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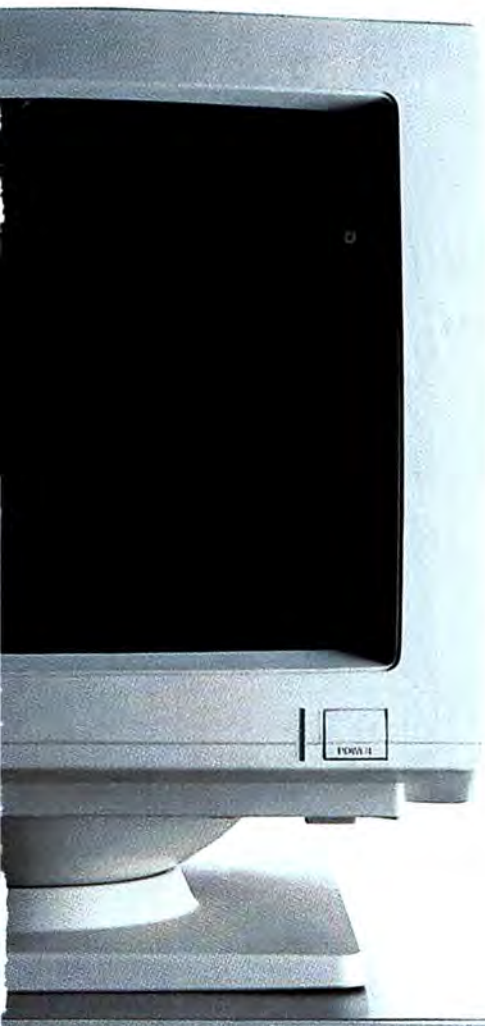

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*Performance Enhancements: Within the first megabyte of memory 128 KB (316SX, 316LT and 210), 384 KB (325) of memory is reserved for use by the system to enhance performance.

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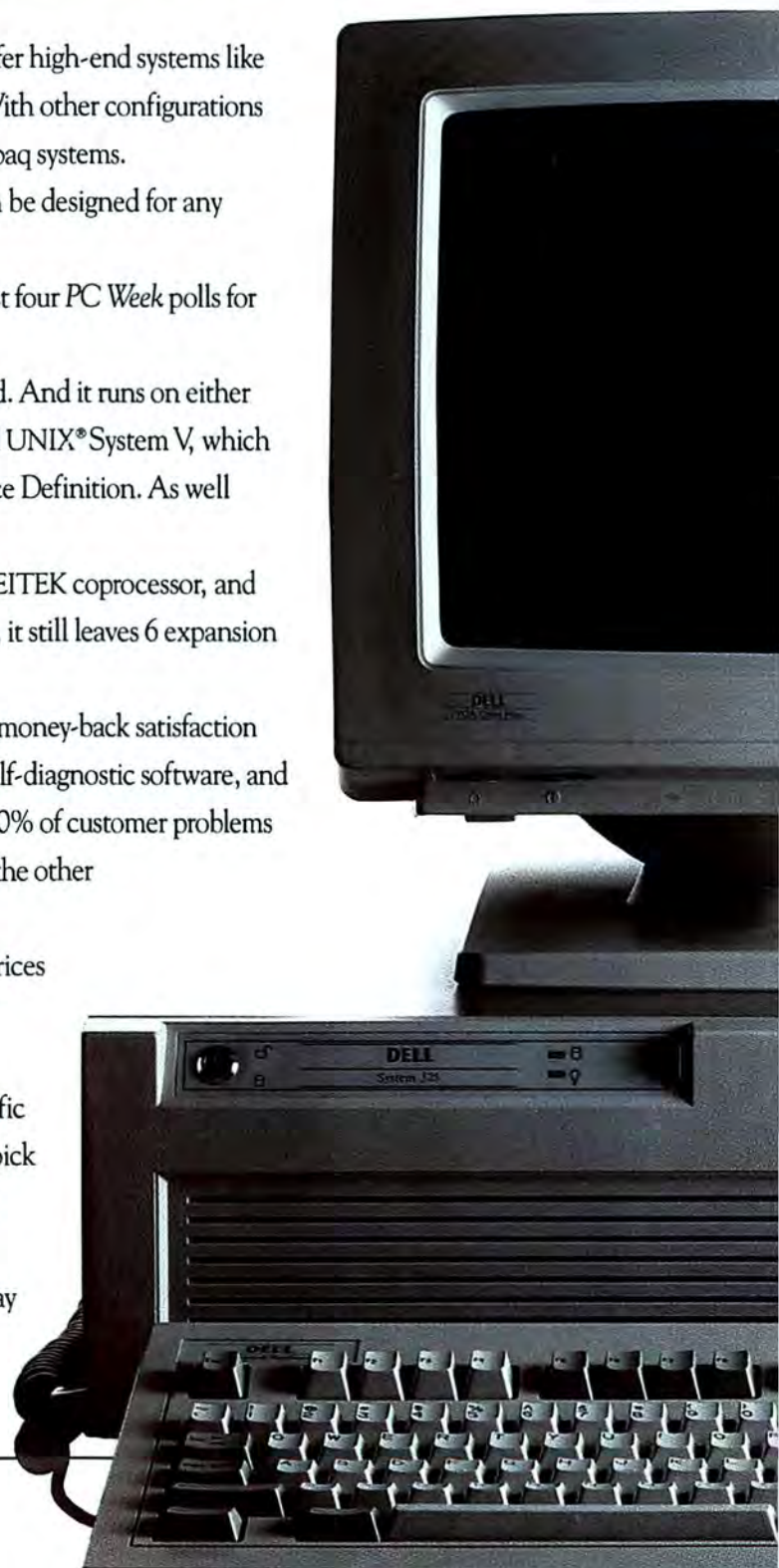

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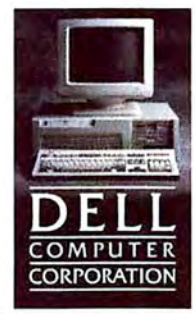

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Circle 74 on reader service card

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Cover photograph by Fred Stimson

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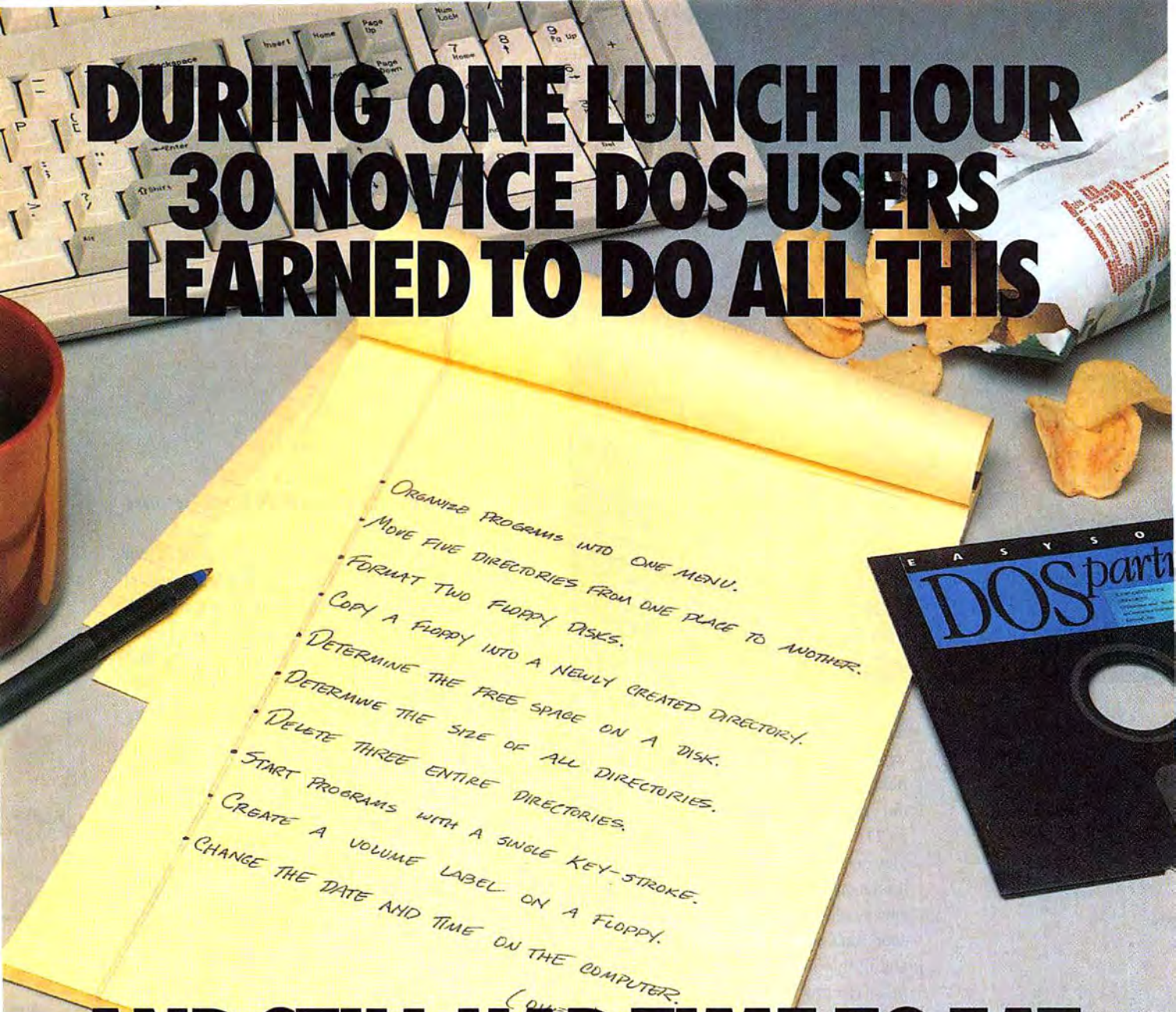

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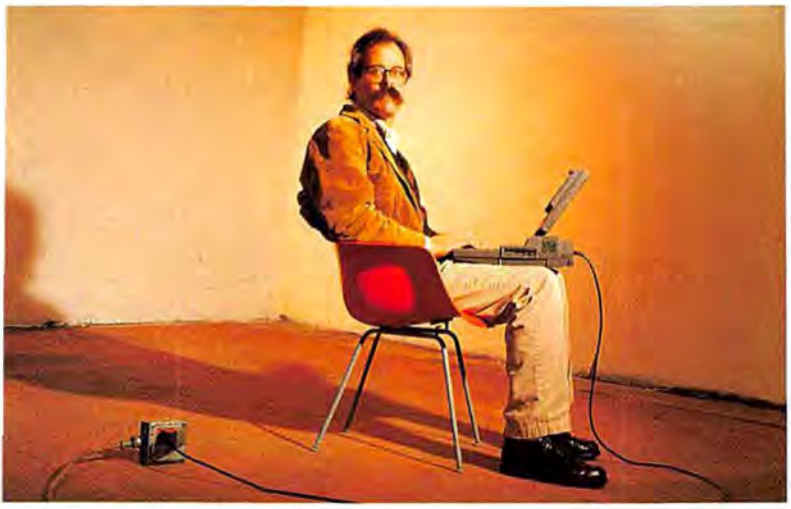


ROBERT CARDIN

John Diebold, author of this month's "First-Class Laptops for Frequent Flyers"

If your next business trip will take you anywhere near the South Pole, heed John Diebold's advice: "Don't bring a laptop with a liquid crystal display." Subzero temperatures and LCD screens, it seems, don't agree. Our reviewer, a marine geophysicist, learned that lesson on one memorable trip aboard a Navy survey plane, mapping an underwater fault zone somewhere south of Tierra del Fuego—and in the process racking up several thousand miles circling over one small patch of ocean.

Even the most confirmed road warrior would have trouble topping that story. For most of us, it only *seems* like we spend half our working lives waiting to be herded onto what one frequent flyer calls "a cattle car with wings." Traveling with a laptop can turn those lost hours into productive ones. But as every business traveler knows, lugging a laptop around involves trading one set of frustrations for another.

Diebold, whose home base is Columbia University's Lamont-Doherty Geological Observatory, spends up to two months a year in the field. The serious number-crunching is reserved for a mainframe back at the lab; for field work, a light, fast portable PC is essential. Thankfully, Diebold reports in this month's roundup of systems-to-go, the current crop of battery-powered 286 laptops is up to the challenge.

As long as you can live with shades of gray, VGA and double-scan CGA displays are first-rate choices. Compaq has pioneered incredibly small, light, and fast storage options, including a pair of hard disks and an ultrathin standard-format floppy drive. The result? Today's laptops need not be much larger than a downsized keyboard.

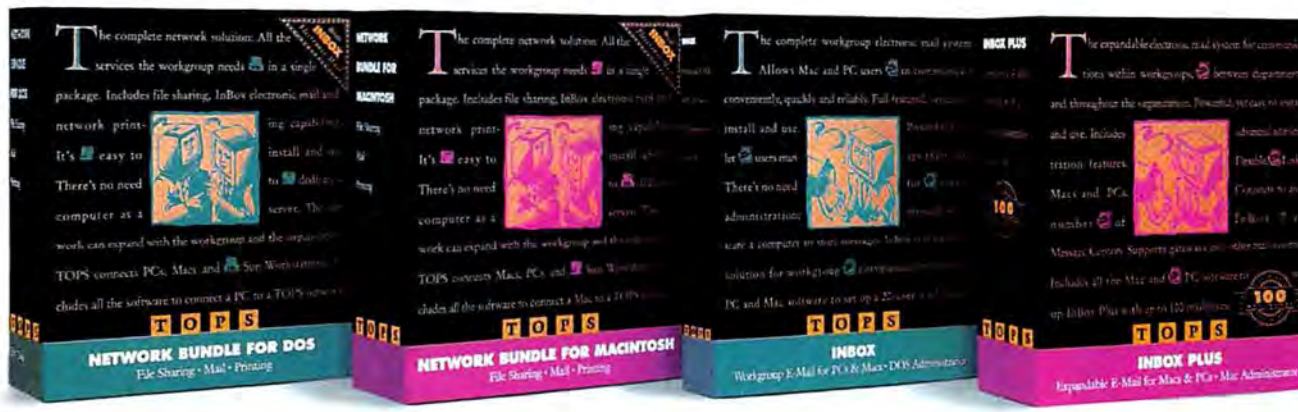
All other things being equal, Diebold argues, it's battery life that separates the contenders from the also-rans. But determining how long a battery pack will hold up in the real world is no mean feat, he says. "First, each machine must be tested exactly the same way, with identical patterns of CPU, disk, and display use. Another complication is that each new battery pack has to be deep-cycled a few times before consistent results are achieved. And since there are two levels of testing—'normal' use and 'power-saving options on'—all this takes a fair amount of time and bookkeeping."

So far, no one's managed to build a full-strength laptop with enough battery power to keep working nonstop, coast to coast. But given recent advances in laptop design, it's probably only a matter of time. Now, if someone can just come up with an LCD screen that works when it's 20 below.... ●

Ed Bott

Ed Bott
Managing Editor

Four reasons why 1990 will be the year of the workgroup.



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August 1989
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Circle 75 on reader service card

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Circle 6 on reader service card

Mike Hogan

SX Gets a Boost

20-MHz Version of 386SX Debuts as SX Machines Reach One-Sixth of Retail PC Sales

Continuing to push its 386SX chip as the entry-level PC standard, Intel will begin shipping a 20-MHz version in April. Up to 40 percent faster than the 16-MHz model when accompanied by a memory cache controller, the new chip is roughly twice the price—$125 each in volume. Intel also plans a low-power version tailored for laptops. The chip maker expects to sell the 16-MHz SX for years, but figures the 20-MHz DX version of the 386 chip will be elbowed aside. (The DX provides a 32-bit external data bus rather than the SX's 16-bit bus; both have 32-bit internal processing.) Already, the original 16-MHz 386 "has sort of died a natural death," reports Jim Chapman, marketing manager for the chip line. The SX has shown the "most significant volume ramp in the history of Intel microprocessors," he adds. StoreBoard reports that SX-based PCs climbed from below 4 percent to 17 percent of all IBM-compatible retail sales last year and now easily surpass Macintosh shipments. Marketing a 20-MHz SX is "a very natural move," says Michael Slater, editor of *Microprocessor Report* in Palo Alto, California. He speculates that Intel may make another SX that could be dropped directly into a 286 socket: "With 20 million 286 systems out there, that certainly looks like an appealing solution." Chapman declined to comment.

Toshiba Challenges Compaq

System Maker Introduces Laptops With Better Screens and Keyboards

Toshiba America has rounded out its ultralight offerings with two models that compete head-on with laptops from Compaq. Toshiba's 6-pound, $2699 T1000XE is virtually identical to the $1699 T1000SE introduced in December, except that it includes a 25ms 20MB hard drive rather than an internal floppy. Aimed at the traveling professional or salesperson who needs more memory than T1000SE customers do, it has DOS and the *LapLink* serial transfer program in ROM and 1MB of memory expandable to 3MB. A 1.44MB external floppy is a $249 option. Toshiba research shows that users would rather have the T1000XE's larger screen with 640 by 400 resolution and a better keyboard than have both a floppy and a 20MB hard disk as in Compaq's LTE, says Tom Sherrard, director of PC marketing. Toshiba assumes most laptop customers already have a desktop PC. The T1200XE, on the other hand, is offered as a desktop PC alternative like Compaq's SLT 286. Only an inch deeper and 1.5 pounds heavier than T1000 models, the $3999 T1200XE includes a 12-MHz 80C286, 1MB of RAM expandable to 5MB, and both a 1.44MB floppy and a 20MB hard disk. It challenges Compaq on the basis of memory, the keyboard, and a double-scan CGA display that is larger and brighter than the T1000XE's. A 16-bit expansion bus is being readied for both Toshiba systems to provide the card and disk add-in capabilities of the SLT 286's docking station.

Businessland Changes Course

As Earnings Fall, Premier Corporate Reseller Overhauls the Way It Does Business

Stung by cutthroat price competition and weighed down by the costliest retail outlets in the industry, Businessland is laying off up to 270 of its 3900 employees and closing most of its 90 or so Businessland storefronts in favor of by-appointment-only showrooms. The company doesn't need high retail overhead, explains a Businessland spokesperson, since 80 percent of revenues come from outbound sales of complicated systems to corporate clients. The showrooms will be more conducive to uninterrupted demonstrations and customer training, she maintains. The first branch offices opened in January—two in Los Angeles and one each in San Jose, Atlanta, Phoenix, and Washington, D.C. Businessland expects to recover lost walk-in trade by expanding the 22 outlets of its ComputerCraft subsidiary into the 50 U.S. major metropolitan markets. Staff cuts, facilitated by automation of distribution and information services, will be mostly administrative and won't affect Businessland's ratio of 1.2 technical support members to each salesperson. The layoffs were precipitated by the fall in Businessland's net operating income from 6 percent a year ago to 2.5 percent in the quarter ended September 30. Earnings were nearly halved to $4.3 million on revenues of $315.8 million. The loss of Compaq's computer line didn't help, but Businessland's spokesperson says that severe price competition is the main reason for the earnings slump.

R:base 3.0 Appears

Targeting Paradox, Microrim Adds Pull-Down Menus and Full SQL Support

Microrim has completely rewritten *R:base*, hoping to catapult it back into the role of second-best-selling data base manager. Scheduled to ship by April, *R:base 3.0* features a new interface with pulldown menus and query by example (QBE) similar to Borland's *Paradox*—the package that shot past it on best-seller charts last year. Unlike *Paradox, R:base 3.0* lets users update their data bases by editing QBE answer tables, reports Product Marketing Director Mickey Friedman. The rewrite also gives *R:base* a 100 percent ANSI-compatible SQL and better positions it to work with Microrim's upcoming *Vanguard* SQL server. But developers will need to run existing *R:base* data bases and applications through a conversion routine, making some programming adjustments for applications. *R:base 3.0* costs $725 for up to three users, $995 for a six-pack, $2995 for unlimited network use, and $25 per customer for unlimited run-time versions. An *R:base* compiler update and *Vanguard* will ship later this year. While International Data Corporation analyst Nancy McSharry lauds the new interface, she adds, "They'll maintain their 6 percent share, but I don't know if Microrim knows how to play the marketing game well enough to expand." Plagued by executive turnover, the Redmond, Washington, firm lost President David Hull in December; his responsibilities were assumed by founder and chairman Wayne Erickson.

SQL Alliance Shifts

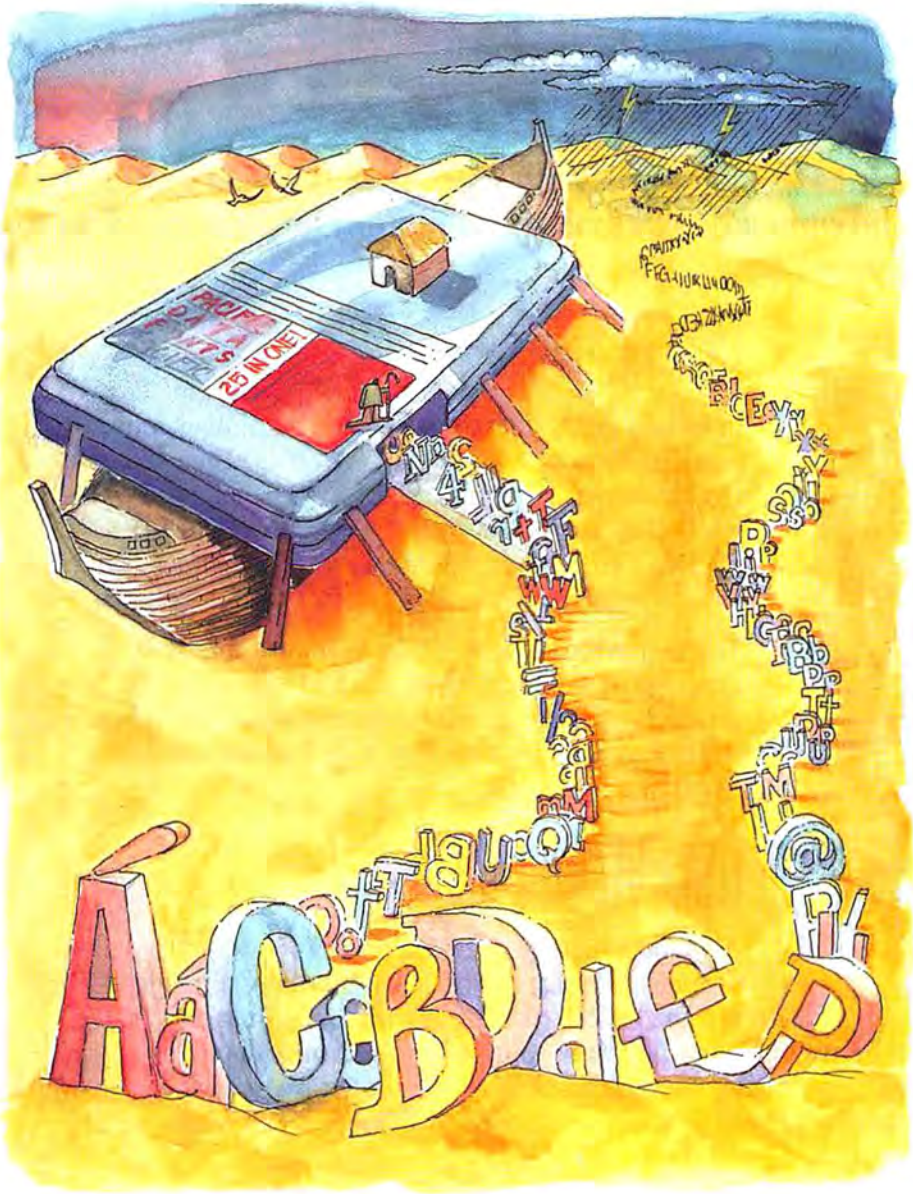
Ashton-Tate Loses Retail Exclusive on SQL Server, Considers Other Options

Still trying to get the new version of *dBASE IV* out the door, Ashton-Tate has lost its exclusive retail marketing rights to, and codevelopment role for, *SQL Server*, which had been a joint project with Microsoft and Sybase. Microsoft, which retains OEM marketing rights, is now free to offer the data base engine to any front-end manufacturers. Ashton-Tate chairman Ed Esber, Jr., says his company still plans to offer an *SQL Server* version of *dBASE IV 1.1* sometime after it ships *IV*'s debugged update. He adds that his company will take the opportunity to make its front end compatible with SQL engines from Novell, IBM, and even bitter rival Oracle. *Soft-letter* publisher Jeffrey Tarter doubts that a generic approach will suffice for high-performance, enterprise-wide data management. "They canned their in-house server effort and lost external technology that they were depending upon," Tarter notes. "They're really starting from ground zero, and that is an appalling situation for a data base company." But Kidder Peabody vice president Bahar Gidwani doesn't expect the loss to seriously damage the company. Gidwani estimates that Ashton-Tate lost only $2 million in the fourth quarter on continuing operations, compared with $14 million in the third, and expects it to make as much as $6 million in the first quarter of 1990. Ashton-Tate will accelerate its SQL development work both in-house and through Interbase, a firm in which it holds a 51 percent share, says Esber.

Curing Wyse's Woes

Taiwanese Group Acquires PC-and-Terminal Manufacturer

Financially troubled Wyse Technology has agreed to be purchased by a group of offshore investors that includes the Taiwanese government and Mitac International. International Data Corporation analyst Bruce Stephen believes that Mitac's participation could result in a melding of the Wyse and Mitac product lines, with Mitac's laptops and MCA and EISA desktop PCs complementing Wyse's passive-backplane–equipped ISA systems. However, both companies deny any immediate plans for merged product lines. Spokesperson Shelley Potter says that Wyse is moving ahead with its new multiprocessing systems and other products under development. The Taiwanese government's first acquisition of a public U.S. PC manufacturer, the purchase is viewed by investors as a quick way to create a worldwide market for Taiwanese PCs. Mitac has only a 12 percent share, but it's the only investor with PC experience and will "give direction to Wyse's PC line," says Mitac spokesperson Shawn Leuthold. "PCs have historically been the most unprofitable piece of Wyse's business, and that's what Mitac does best." Wyse's Businessland distribution agreement is unaffected by the buyout. Stephen characterizes the acquisition as a rescue of Wyse from its "financial tailspin" and good news for Wyse customers. "It lets them know there will be continued availability and support for Wyse products," he says. Wyse lost $3.6 million on $119.1 million sales in the quarter ended September 29. ●



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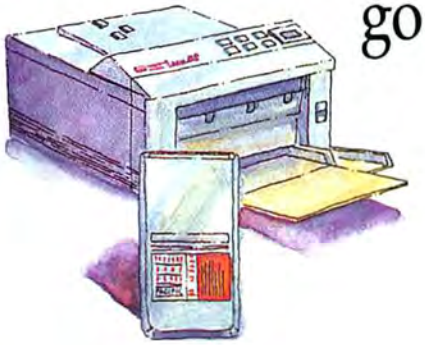

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Circle 223 on reader service card

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Hercules

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Circle 83 on reader service card

FRED STIMSON

Richard Landry

PC Visions: Top Down or Bottom Up?

Who's going to buy the new generation of work-group software?

In smart companies, the answer is—you.

Pundits claim the future belongs to high-powered PC networks and work-group software, but nobody seems to know how this new technology's going to be bought and sold. Will executives and MIS heads in large companies impose a top-down vision on their organizations, leaving frontline managers and staff to pick up the pieces? Or will PCs continue to drive corporations from the bottom up, even as they get linked into enterprise-wide information systems? Will the new PC technology meet the needs of small business too, or will the economy's most lively sector end up stuck with yesterday's solutions?

Users have a right to ask such questions, since they ultimately pay the freight every time PC technology advances. But vendors also have an obvious stake in the answers. Firms like Businessland that specialize in high-tech, support-heavy solutions have a hard time competing with low-cost, low-support suppliers (see *Top of the News* in this issue). Meanwhile, companies like Microsoft and WordPerfect are having a field day selling off-the-shelf packages that they can support effectively with manuals, disk-based tutorials, and toll-free technical help lines.

When it comes to network software that increases the power of an entire work group, which of the two models will prevail? Does more sophistication translate into more centralized planning of software purchases with strategic business goals in mind? Or can network software be sold like most PC software is today—right to the people who need and use it the most?

Top-Down Marketing: Lotus Notes Lotus cast a clear vote in favor of top-down buying recently when it announced the new sales strategy for its groupware package *Notes*. If you were around in 1988 when Lotus first announced *Notes*, you might remember the grass-roots excitement it was expected to create. *Notes* would be adopted first by handfuls of users looking for something more from their network than E-mail and printer sharing; pretty soon, the innovative applications they devised would draw the whole work group into using the product. Later, Lotus spun out pretty much the same yarn for *Agenda*, its personal information manager.

Now Lotus plans on selling a 100-node *Notes* package directly to corporations for a cool $62,000, and Lotus chief Jim Manzi promises to field an army of "application engineers" to support it and *Agenda* too. Why? For one thing, Lotus's experience with specialized packages like *Agenda* suggests that users need more than just an innovative piece of software to be productive. Helping people tap the power of a new class of software can be a complex and expensive undertaking, says Manzi, so it's only natural for Lotus to apply its effort to big accounts, where the biggest return is possible. That means top-down marketing in spades, at least until the product becomes widely accepted.

Will Lotus ever take *Notes* down to the department or small-business level, where information-sharing problems can be complex but where a $62K price tag is prohibitive? It depends, says Manzi. "We'd love to make it successful there if we can figure out the right distribution channel. But first we need to make it successful."

(continues)

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- MS DOS (choose 3.3 or 4.01)
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- 1.2 MB or 1.44 MB Floppy Drive
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- MS DOS (choose 3.3 or 4.01)
- Integrated Floppy Controller
- Memory Management Software

Base system:	$1,263
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20 MB VGA color system	$2,193
40 MB VGA mono system	$1,974
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Circle 321 on reader service card

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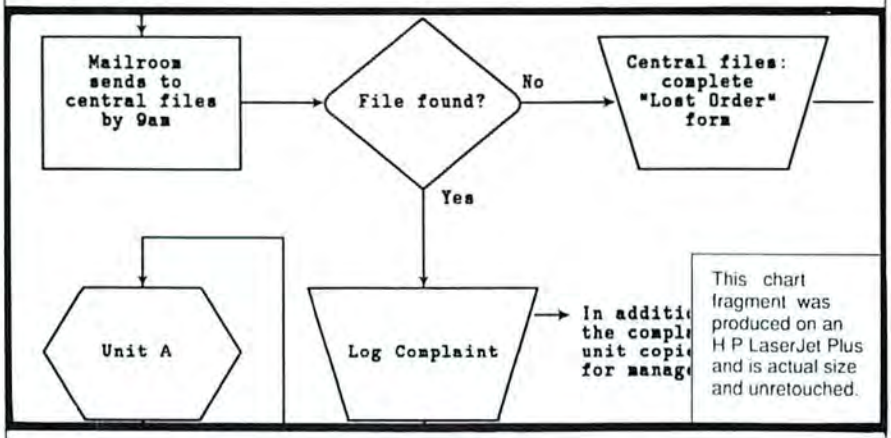

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Circle 79 on reader service card

The New PC Vision: Bottom Up? Not everyone agrees that top-down marketing is the key to launching the next generation of network applications. Compaq marketing head Mike Swavely, for example, says the price/performance of the company's new Systempro network server will appeal to technical and executive types as a low-cost alternative to a minicomputer in a department or small company (see the preview "Compaq's Double-Barreled Server" in this issue). But the impetus for buying one won't necessarily come from above. Instead, it will come from managers and staff who want to extend vital company information to every member of the work group, making them all faster, smarter decision makers.

Group productivity software has been around for a long time in products like IBM's *PROFS* and DEC's *All-In-One*, WordPerfect exec Pete Peterson noted recently. But more often than not, those mainframe- and minicomputer-based packages served only to help members of the company elite communicate with each other. Today's work group software has to link all members of an enterprise, he said, so it must appeal to them in the way that popular PC applications usually do—with a combination of simplicity and power that makes them want to buy it and use it a lot. If Peterson's right, then *bottom up* will become the software development watchword of the nineties.

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; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

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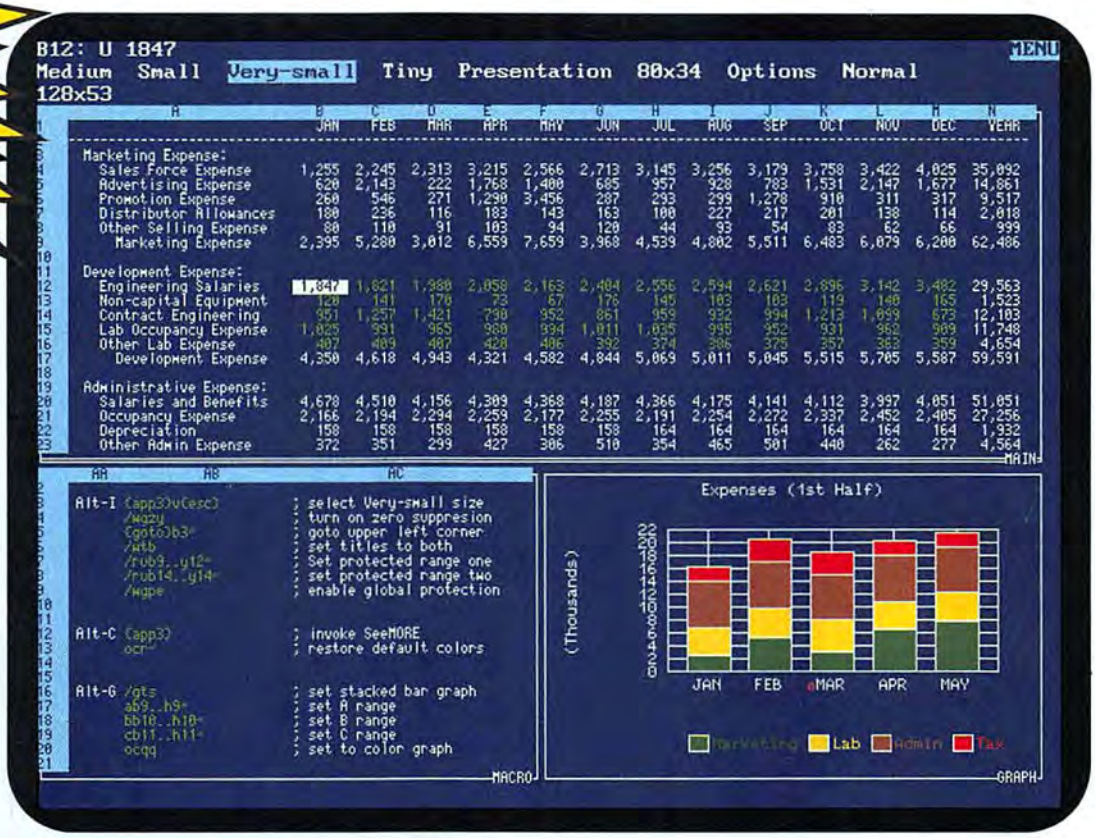

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Multiple Windows.

SeeMORE Version 2 provides a complete windowing system for 1-2-3. Create as many tiled or overlapping windows as you like including multiple graph windows!

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SeeMORE works with 1-2-3 Release 2, 2.01 and 2.2 and Symphony 1.1, 1.2, and 2 on any PC equipped with a standard graphics adapter. (CGA, EGA, VGA, MCGA, Hercules, 3270PC, AT&T 6300, or Compaq/Toshiba gas plasma.) Join noted columnist Jim Seymour who says, "I use SeeMORE almost constantly."

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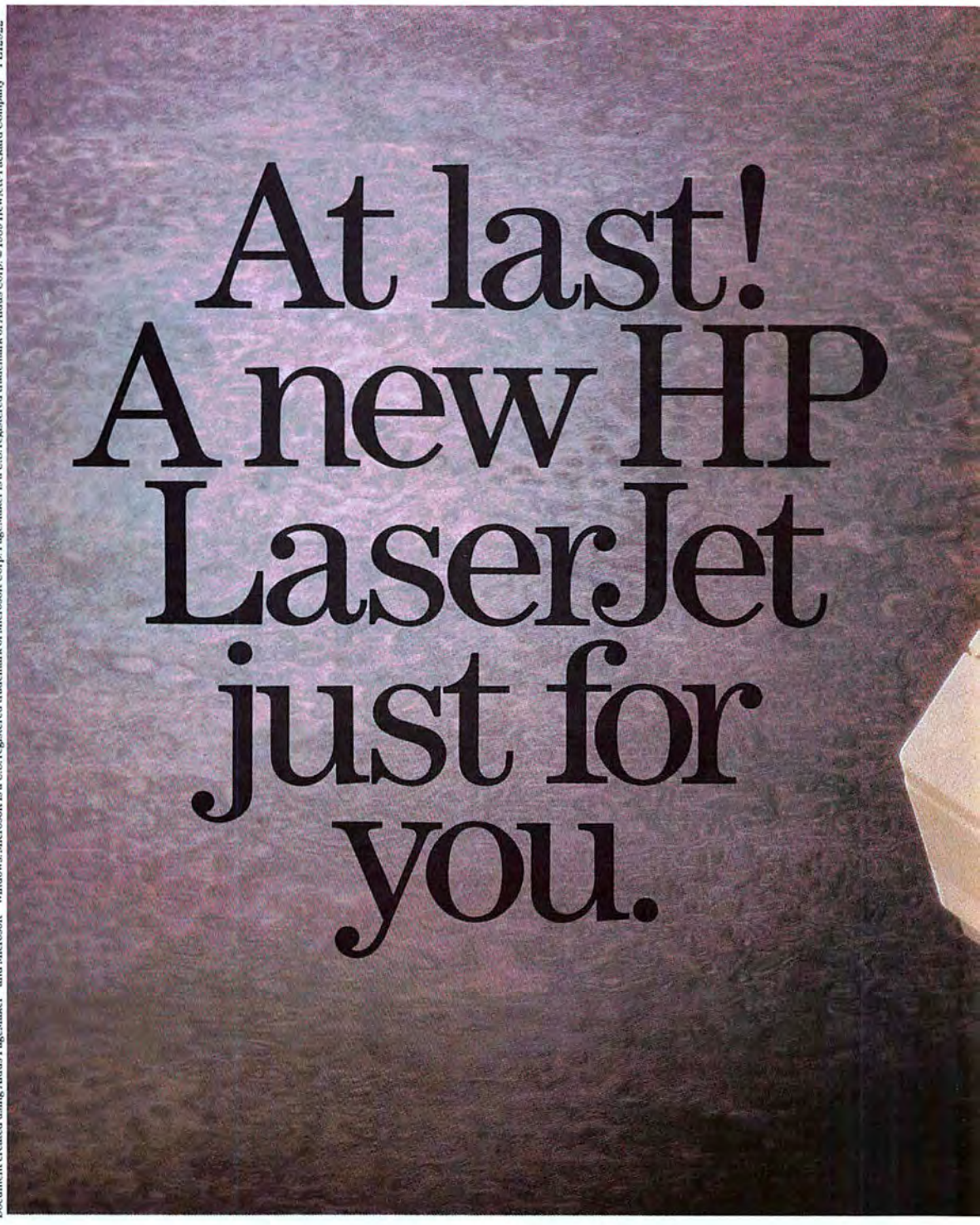

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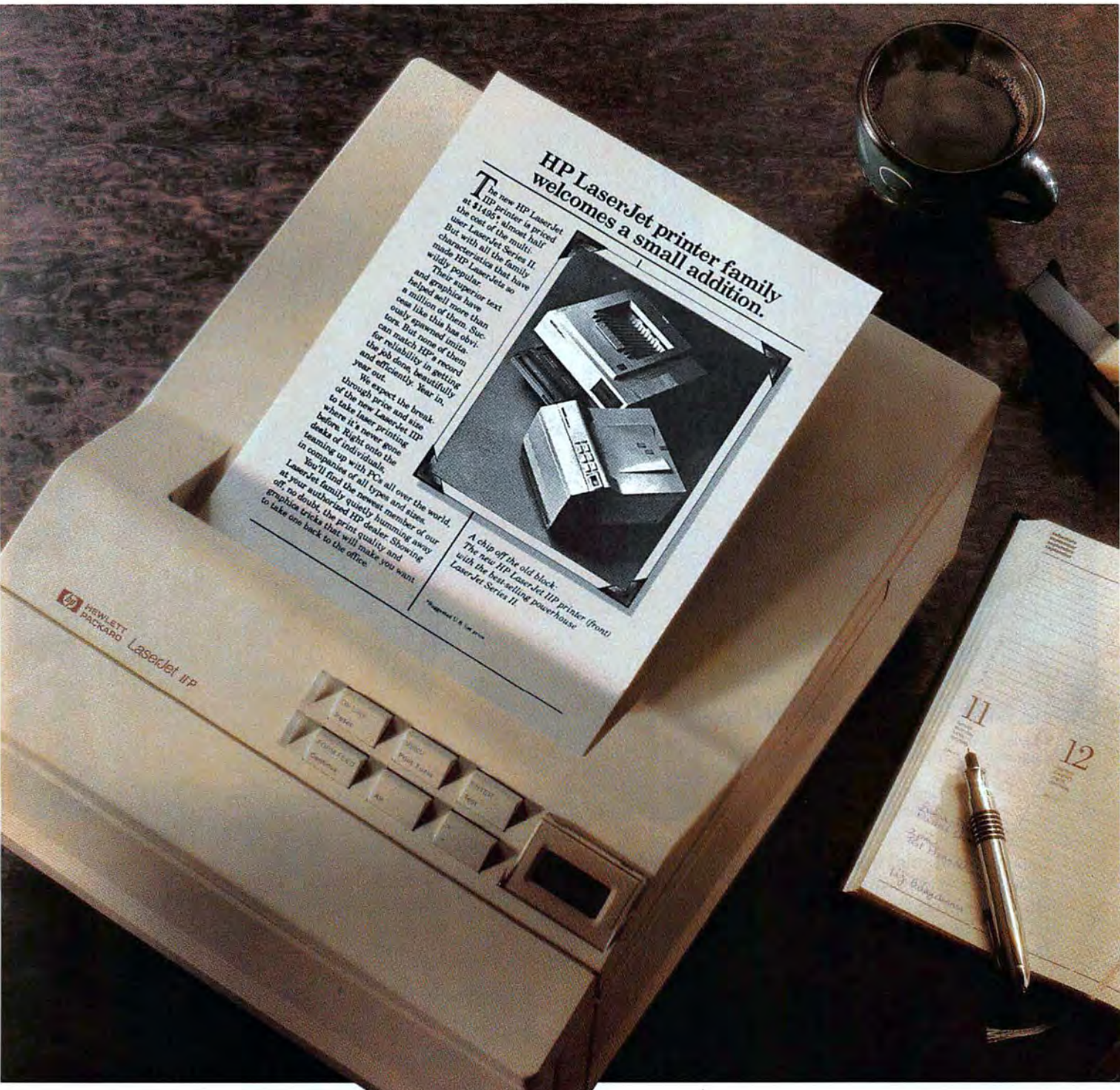
At only $1495*, it's got your name on it.

The HP LaserJet printer family has expanded—in a small way.

The new HP LaserJet IIP (as in Personal) fits right on your desk. And, with a price almost half of the multi-user LaserJet Series II,* into most budgets.

Its simple front panel gives you easy, push-button control over the menu, the 14 internal fonts, form feed and other functions. It handles four different paper sizes: letter, legal, executive and A4, as well as envelopes. In portrait

*Suggested U.S. list prices: LaserJet IIP $1495; LaserJet Series II $2695. Dealer prices vary.



The new HP LaserJet IIP printer.

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The 512K standard memory is upgradable to 4.5 Mbytes for more complex graphics and publishing programs.

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10/89

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LETTERS

Reactions and responses from the PC World community

JEFF BERLIN

One Man's Wish

Richard Landry asks [December 1989] what the rest of us wish for in 1990. I wish the PC industry would give a passing thought to Strippy's Law of the Finite Market:

1. At any given time, for any given product, there is an exact, finite, but indeterminable number of people willing to buy that product.

2. All the hype in creation will not increase that number.

3. Every unit sold subtracts one from that number.

4. The only way to escape this decreasing market is to come up with a better and truly different product.

5. Generally, such a product comes from a better and truly different company.

Robert Strippy
Charlottesville, Virginia

ANTHONY RUSSO

Carpal Tunnel Vision

Kudos to *Consumer Watch* for addressing the growing blight of repetitive-strain injuries [October 1989]. With any luck and good sense, your readers will pay attention to the preventive steps you outlined. The magnitude of the injuries suffered from using computer keyboards is mind-boggling—people with carpal tunnel syndrome can lose the ability to open doors or tie their shoes. You mentioned the danger to clerical workers, but this affliction can strike journalists, directory assistance operators, PR people, and anyone else who uses a keyboard. Let's hope that more attention is paid not just to productivity, but also to safe working practices.

Mary Ann Merrill
Mountain View, California

No More ARC Wars

The ongoing debate over which shareware data compression utility is the best [*Letters*, December 1989] seems to be missing the point. When I need a balance of speed, size, portability, and operational flexibility, I use Rahul Dhesi's *ZOO*. When size is more important than speed, I use Yoshi's *LHARC*. And when I need *ZIP* or *ARC* file compatibility, I use Phil Katz's *PKZIP* or Thom Henderson's *ARC*, respectively. Rabid devotion to a single utility to the exclusion of all others is foolish.

Rich Levin
SYSOP
Philadelphia's Mother Board BBS
Philadelphia, Pennsylvania

Any Support for This Column?

I have read Stewart Alsop's *Windows Journal* with dismay for the last few months. The straw that broke the camel's back was Alsop's discussion of PIMs [personal information managers] in the December 1989 issue. *DeskTop Set* doesn't attempt or claim to be a full-blown PIM any more than *SideKick* does. Alsop also ignores *Pack Rat*'s strengths in group scheduling and communications and describes the program as inflexible. If the users my company has trained have any complaint, it is that *Pack Rat* is *too* flexible. I urge you to find someone less subjective and more informed to write about developments in the *Windows* arena.

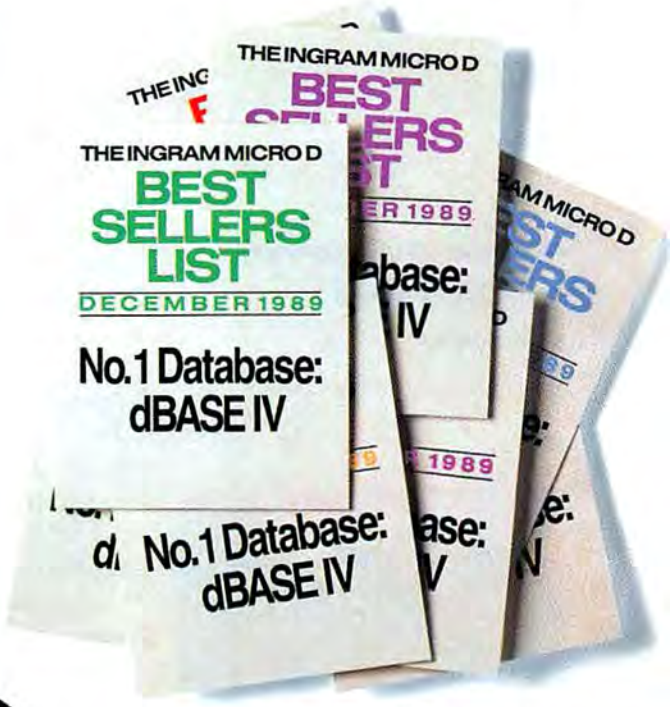
Leon Chalnick
Palos Verdes Peninsula, California

(continues)

With dBASE IV,

dBASE IV rated Four Stars in Software Digest's exhaustive review, after taking top ratings in nearly every category, including Best Overall.

In 1989, PC World readers overwhelmingly voted dBASE IV the best database, marking the 7th year that dBASE software has placed first.



dBASE IV (along with dBASE III PLUS) dominated database sales on the Ingram Micro D chart for all 12 months of 1989.

When it comes to database software, it seems like everyone's got an opinion.

But we think you'll agree that the opinions that count most are those of customers themselves.

Who—after months of working with dBASE IV®—voted it the Number One database in publications like InfoWorld and PC World.

Of course, you should pay attention to the opinions of experts as well.

Like the independent panel at Software Digest that rated dBASE IV the most useful and powerful dBASE®-compatible database. And the team at Personal Computing who rated dBASE IV one of the top Microcomputer Databases in March 1989.

In Fact, The Whole World's A Critic.

And let's not forget user-voted awards from all over Europe, where dBASE IV has sparked a 50% increase in dBASE product sales over the previous year, making it the industry standard overnight.

In fact, dBASE IV is the undisputed best selling database all over the world.

In the United States, it's been a leader on the sales lists of major distributors like Ingram Micro D and Softsel. And consistently among the top selling software products listed by Software Magazine.

Let's Review The Reasons Behind The Ratings.

One reason dBASE IV rates so highly is that it gives users quick and easy access to data—without writing a single line of programming code.

Its menu-driven Control Center offers point-and-shoot simplicity. While also letting you access What-You-See-Is-What-You-Get Design Tools that will increase your productivity.

Tools like the Database Designer to create databases by filling in the blanks.

The Forms Designer to create custom forms as easily as drawing them on paper.

The Report Designer for reports automatically

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everyone's a critic.

After rigorous technical evaluation, Personal Computing rated dBASE IV one of the Top Microcomputer Databases in March 1989.

In March of 1989, the highly influential readers of InfoWorld voted dBASE IV the best relational DBMS of 1988.

In 1989, dBASE IV was the number one selling database for 20 out of 25 of Softsel's twice monthly HOT LIST.

adapted to your database. Or for quickly and easily creating your own custom reports.

The Query By Example Designer for quick answers, even with data from multiple databases.

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dBASE IV Generates More Than Praise.

dBASE IV also generates simple turnkey applications —even for novice users. By using the Applications Generator, all your custom databases, forms, reports and labels can be quickly consolidated into a single, easy-to-use application.

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Planner Plaudits

Your October 1989 review of *1-2-3* release 3 ["Power Spreadsheets: A New Standard"] left the clear impression that this product is carving out new territories in external data base management and manipulation using a spreadsheet. Let's set the record straight: *VP-Planner* and *VP-Planner Plus* blazed this trail long ago. The current version of *VP-Planner Plus* offers far more data base power in 640K than *1-2-3* users will see for a long, long time. And there's a new version on the way.

Jim Eikner
Austin, Texas

Quicken Quibble

Your November 1989 *Product Outlook* item claims *Quicken 3* is capable of exporting to ASCII and *1-2-3*. Unfortunately, the dollar amounts are formatted with commas and cannot be directly imported into *1-2-3*, *dBASE*, or other programs. Users must purchase an additional $19.99 module from Intuit in order to import *Quicken 3* data into a *1-2-3* spreadsheet.

James McCullen
Cranford, New Jersey

An Intuit spokesperson confirms that the Quicken *Transfer utility, sold separately, automatically converts* Quicken *files into* 1-2-3 *format, retaining all the original formatting and formulas. However, it is possible to use* 1-2-3*'s Format Numbers menu to modify a directly imported* Quicken 3 *file. —Ed.*

Exploring the New World

My copy of *Webster's NewWorld Writer II* does things that your October 1989 review said were impossible. The Features Evaluation table indicates the program can't jump to a specific page, temporarily exit to DOS, or support a mouse. The mouse capability is undocumented, but my Logitech mouse works well with *Webster's*. DOS is accessible from the menu line, and users can jump not only to a page but also to any line in a page.

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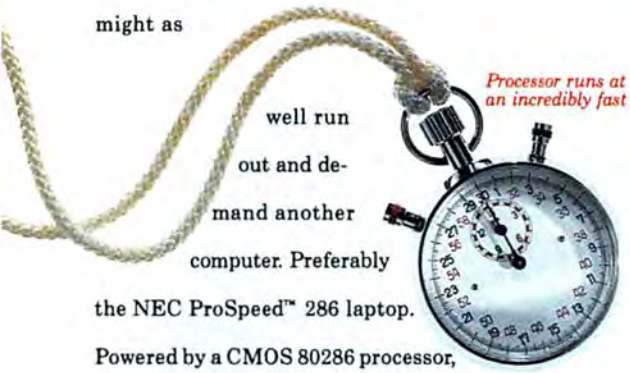
An awesome display of power.

Undoubtedly, the most important element of a laptop computer is power. After all, if you can't run demanding applications, you might as well run out and demand another computer. Preferably the NEC ProSpeed™ 286 laptop.



Processor runs at an incredibly fast 16MHz.

Powered by a CMOS 80286 processor, running at a blinding 16MHz, the ProSpeed can accommodate the most sophisticated applications. It's equipped with one megabyte of memory that's expandable to five. And it comes with either 20 or 40 megabyte high-speed hard disk drives. There's even a model with a 100 megabyte drive for data-intensive applications. Now, all this makes a powerful statement for the ProSpeed 286. But perhaps the most powerful statement is this: quite simply, it's the most powerful 286 laptop you can buy.

High-speed hard disk— up to 100 MB.

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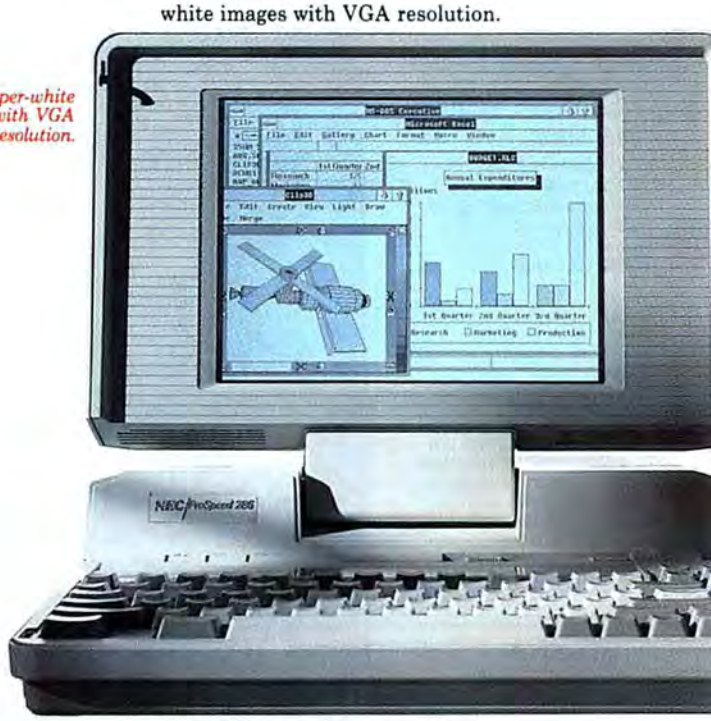
C&C Computers and Communications

An awesome power of display.

Undoubtedly, the most important element of a laptop computer is its screen. After all, if what you're looking at isn't very clear, then clearly you need another computer. Preferably the NEC ProSpeed 286. Engineered with an advanced screen technology, the ProSpeed gives you crisp, bright, black-and-white images with VGA resolution.

Paper-white screen with VGA resolution.



And with more and more people moving towards advanced graphics-oriented applications, the case for the NEC ProSpeed 286 becomes even clearer.

ProSpeed™ 286

Call 1-800-826-2255 for literature and 1-800-FONE-NEC for technical advice. In Canada, call 1-800-268-3997.

NEC

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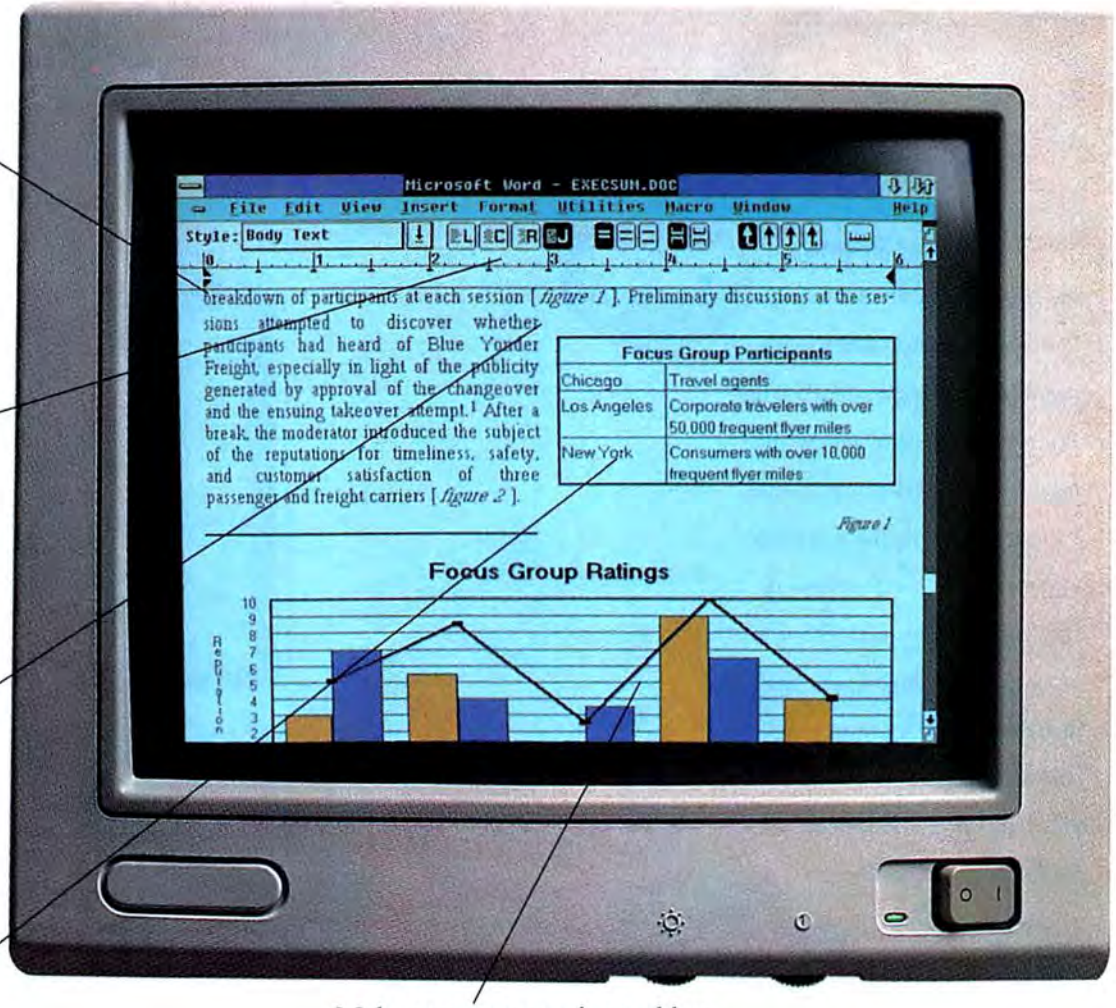
Word processing will two pages than it ha

What you see is what you get.
Also known as WYSIWYG, this on-screen editing feature lets you see exactly what your changes are the instant you make them.

Location, location, location.
Use the ruler to make everything flush left, or right. Or centered. Single-spaced. Double-spaced. Anywhere and any way you want it. With one simple click.

It's a wrap.
You can move or resize any positioned object, such as a chart or table, and watch the text automatically wrap the whole thing into a nice, neat package.

We've got tables covered.
This feature makes creating a table as easy as creating a spreadsheet, sending the TAB key the way of carbon paper.



Make sure your numbers add up.
Through dynamic data exchange (DDE), any changes made to the original spreadsheet will show up here automatically. It's convenience words can't describe.

Something happens the first time you look at new Microsoft® Word for Windows.™

You stare. A conscious close of the mouth may even be necessary.

Don't worry. It's a standard reaction. Because when it comes to word processing on a PC, Word for Windows isn't like anything you have ever seen before.

In creating it, we took the collective experience of producing the two leading word processing programs, powerful Word for the PC and the Macintosh.® Consequently, every level of word processing, from the quick memo to the complex document, becomes very easy and simple to do. Downright elementary, actually.

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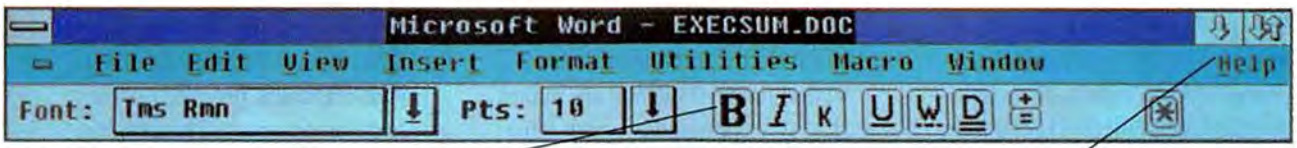
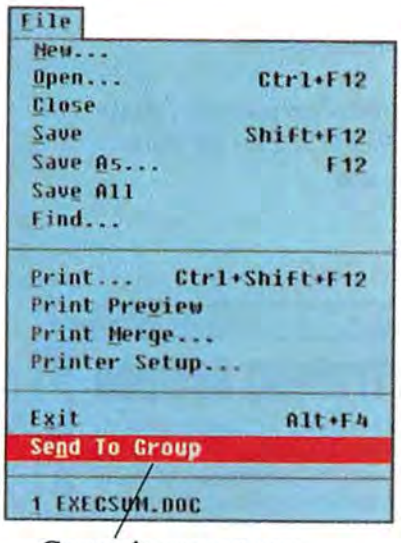
evolve more on these s in the last ten years.



See, point, do.
A liberal collection of icons located on the Ribbon replaces an endless string of commands to let you format characters by eye instead of by memory.

Help wanted.
Word for Windows context-sensitive, on-line help gets you up and running quickly. And keeps you there.



Customize your menu to serve you.
You can create your own time-saving menu commands to speed up your daily routine. And we've combined sophisticated features like macros, Styles and glossaries into Document Templates, bringing task automation to a new level.

Express yourself.
Change everything from the size of your type to the look on your face.

Choose your weapon.
Word for Windows was designed with the mouse in mind, but it can be used equally well with keyboard commands.

strokes. Now you can rely on icons that are instantly understandable. No more prompt this for that to happen. Prompt that for this to happen.

We've even devised a way for Word for Windows to utilize your existing work, by giving it the ability to directly read and write a number of file formats, including DCA, WordPerfect,® WordStar,® Word for the PC and MultiMate.®

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We truly believe that Word for Windows, and the graphical user interface, are the way of the future.

And the future is now.

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I know *Webster's* isn't perfect —it lacks windowing, for example—but if you tally what you get for what it costs, it's a very good product.

Dale Durnell
New York, New York

Perfect Figuring

Power Tip No. 70 [October 1989, page 124] fails to mention that *WordPerfect 5.0* provides a built-in calculator function in the Macros keyboard found on the Conversion disk. Enter Setup mode by pressing <Shift>-<F1>, select Keyboard layout, and choose Macros. Pressing <Ctrl>-C will then pop up a calculator box with on-screen directions.

Joan Golis
Plantation, Florida

Q&A Write-Up

Your October 1989 review of *Q&A Write* overlooked an important feature. The reviewer criticizes the program because fonts must be selected by number instead of name. *Q&A Write* allows users to assign fonts in any order. The personalized selection is then displayed at the bottom of the page by number *and* abbreviated name. This feature makes it easy to remember which fonts you've assigned to your document.

Debbie Longshore
Public Relations Specialist
Symantec Corporation
Cupertino, California

Corrections and Clarifications

The Features Evaluation table in November 1989's roundup review "The Easy Road to Desktop Publishing" contains two errors. The version number of *Publish-It* should have been listed as 1.13. Also, *Springboard Publisher 1.01* can import text from *WordPerfect 5.0* only when the file is saved in *WordPerfect 4.2* format.

Our December 1989 preview of *DrawPerfect* contains a screen shot originally produced using another program. The graphic, provided by WordPerfect Corporation, was created using Micrografx's *Graph Plus 1.3* and later modified in *DrawPerfect*. *PC World* regrets any misunderstanding.

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

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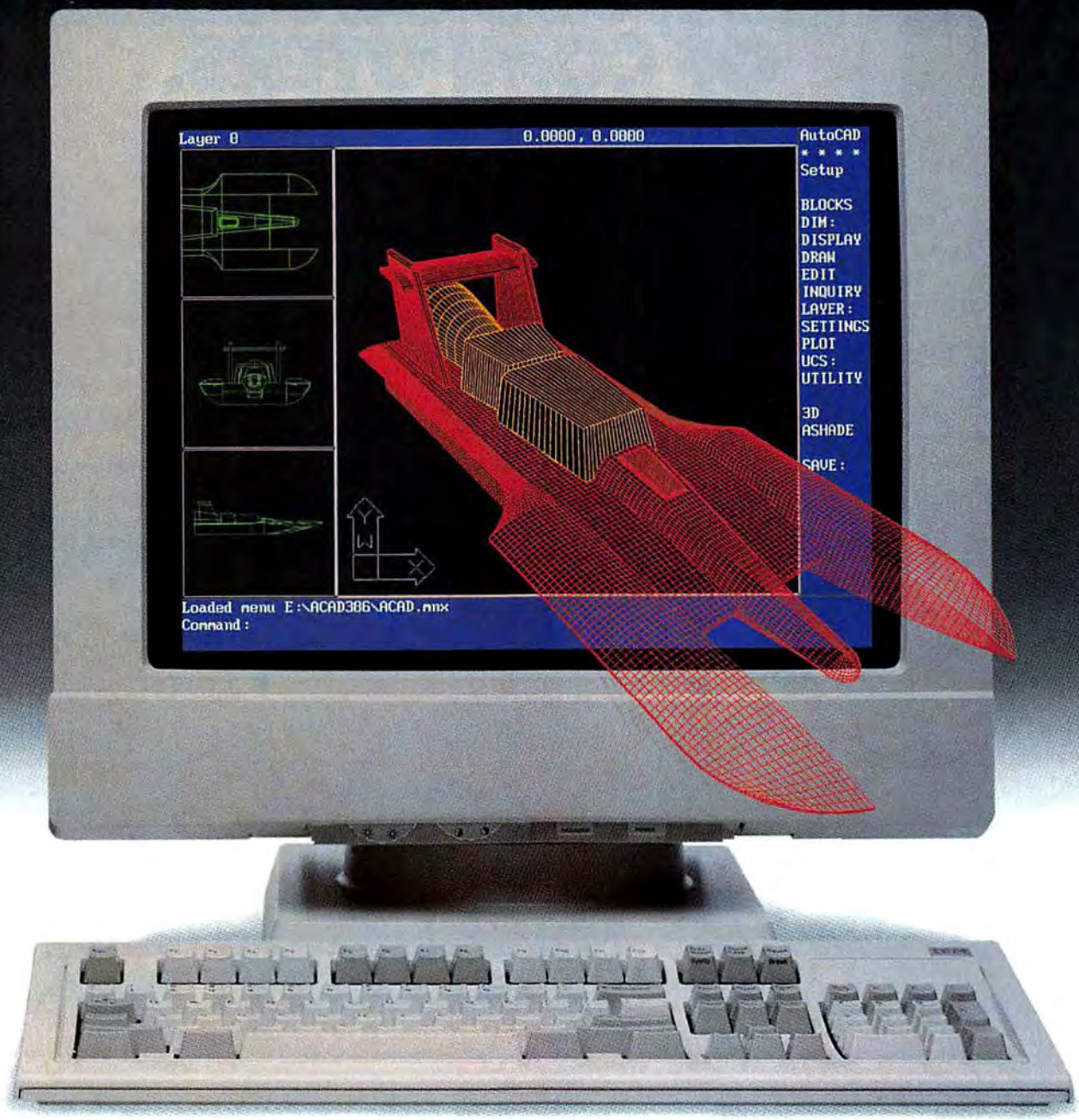

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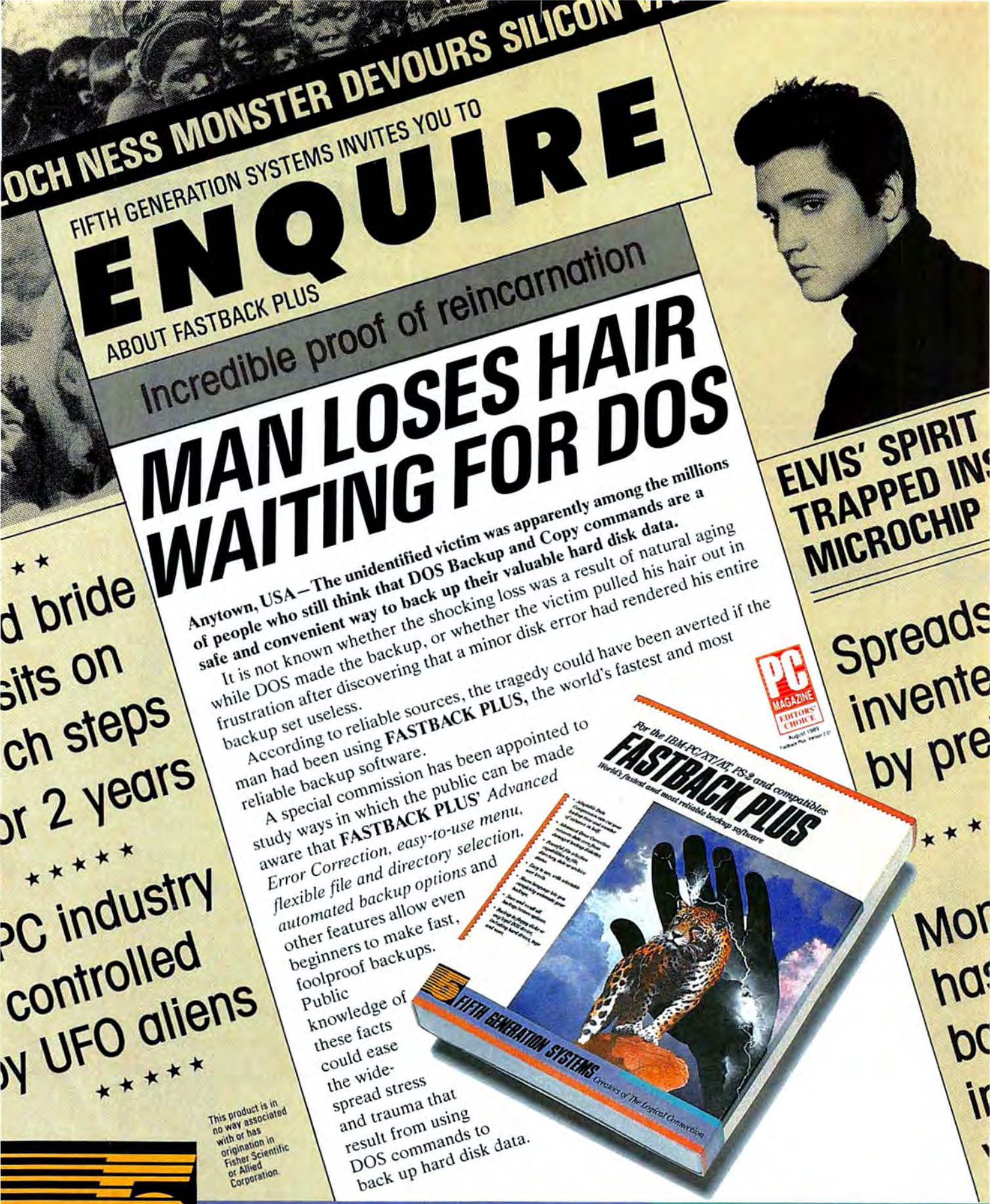
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MAN LOSES HAIR WAITING FOR DOS
Anytown, USA—The unidentified victim was apparently among the millions of people who still think that DOS Backup and Copy commands are a safe and convenient way to back up their valuable hard disk data.
It is not known whether the shocking loss was a result of natural aging while DOS made the backup, or whether the victim pulled his hair out in frustration after discovering that a minor disk error had rendered his entire backup set useless.
According to reliable sources, the tragedy could have been averted if the man had been using FASTBACK PLUS, the world's fastest and most reliable backup software.
A special commission has been appointed to study ways in which the public can be made aware that FASTBACK PLUS' Advanced Error Correction, easy-to-use menu, flexible file and directory selection, automated backup options and other features allow even beginners to make fast, foolproof backups.
Public knowledge of these facts could ease the widespread stress and trauma that result from using DOS commands to back up hard disk data.
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Display and print mathematical equations, walk in the PATH of DOS, comprehend VGA clones' compatibility claims, learn the first step to software support, discover why Windows/386 shouldn't use HIMEM.SYS, and generate semi-logarithmic plots of dBASE data.

Karl Koessel

Scientific Word Processor

Q. *I'm paralyzed from the neck down and am looking for a program to help me study algebra, trigonometry, calculus, and physics. I don't want a tutorial program or one that can solve equations. What I need is a program that will enable me to compose mathematical equations that appear on screen exactly the way someone would write them on paper. For example, one-third the square root of the quantity four times the square of* x *should appear as*

$$\frac{\sqrt{4x^2}}{3}$$

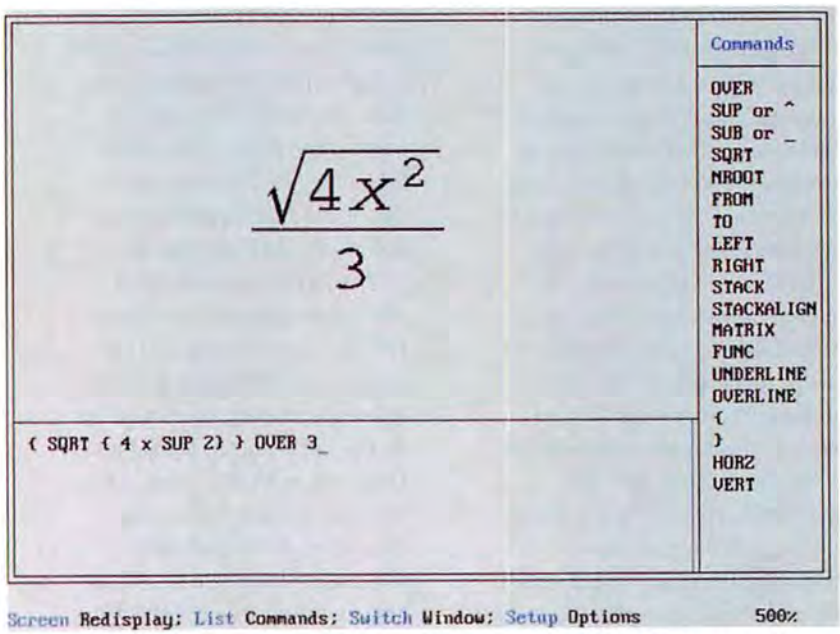
not as SQR(4(x^2))/3. And since I will need to turn in homework papers for classes, the program should also produce properly formatted printed output.*

Thomas J. Swiezy
Indianapolis, Indiana

A. Usually, programs for solving equations and for composing technical manuscripts (such as math and physics textbooks) can graphically display and print mathematical equations. However, your needs don't warrant such complex programs—you'd be better served with features such as page preview and toll-free phone support. I suggest you take a look at *WordPerfect 5.1*.

The ever-popular word processor now has the ability to compose mathematical equations as graphic items and place them anywhere in a document. To aid in composition, many symbols, functions, and even common words such as *over* (which facilitates the creation of complex fractions) can be selected from a scrolling list. And *WordPerfect*'s page preview and comprehensive printer support recommend it for anyone doing science and math homework.

(continues)



WordPerfect 5.1 has added the ability to compose mathematical equations that appear on screen and in print just as your professor would write them.

ANTHONY RUSSO

WHERE TO BUY

WordPerfect 5.1
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
800/321-4566 (orders), 801/225-5000, 801/222-5077 (fax)
LIST PRICE: $495, upgrade from previous versions (except Student, Junior, and Personal) $60
Reader service no. 666

The Primrose PATH

Q. *I'm stuck between an AUTOEXEC and a directory. I often hear references to the PATH command in terms of the AUTOEXEC.BAT file. Can you give me a simple explanation of what PATH is for and how to use it?*

Chris Maers
West Palm Beach, Florida

A. While directories allow you to organize hard disk files into manageable groups, they also hinder access to external DOS commands and programs (both of which are command files and have COM, EXE, or BAT extensions). Surely everyone at some time has entered a command at the DOS prompt only to receive a 'File not found' error message because the command file is not in the current default directory. PATH's function is to facilitate access to the command files stored in your directories.

PATH lets you specify a sequence (sometimes called the extended directory search path) of one or more additional drives and/or directories for DOS to search whenever a command file is not found in the current (or specified) drive/directory. Thus, a command file residing in a "PATHed" directory can be invoked without changing to or specifying its directory.

For example, hard disk users should keep a copy of each external DOS command file (from their original DOS disks) in a directory called C:\DOS, and their AUTOEXEC.BAT file should include a PATH command with a directory list that includes C:\DOS. That way, they can invoke any DOS command from the DOS prompt, even when C:\DOS is not the current directory. It's also a good practice to keep batch files and frequently used utilities in PATHed directories. For example, my AUTOEXEC.BAT contains the command PATH = C:\BATCH;C:\DOS;C:\UTIL;C:\WORD.

As you can see, the PATH command's directory list must contain no spaces, and each directory name except the last must be followed by a semicolon to separate it from the others; however, you may use a space instead of the equal sign. Each directory listed should be prefixed with its appropriate drive designator (so that DOS can find those directories when their drive is not the default). Note also that some programs will create or modify the PATH command in your AUTOEXEC.BAT as part of their installation process. My word processor appended the name of its directory to my PATH command so that it can find supporting files such as its spelling checker.

The DOS command line's 128-character maximum limits PATH's directory list to 123 characters. The amount of available environment space also limits the list's length. By default, DOS sets aside 127 bytes of environment space for storing the names of DOS variables and their string values, and as long as there's room, DOS automatically adds any PATH (or PROMPT or SET) command you issue into the environment. If necessary, DOS will expand the environment space, provided no memory-resident program (including DOS commands such as MODE, PRINT, and GRAPHICS) is loaded. Trying to set a new PATH when there's insufficient space generates an 'Out of environment space' error message. To increase environment space, add the line SHELL = C:\DOS\COMMAND.COM /P /E:256 to your CONFIG.SYS file and reboot.

VGA Drivers and Compatibility

Q. *I have an AT clone with a Hercules-compatible monitor. I want to upgrade to VGA graphics and still be able to run my Hercules-graphics software. While scrutinizing the advertisements, I see claims for both IBM VGA compatibility and "register-level" compatibility. Yet many ads also mention that drivers for various programs—in particular,* Windows*—are included. What's the difference between IBM VGA and register-level compatibility? And why would a compatible card need drivers? Aren't drivers necessary only for nonstandard hardware?*

V. B.
San Francisco, California

A. What you see on screen changes in response to values written into the registers of a video adapter (which may be a board or a chip). "Well-behaved" programs manipulate the display by calling on DOS services, which in turn write the appropriate values into the video registers to produce the desired

(continues)

I write pretty well.

HOMONYM ERROR

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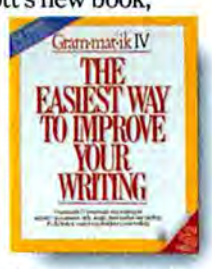

ANSWERS: Sentence 2–"have too do" (Verb Agreement: The verb have is not in agreement with too.) Sentence 2–"too" (Homonym: Unless you mean also or overly for too, you probably mean to or two.) Sentence 3–"each one" (Long-winded or wordy) Sentence 3–"one up." (Avoid ending a sentence with a preposition.) Sentence 5–"a spelling checkers" (Article: Usually a is used with a singular noun or phrase.) Sentence 7–"And" (Cliche: Use sparingly to start a sentence.) Sentence 7–"are" (Verb Agreement: Be sure you are using are with a plural subject.) Sentence 8–"..." (Ellipsis mark: The proper form is. . . .)

Reference Software

**New Grammatik IV works inside WordPerfect® 5.0/5.1, Microsoft Word® 5.0, WordStar® 5.5, Professional Write® 2.1, and XyWrite III, and works directly on files created by 33 word processors. Grammatik is a trademark of Wang Laboratories, Inc. © 1989 Reference Software International, 330 Townsend St., Suite 123, San Francisco, CA 94107. (415) 541-0222.*

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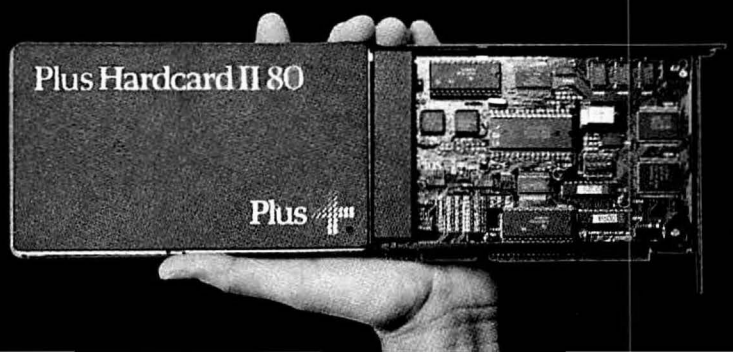

display. Unfortunately, many programs "misbehave," bypassing DOS and talking directly to the video registers for faster performance. Even though some of the first VGA "clones" don't support misbehaved programs, they claim VGA compatibility because they support the well-behaved ones. However, only a register-level–compatible VGA will support both well-behaved and misbehaved VGA programs and can truly be called VGA compatible.

Nevertheless, even a register-level VGA compatible must trap and emulate commands from programs that try to talk directly to EGA, CGA, or Hercules Graphics Card registers, which a VGA doesn't have. Even with claims of "backward compatibility," you may find that some of your Hercules-specific programs will not run correctly; you'll have to reinstall them, specifying your new VGA video adapter.

All devices—including your keyboard and serial ports—have drivers. Some device drivers are resident in the operating system; others are added to DOS using a DEVICE statement in CONFIG.SYS. Drivers allow programs to use devices without talking directly to the hardware.

Drivers for the most common video adapters, mice, and so on are included on the *Windows* Setup disk. To obtain maximum speed, *Windows*' SETUP program incorporates drivers for your system's hardware right in the *Windows* program itself. The drivers that you read about in ads for VGA boards enable *Windows* to support any additional, nonstandard modes, such as 800-by-600-pixel resolution, offered by those video adapters for high-resolution monitors.

Circle 204 on reader service card

Software Support

Q. *I'm having trouble printing with* WordPerfect 5.0. *No matter what combination of printer driver and software setup I try, I am unable to print with a top margin of 1 inch. Instead, my printouts overstrike the first few lines at a margin of 1½ inches, then proceed normally.*

I have an Epson LQ-950 printer. However, WordPerfect 5.0 *doesn't have an LQ-950 driver, so I've tried unsuccessfully to use the LQ-1050 and LQ-2500*

(continues)

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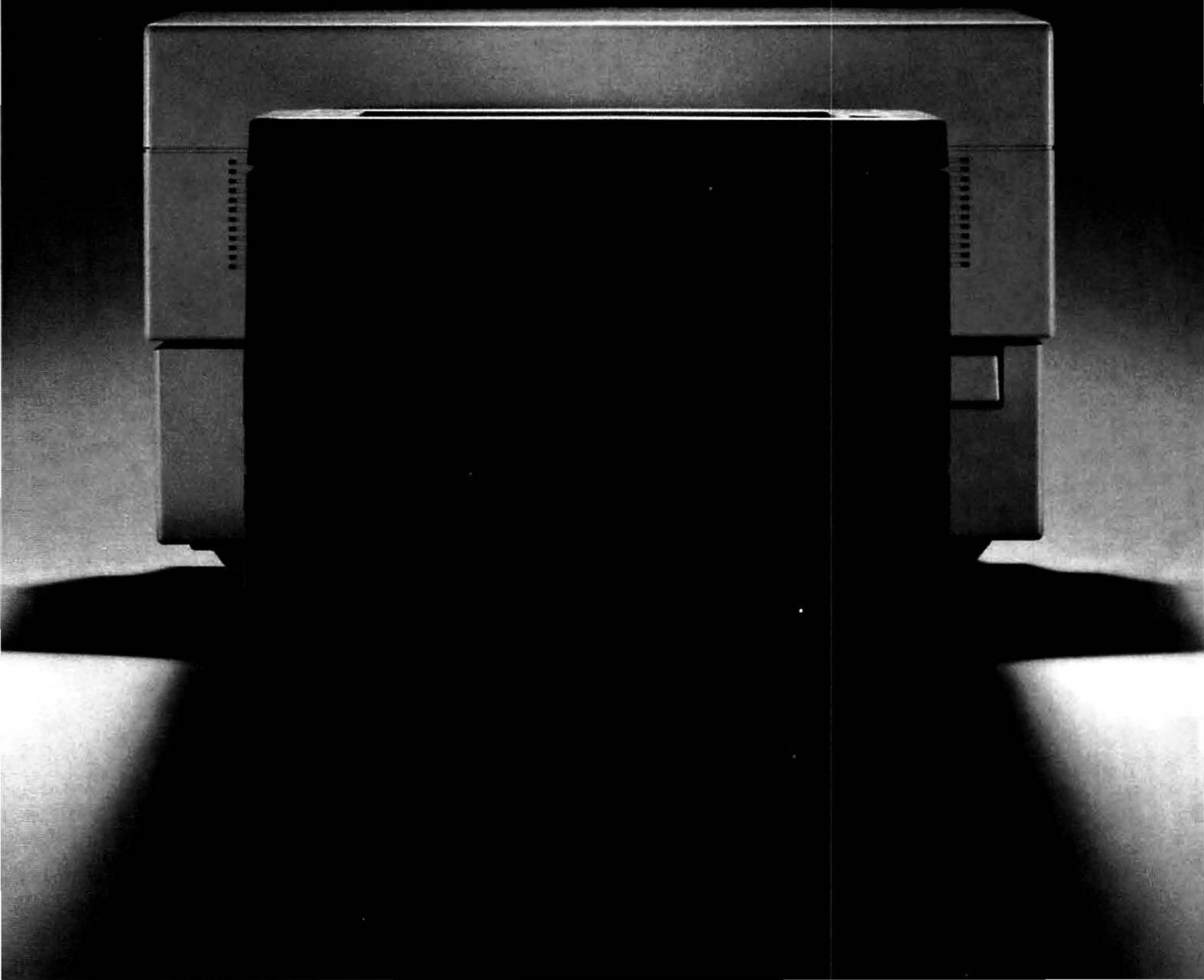

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One of the best things about microLaser is that you only buy what you need. So if you're not ready for PostScript language, you can buy the standard microLaser for less than $2,000 and add PostScript software and other powerful features later.

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drivers. Can you help?
William J. Hoffman
Mentor, Ohio

A. As a user of any software product, you should never be shy about calling the vendor for support. WordPerfect Corporation provides its customers with exemplary support for its products. And that's a good thing, too, because without fanfare WordPerfect frequently releases interim or "maintenance" upgrades. These upgrades may include fixes for minor bugs or additional device support, without changing a product's version number.

You can find the date of your release of *WordPerfect 5.0* and the toll-free product support number by pressing <F3> (Help) and reading the date in the upper right corner of the screen. Given that information, the support person would probably tell you that there has been an upgrade that includes a driver for your Epson LQ-950.

WordPerfect will send you the LQ-950 driver free of charge if you ask for it. For those who feel they must keep up with every upgrade—major and minor alike—WordPerfect offers a Software Subscription program. Call 801/222-1400 for details.

HIMEM.SYS and Windows/386

Q. *Apparently, when I installed* Microsoft Excel, *it added to my CONFIG.SYS file a reference to a device driver called HIMEM.SYS. Since that time I've installed* Windows/386. *Recently a colleague told me that the DEVICE = HIMEM.SYS command was unnecessary now that I'm using* Windows/386. *Can you explain why that driver was beneficial when I ran* Excel *with its run-time version of* Windows *but is extraneous with* Windows/386?

Gino Botti
Syracuse, New York

A. HIMEM.SYS enables certain programs—including the memory-hungry *Windows* and *Windows* applications like *Excel*—to use nearly 64K of a 286- or 386-based system's extended memory (assuming, of course, that extended memory is present). HIMEM.SYS is based on an addressing idiosyncrasy of the

(continues)

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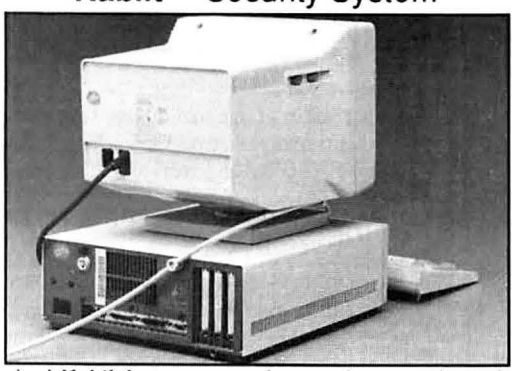

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80286 processor (mimicked in the 80386) and is limited to managing this under-64K segment.

Windows/386, on the other hand, already includes code equivalent to HIMEM.SYS and uses the 80386 processor's virtual address capabilities to manage the rest of installed extended memory. In such a system, HIMEM.SYS would simply waste the space it would occupy.

Logarithm and Blues

Q. *I'm looking for graphics software that can use data from* dBASE *files and generate plots on a semilogarithmic graph containing at least three log cycles.*

Afeef Anam
Sana'a, Yemen Arab Republic

A. While many graphics packages produce semilogarithmic plots, Lotus's *Freelance Plus 3.01* also pulls data directly from *dBASE* files. And its wealth of high-quality fonts, hardy editing and drawing features, enormous clip-art library, and ability to import scanned images (other than gray-scale ones) won *Freelance Plus 3.01* the *PC World* Best Buy award (see "Polished Presentations," November 1989).

WHERE TO BUY

Freelance Plus 3.01
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500, 617/253-9150 (tech support), 617/623-6572 (customer service), 617/629-3981 (fax)
LIST PRICE: $495
Reader service no. 667

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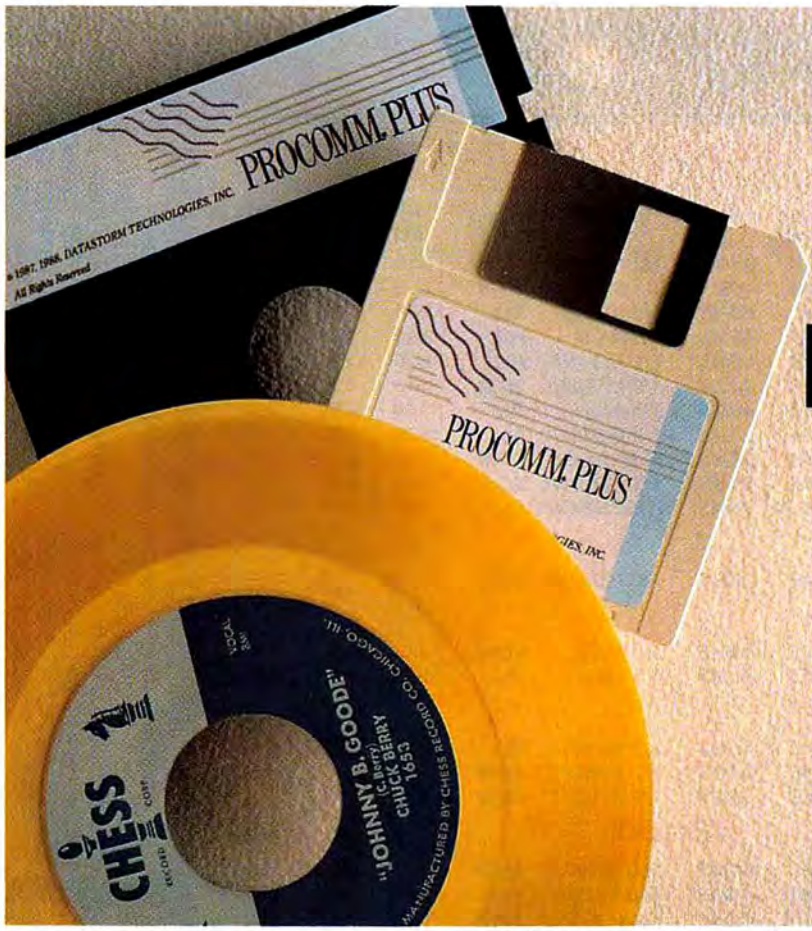

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ST125	20MB	40MS	3.5 INCH	MFM	259	219	214
ST238R	30MB	65MS	1/2 HEIGHT	RLL	249	204	199
ST138R	30MB	40MS	3.5 INCH	RLL	299	259	254
ST250R	40MB	65MS	1/2 HEIGHT	RLL	275	224	219
ST251-1	40MB	28MS	1/2 HEIGHT	MFM	369	329	324
ST157R	50MB	40MS	3.5 INCH	RLL	339	299	294
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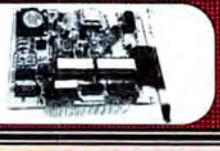

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CONSUMER WATCH

Advice and information for the computer consumer

Dozens of top manufacturers have been cited for violating the FCC's regulations on computing devices. Here's how to identify uncertified machines and avoid radio frequency interference with other equipment.

Anita Amirrezvani

ANTHONY RUSSO

The Limits of Interference

An airplane is coming in for a landing at a busy metropolitan airport. Suddenly, communications from the air traffic control tower are mysteriously interrupted.

A police car is racing to the scene of a crime, getting details from the dispatcher. But interference and static make it difficult to hear the address.

A lawyer is sitting at home watching TV after a difficult day. However, reception is unusually fuzzy, and fussing with the antenna doesn't help.

These scenarios may seem unrelated, but they aren't. In all three, radio frequency (RF) emissions from improperly shielded computers could be interfering with other electronic devices and disrupting communications. To avoid such problems, the Federal Communications Commission requires manufacturers to shield PC hardware so that disruptive emissions are reduced.

Under the law, equipment must be labeled clearly with FCC identification numbers and marked as complying with either Class A or Class B specifications. Class A hardware is intended for use only in commercial environments. Class B standards, which are stricter, apply to any equipment that may be used in a residential neighborhood or that is commonly transported from one location to another. The purpose of the stricter standard is to mitigate interference—"snow" on TV screens, static on radios, and interruption of emergency communications.

To ensure compliance, the FCC requires manufacturers to submit sample Class B machines for testing. Major changes in a machine's design, such as an increase in clock speed, require new tests and recertification. The FCC also conducts undercover investigations at retail outlets and trade shows to make sure that uncertified machines aren't offered for sale.

But not all manufacturers follow the rules. To find out which companies have paid fines for violations or received warnings, *PC World* filed a Freedom of Information Act request with the FCC. We learned that in 1988 and 1989 dozens of well-known computer companies were cited or warned, including Acer, Club American, Dyna Computers, Everex, Fivestar, Grid, Micro 1, Mitsubishi, PC Values, TeleVideo, and Toshiba.

Some, like Dyna Computers, were fined for selling equipment that, according to the FCC, should have been certified Class B instead of Class A. Others, like Toshiba, were fined when the FCC purchased their equipment from a retail outlet, tested it in a government lab, and found that it exceeded Class B emission limits. But most of the major manufacturers on the list paid penalties for minor offenses—labeling the equipment incorrectly, or displaying it at trade shows without a notice stating that it was uncertified and therefore not available for sale.

Everex, for example, was cited several times for failing to label imported modems and systems. In July 1988, Everex tried to have one of the penalties rescinded, claiming that the label had been inadvertently left off during the manufacturing process. In refusing the request, the

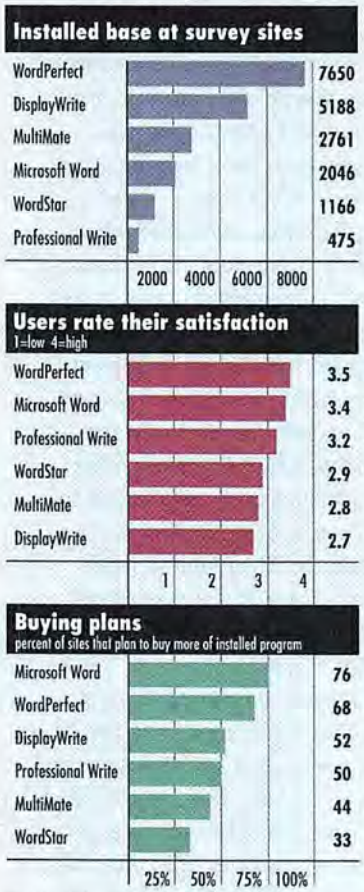
(continues)

RATE YOUR SATISFACTION: Word Processing Software

Here's a case of strange bedfellows: Top-rated *WordPerfect* and bottom-rated *DisplayWrite* are the most widely used word processors in this survey of 200 large organizations. Although *DisplayWrite* is dated, IBM's marketing clout helps keep it alive.

Microsoft Word ranks close to *WordPerfect* in user satisfaction, but considering they're both top-selling products, users' enthusiasm is tepid. *Professional Write,* in third place, has found a niche among users willing to trade power for convenience.

Sites using *Microsoft Word* are more likely than others to buy more of their installed word processing program—perhaps because its long-awaited upgrade, *Word for Windows,* promises graphical wonders.



Source: International Data Corporation. From a survey conducted in July 1989 of 200 large organizations, each with at least 50 PCs.

FCC wrote rather tartly that "putting on the label 'after the fact' is no longer an acceptable response from you to these violations.... We have no evidence whatsoever that Everex's performance in this area is improving, quite the opposite."

Joseph Chan, compliance manager for Everex, says that his company doesn't intentionally violate the rules. "We ship thousands of computers per day, and the production people can make a mistake by not putting on a label, or by putting the wrong label on the wrong machine," he explains.

In another case, TeleVideo "reluctantly" paid a $2000 fine, according to a letter to the FCC, when one of its distributors wrongfully sold ten of its Class A 80386 machines to a computer store. For FCC ratings, the channel of distribution is critically important: Most machines sold through retail outlets or mail-order houses require Class B certification because there's a chance they'll be used at home.

Accidental slips such as TeleVideo's may be rare. But for best results, consumers should check a machine's rating before buying, especially since computer owners are responsible for correcting any interference problems that result from the equipment they operate.

Buyers can check Class B certification by telephoning any FCC office or by dialing the FCC's bulletin board with a modem at 301/725-1072. Equipment least likely to be certified, according to the FCC, includes inexpensive imports and no-name clones. "One of our biggest problems is the individual who puts together a bunch of substandard equipment and sometimes even puts illegal FCC labels on it," says Jerry Freeman, FCC coordinator for computer marketing enforcement in Norfolk, Virginia.

Another potential problem for buyers is the gray area between Class A and Class B regulations. Manufacturers decide upon the likely audience for their machines and then build them to the appropriate specifications, but the FCC may not agree with their decisions. Grid Corporation, for example, was cited in 1988 for displaying a portable, the GridLite Plus, with Class A credentials. Grid tried to have the penalty revoked, noting in a letter to the FCC that the machine was "only marketed for use in the commercial environment." In response, the FCC pointed out that under its rules a laptop "is considered a Class B device notwithstanding marketing strategy and targets, price, or advertising claims."

So what kind of PC equipment doesn't need to be certified Class B under the law? The FCC's Jerry Freeman says that the list includes networking equipment, 486s, sophisticated scanners, and anything that can't be moved easily. Costliness may be another factor: The FCC recently rescinded a fine levied against Tandon for a Class A 386 machine displayed at the West Coast Computer Faire. In a letter to Tandon, the FCC's Richard Smith explained that "the relatively high price of the computer ($9499 without a monitor or other peripheral devices) and its extensive capabilities indicate that its use would probably be largely in a business environment."

Nonetheless, major manufacturers such as Everex and Compaq say that they make it a mat-

(continues)

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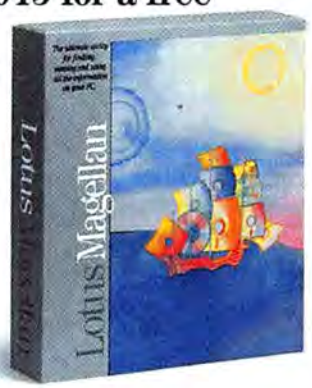
Call 1-800-345-1043 for a free Magellan demo kit. Ask for DBG-3593. And spend your time working with information, instead of looking for it on your PC.



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"I suppose, Dorfman, in its broadest sense, you could call this networking."

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IBM

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ter of policy to certify their machines Class B. Compaq's Deskpro 486/25, for example, already has a Class B rating. "It's an added measure of comfort and implies a higher level of quality," says Compaq spokesperson Nora Rice.

Most peripherals that are sold separately from PCs must also adhere to FCC Class B guidelines. The only exceptions are business-only equipment and what the FCC calls *subassemblies*—devices such as memory boards that are inserted into a shielded computer case and that don't have a link to the outside world. Accelerator boards, on the other hand, require separate certification because they increase the computer's clock speed and therefore its radio frequency emissions.

If you accidentally purchase new Class A equipment for use at home and the vendor was aware that you would be installing it in a residential area, take it back and demand a shielded device or a refund. Watch out for used equipment originally designed for business use and therefore rated Class A. FCC spokesperson Thomas Hora says that if FCC inspectors discover a Class A device causing problems in a residential area, they may ask the owner to stop using it until it is properly shielded. If, on the other hand, you're ever on the receiving end of interference, you can call any FCC office and ask the agency to track down the culprit.

SHOP TALK

Whose Problem Is It, Anyway?

In December 1987, the Albert Einstein College of Medicine purchased a Fivestar 80386. In the ensuing months, we had to return the machine to replace the motherboard, and we had to purchase a Fivestar modem because our original modem was incompatible. We had hardly put the machine to use when we encountered a new problem—the computer continually and spontaneously rebooted.

When we returned the machine for repair, we were informed that the motherboard had failed once again. A Fivestar representative explained that Fivestar's supplier had produced a faulty product that the company no longer handles, and he advised us to buy a new base system for $1100. I don't see why we should have to pay for Fivestar's mistake in choosing vendors.

Itamar Salamon, M.D.
Bronx, New York

Fivestar responds: Our records show that the computer was sold to Clue Enterprises, a reseller in Bronxville, New York. Although we have called Clue to get help for Dr. Salamon, the company has not returned our messages.

We supply a one-year warranty with our computers; Dr. Salamon's machine has been out of warranty for one year. Common sense would suggest that the functionality of a major purchase should be verified before the warranty expires. However, after checking his computer, we have found that the hard drive controller was faulty. We have installed a new controller and will be returning the computer to Dr. Salamon.

Charles Ashford
Service Manager

Computer Insurance Mystery

At People's Computer, where I sign the checks, we have paid yearly property insurance premiums to Safeware Insurance for the past five years. In October 1988, People's purchased an almost-complete orphaned Seequa Chameleon computer for $105—a very good deal. This computer contained five major hardware upgrades, which were to be used to repair our two other, nonfunctional Seequa PCs.

Records indicate that the computer was shipped from Pennsylvania to New York, but it never arrived. It seems that the equipment was lost in a fire at a local UPS depot. Several weeks later, a computer supplier estimated that replacing the parts that the Seequa computer was going to supply would cost $1800. We sent a claim form for that amount to Safeware.

The seller, meanwhile, had received $206 compensation from UPS as a result of the loss and sent me $105 for my loss. Safeware now claims that they don't owe me anything. Safeware's ad, however, promises coverage for full replacement value. Safeware takes the position that the computer was not covered by their policy because it never arrived at People's.

Steven L. Bender
Oakland Gardens, New York

Angelina Casualty Company responds: As the insurance company that underwrote the policy issued to Mr. Bender, we are concerned that he was not satisfied. But after reviewing the matter, we believe it was handled properly.

Michael Jensen
Assistant General Counsel

Editor's note: Mr. Bender's letter raised two key questions: What is the meaning of full re-

(continues)

They Left out Features....
We Left out the COMMA!!

The only thing missing...

is the comma in the price. If you look at the chart on the right you will see prices charged by our competition. All but one contain a comma. DesignCAD 3D sells for $399.00. Period. No Comma!

In order to draw the complex pictures shown below it is desirable to have the following 3D features:

- **Interactive design with 3D cursor**
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- **Shaded output to printers and plotters**

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PC MAGAZINE SAYS...

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Mega Model	$ 995.00	MegaDraw $195, List $295, MegaShade $395
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VersaCAD Design 5.4	$ 2,995.00	N/A

Source: Byte Magazine

BYTE MAGAZINE SAYS...

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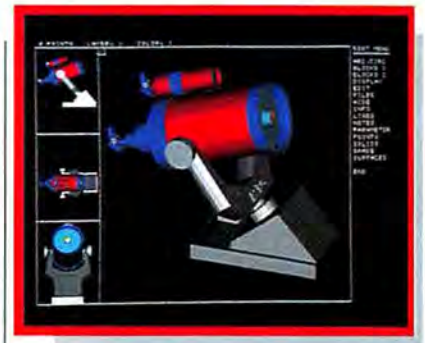

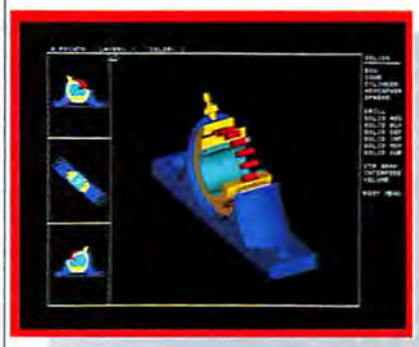

HOW DO I GET ONE?

DesignCAD 3-D and DesignCAD 2D are available from most retail computer stores, or you may order directly from us. If you have questions about which program to purchase please give us a call. All you need to run DesignCAD 3-D is an IBM PC or compatible computer with 640 K RAM memory and a hard disk. Both products support most graphics cards, printers, plotters and digitizers. Free information and a demo disk are available by faxing (918) 825-6359 or telephoning:

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Circle 306 on reader service card

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**OCR is an abbreviation used by industry experts for *optical character recognition*, an important component of page *recognition*.

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placement; *and are computers covered while they're in transit to a new owner?* Consumer Watch *contacted Safeware and Angelina Casualty, but both declined to discuss the specifics of Mr. Bender's case "in a public forum." Angelina's Michael Jensen said that as a general rule, "the purchase price would pretty well fix the replacement value of any piece of equipment." On the issue of computers in transit, Safeware CEO David Johnston said that coverage depends on "when the ownership rights were actually transferred."*

Because these answers don't shed much light on the issues, we strongly advise potential insurance buyers to describe their needs carefully to avoid unpleasant surprises.

A Job Well Done: Gateway 2000

I bought a system from Gateway 2000 and discovered a faulty drive cable. After a single phone call, a technician expressed me two new cables the next day.

Later, when my VGA monitor developed a problem, I received a brand new one, also by express mail. I was also able to use the original monitor until the replacement arrived. It's refreshing to deal with a company that takes courteous care of its customers even after the sale.

Richard Pownell
West Covina, California

Take action! If you've got a complaint or a compliment, send it to Consumer Watch. *We'll follow up and publish letters with the broadest interest. For more information, see How to Contact PC World, page 4.* ●

BACK ISSUES

Missing something? Back issues are available for $6 per copy (U.S. and Canada), while supplies last. Rate includes surface delivery. If you wish airmail delivery, please add $6 per copy (U.S. and Canada). For all other countries, back issues are $20 per copy, which includes airmail delivery. For foreign orders, prepayment is required in U.S. dollars.

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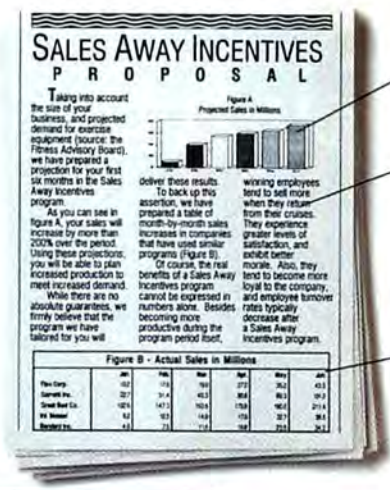

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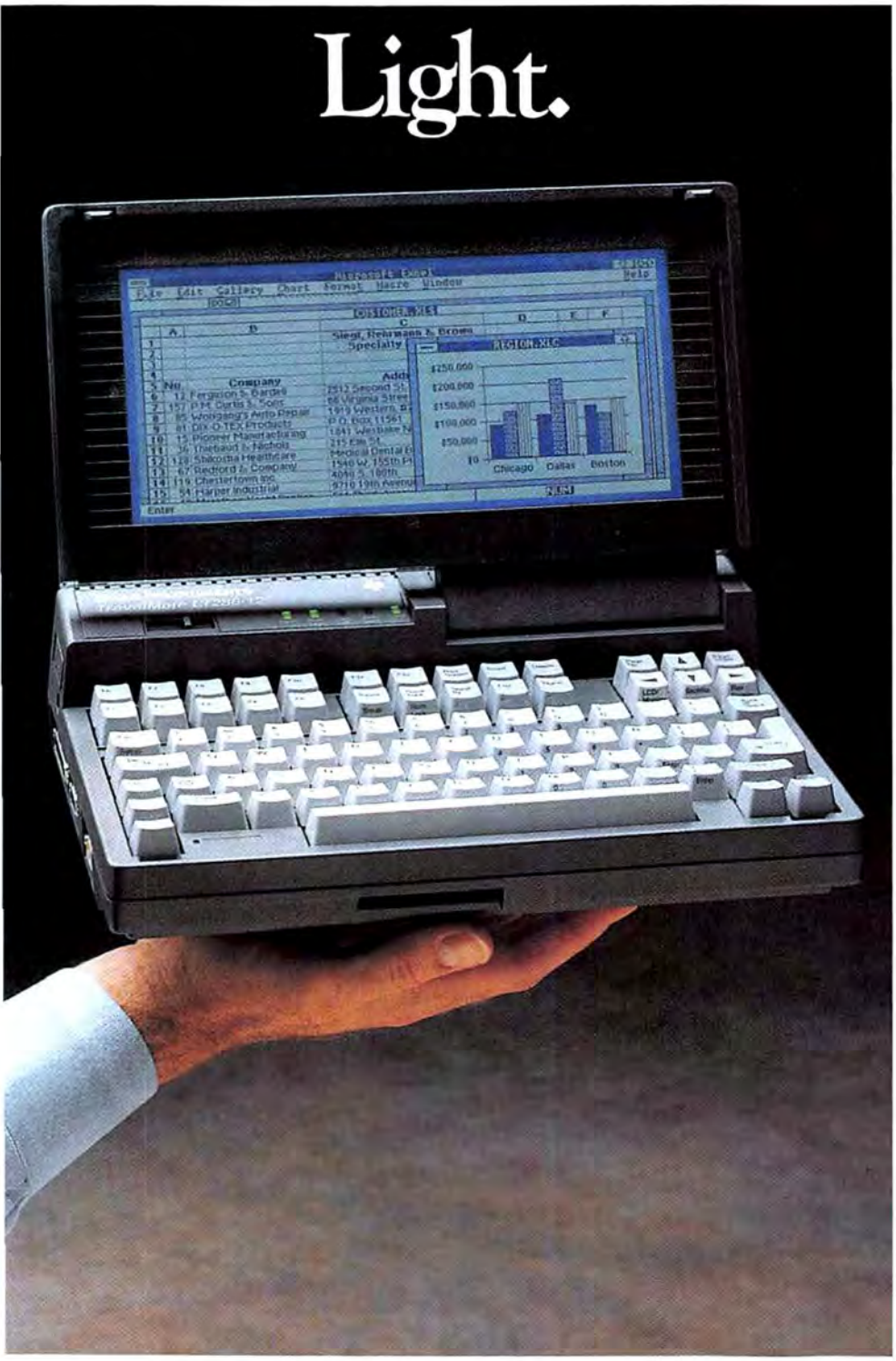
Texas Instruments you really want in 286-



Model 12: All the power — half the weight.

Weighing a remarkable 6.7 lbs. — including battery and 20 MB hard disk drive — TI's TravelMate LT286 Model 12 delivers all the processing power of a desktop PC in a laptop. It's the perfect choice for professionals who need to work on-the-go.

With the Model 12, you don't sacrifice performance for small size and weight. Business software runs fast, thanks to a 12 MHz 80286 microprocessor. There's plenty of storage for all kinds of software applications, since the internal hard disk drive comes standard, and MS-DOS 3.3® and LAP-LINK™ are in ROM. Plus, you get 1 MB of RAM, expandable to 4 MB, a feature many other laptops can't match. The Model 12 can even be a member of your local area network.

Not only does the Model 12 perform like a desktop PC, it feels like one, too. The AT®-style keyboard provides full-size, full-travel keys that give your fingers plenty of room and great response.

Other advantages include an easy-to-read, backlit LCD screen that your eyes will appreciate. For additional flexibility and convenience, snap on a 3.5" high-density floppy disk drive, or remove it and travel light. Then send work to your office with just a phone call, thanks to an optional internal modem.

The removable 3.5" high-density diskette drive and internal modem are optional.

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offers two things class laptop computers.

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As with the Model 12, an intelligent power management system turns off the screen and hard disk drive during periods of inactivity to extend battery life, allowing you to use the laptop longer.

Considering all these features and the performance and versatility they deliver, why would you ever need a desktop PC? **For the names of the dealers nearest you, call 1-800-527-3500.**

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*imagination not included

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Have an idea for a program? Layout has the parts to build it for you. Apply your creativity with windows, buttons, text, and pull down menus, and Layout takes care of the rest. Need to store some information?

Layout will store it with hypertext cards, the latest in database technology. Want to add a picture? Layout has lots and lots of graphics capabilities. How about giving your program a run to see what it looks like? Tell Layout, and you'll have an instant preview of your program.

Imagine This

Layout automates the best of OOP (object oriented programming) and CASE (computer aided software engineering). Layout is both simple and powerful.

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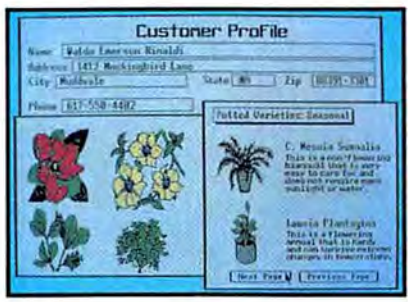

keep track of what you're doing – Layout does the housekeeping for you. And when you're finished, Layout is waiting to turn your ideas into a powerhouse program. With the click of a mouse or a tap of a key you can create a ready-to-run program (a real, .EXE file – not a pseudo program) or Layout can create complete C, Pascal, and QuickBasic programs, too.

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The programs you create with Layout run on any IBM-compatible PC and are all your own. There are no royalties, fees or special run-time shells. The programs run incredibly fast, with or without a mouse. And best of all, the programs you create can run on standard PCs.

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Circle 147 on reader service card

Edited by ERIC BENDER

Supercenters Emphasize Service

Inacomp Differentiates

Finding Niches in "Generic" Channel

PETER YATES

In the brutal competition among PC chains, Inacomp's Rick Inatome looks for new sales and service options.

Computer chains took a beating last year—profit margins nose-dived, and rumors flew about further consolidation among the major chains. But Inacomp Computer Centers prospered and launched aggressive initiatives.

Once considered a mom-and-pop chain destined to be devoured by a larger rival, Inacomp has thrived in the cutthroat PC retail market. Founded in 1976, the company has over 100 company-owned and franchise stores in 22 states. The Troy, Michigan, firm has turned a profit every year, with revenues from company-owned stores totaling $274.3 million for the year ended July 29—more than for the previous year. The primary growth comes from an increase of 22 outlets.

President Rick Inatome attributes the firm's success to innovating while minimizing financial risks. The latest move is "Supercenters" that sell everything from PC hardware and software to office equipment and business services. A joint Inacomp/Mitsubishi venture, Computer Supercenters International will own and manage a chain of Computer City Supercenters. The first store opened last December in a Los Angeles suburb, and 20 more are planned for the next four years.

The Supercenters will average 20,000 square feet—roughly five times the size of a typical Inacomp store—but Inatome cautions against equating the warehouse size with bargain-basement prices or minimal service. "This is very upscale, very service oriented," he says. The first store holds huge trade-show-like vendor exhibits, a network laboratory to assist both in troubleshooting and in purchase decisions, and business and consulting services that include advice and custom work in such areas as desktop publishing and graphics. There's even a child-care center for shoppers' convenience.

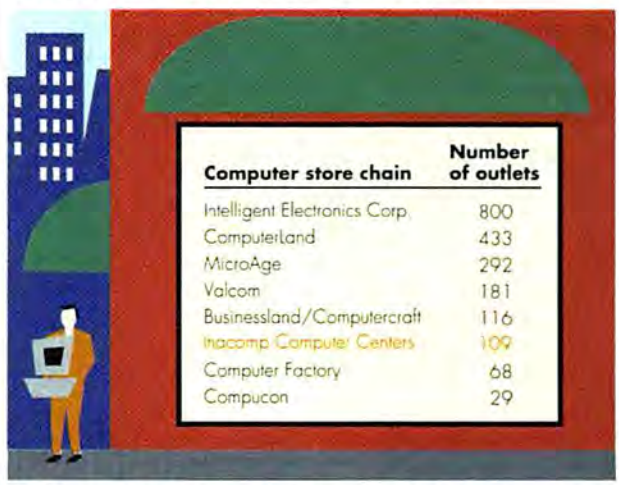
All these services are geared toward home-office users and small and medium-size businesses—consumers largely abandoned by the traditional retail channel, says Inatome. "We had been focusing on large corporate customers and direct sales; this is a way of getting at a marketplace we left behind."

Analysts describe the Supercenters as a smart move for Inacomp and a good opportunity for customers. "The Supercenter fills a unique need," says Peter Sirus, executive vice president for the Buckingham Research Group in New York City. "It creates a space where small-business buyers can bring their problems." He adds that Inacomp minimized its risk by teaming up with Mitsubishi and starting out with just one store.

In another unusual effort, Inacomp late last year opened two stores whose only PC offerings are IBM PS/2s. This deal lets the chain expand despite IBM's moratorium on new dealerships and, says Inatome, allows IBM to "experiment with some new concepts for supporting the next generation of platforms" like high-powered network servers. If mishandled, the arrangement could alienate two other major suppliers—

(see Inacomp, p. 66)

How PC Retailers Rank



JEFF BERLIN

While Inacomp is in the second rank in number of outlets, its Supercenter and PS/2-only stores have drawn keen attention in the reseller community.

Epson's reaction time quickened after it moved R&D and production from Japan to the U.S., says Eugene Kunde.

FREDRICH CANTOR

Epson America Stirs

Printer Giant Challenges Leaders

Epson America, the dot matrix–printer kingpin, didn't kid around when it introduced its first laser printer—the 6-page-per-minute (ppm) EPL-6000, which listed for a full $800 less than the $2695 price tag of Hewlett-Packard's LaserJet Series II. Unfortunately, at the same time last fall HP upped the ante with its 4-ppm IIP, which sells on the street for under $1000.

But Epson didn't miss a beat. It slashed the EPL-6000's list by $400, took out full-page product comparison ads in national newspapers, and offered a $195 PostScript-clone package for $40.

That kind of aggressiveness hasn't been typical of the U.S. subsidiary of Japan's $4 billion Seiko Group. Had it been, HP might not own the laser printer business. After all, the Epson name has been synonymous with printing since the early 1980s, when the MX-80 became the draft printer of choice.

With 18 percent of U.S. sales of dot matrix printers, Epson has maintained a comfortable lead over Panasonic and other rivals, building its annual revenues from $30 million in 1980 to $1 billion today. However, false starts in the laser and PC markets have put the company on a cautious path. For the past several years, it's quietly milked its dot matrix cash cow and offered deeply discounted trailing-edge PCs.

Those days are over, say executives. Beneath the surface calm, Epson has been working hard to create a solid manufacturing and distribution infrastructure. It has transferred R&D from Japan to a San Jose, California, technology center and moved manufacturing to a Portland, Oregon, facility that employs 1000 and builds 70 percent of Epson's printers and 60 percent of its computers. (Another 1000 employees work at the Torrance, California, headquarters.) The move enhances Epson's ability to respond to customer and distributor demands, explains Eugene Kunde, executive vice president and general manager.

Epson gets high marks from both customers and resellers. ComputerLand recently named Epson its service vendor of the year, an honor based on the firm's customer service record. And a 1988 J. D. Power survey examining satisfaction among computer dealers rated Epson first in business practices and brand profitability.

"Epson isn't perfect," says Tom Jorgenson, president of First Capitol Computer in St. Peters, Missouri, "but our feeling is that they are good people trying to do a good job." Jorgenson has carried Epson's printers for four years and its computers for almost two because of the company's commitment to quality hardware and customer service. In one case, he says, an Epson representative drove 60 miles to refund a dissatisfied customer's money with a personal check.

Epson now plans increasingly competitive technology, with advances like the removable screen and drives in the LT-286e laptop. Epson introduced 386 desktops only recently but is preparing EISA-bus models. "It's a new beginning," comments Dataquest senior analyst Bill Lempesis.

Epson's Equity line has done well among computer dealers, as has its Apex brand among mass merchants, adds Lempesis. But while Dataquest ranks Epson 5th for PC unit sales during 1988, its revenues were only 13th, suggesting that most of its business has been in low-end products.

Epson is in a dogfight in the low-end arena with the likes of Packard Bell and Headstart Technologies, notes Bruce Stephen, International Data Corporation senior analyst. It has been dishing out direct customer rebates of $150 to $200 on low-margin products during the past year. To be profitable, it must build a customer base with more profitable 386 and 486 offerings, says Stephen. *—Mike Hogan*

Inacomp

(continued from p. 65)

Compaq and Apple. But over the years the firm has carefully minimized friction and "built up a lot of good will," says Sirus.

As Sirus notes, "there's a clear advantage to being larger, in terms of both effective distribution and the ability to service major national accounts," and talk about possible mergers with other chains never stops. Expansion, especially quick growth through mergers, may be the key to Inacomp's future. "Declining margins and suicidal pricing have put everyone under pressure," says Seymour Merrin, publisher of the *Channelmarker Letter* in Palo Alto, California. "So far, though, Inacomp's been able to hold its own as well as or better than anyone else." *—Roberta Furger*

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PC Magazine [July 1989, Page 263]:

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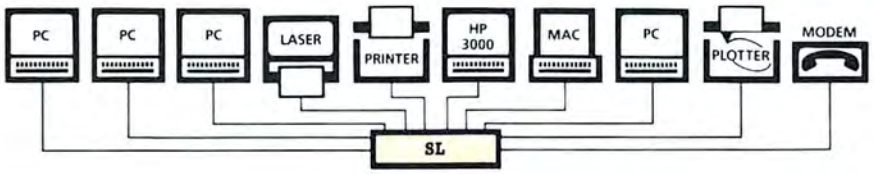

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PC Makers Bundle Software With Systems

Competition Means Top Values in Entry-Level PCs

Increasingly, your low-end PC or laptop is likely to come with what the vendor says is hundreds of dollars of application software—free. Is this really a good deal?

Unless you're wedded to a rival software package, the answer is probably yes. That wasn't always true in earlier years, when hardware suppliers often threw in unimpressive titles and wouldn't support them properly. But today's PC suppliers generally offer solid software. While the packages tend to be entry level, don't underestimate their muscle: "Today even entry-level software is getting pretty powerful," comments Richard Rabins, president of Alpha Software in Burlington, Massachusetts.

"We've seen increased bundling activity in the last nine months," notes Jeff Silverstein, publisher of the *Software Industry Bulletin* in Stamford, Connecticut. It's an indication of the level of competition, Silverstein notes, that even IBM put together a holiday bundle, packaging *Microsoft Works* and two Andrew Tobias personal finance packages with PS/2s up to the Model 55SX.

Consumers "almost expect application software" to come with their PCs, observes Alpha's Richard Rabins.

RICHARD HOWARD

Application bundles are also commonplace for laptops. But the bundling trend is strongest in the consumer market, where customers want to run an application rather than stare at a C> prompt when they drag their purchases home. Thus companies like Headstart have offered turnkey home PCs quite successfully. "Customers are getting trained to almost *expect* application software," Rabins observes.

"Hardware companies continually need to find ways to differentiate what are essentially commodity products," Rabins explains. Michael Slade, group product manager at Microsoft's entry business unit, agrees: "Packard Bell sells in places where toasters are sold, and it's unlikely the person selling toasters will add any value to your software decision process."

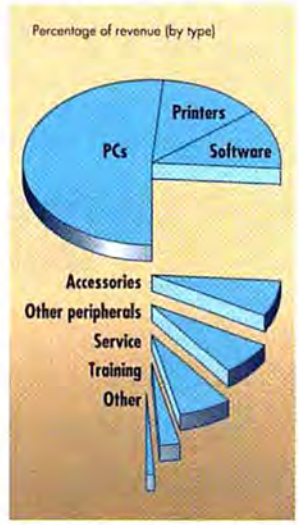
For software vendors, bundling offers "a way to get in front of customers effortlessly, with much reduced cost of sales," notes Spencer Leyton, Borland International's vice president for business development. PC suppliers can also spread the word about the software. With Mitsubishi's laptop, for instance, "*Works* is a very significant portion of the marketing message," Slade points out. Naturally, software firms also hope that users will move up their product lines. "Our assumption is that many people eventually will decide that they want more; that's one reason we spent a lot of time making sure *Works* looks like *Excel*," Slade says.

But, cautions Leyton, "You don't want to bundle a product that's overly upscale or complicated" because of the cost requirements. Adds Slade, "We make the assumption that it costs just as much to support as a retail package."

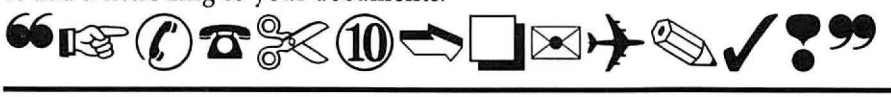
Not everyone makes bundling deals, though—especially not market leaders with powerful applications, like WordPerfect Corporation. "We don't have an aversion to bundling, just an aversion to selling at an unreasonably low price," says WordPerfect executive vice president Pete Peterson. In early bundling arrangements, "the hardware manufacturers got spoiled," he says.

Michael Swavely, Compaq North America president, discounts any shift toward bundling. Compaq just says no, partly because "there's no way you can hit all the customers' needs, no matter what you choose," he says. "The very essence of a PC is that it's a general-purpose computer, and software is a customer choice."
—*E. B.*

PCs at Retail: How the Pie Gets Sliced



At a typical independent U.S. computer retail store, slightly over half of revenues come from PC sales, according to StoreBoard. Printers are the next largest category, followed by software. Industry observers expect service revenues to take a steadily increasing share.



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AND USERS AGREE ■ "Your approach to font generation is the right one--better than Bitstream, MoreFonts, Trionum, you name it." Christopher Sarson, Blue Penguin Productions, Inc. ■ "I've now been using GLYPHIX 3.0 with WordPerfect 5.0 ... I couldn't be happier with the quality, ease of use, and, most of all, printed output of this product." Claude Carle, Beverly, Massachusetts. ■ "I am using WordPerfect 5.0 and was using Bitstream Fonts. I carefully removed my Bitstream to make room for Glyphix, thinking that if it did not work out, I could go back to the Bitstream. But I will not go back." Lorne Bowerman, R&L MicroServices Inc. ■ "As a WordPerfect certified instructor, I feel that all my students should know about your program and I make a point to mention it." Don Williams, Computer Learning Centers of America. ■

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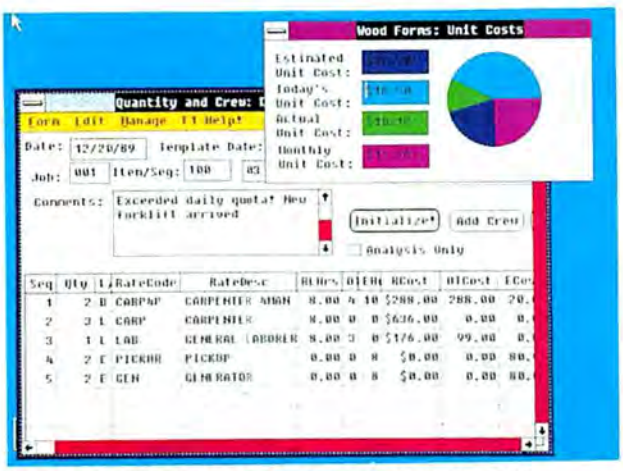

Among early SQL front ends is Gupta Techologies' SQL Windows, which created this cost-tracking package.

Still Waiting for SQL

Server Front Ends Just Arriving

For years, software gurus have extolled the virtues of dedicated data base servers, calling them the ultimate solution for business users who need quick and easy access to vital company information. Problems in assembling all the required software, though, have left the server promise largely unfulfilled.

Offerings like the Microsoft/Ashton-Tate/Sybase *SQL Server* aim to speed data base access by dividing the work between front-end "clients" and back-end "servers" on a local area network. The basic concept is straightforward: From the comfort of their favorite application, users request specific information; a high-powered 386- or 486-based server then processes the query and downloads only the requested information (rather than dumping the entire data base for the workstation to process). The keystone of this scheme is Structured Query Language (SQL), which provides an industry-standard way to grab mainframe and minicomputer data as well.

Intrigued by the concept, a few organizations have invested in the new technology, but most customers want to see all the pieces before making a move.

With the exception of IBM's server (due by April in OS/2 Extended Edition 1.2 Database Manager) and Microrim's *Vanguard*, the major back-end products already have arrived. Gupta Technologies, in fact, has been shipping its *SQLBase* server since 1986. But server vendors have been forced to sell their wares without the benefit of front-end workstation software, which provides the puzzle's final piece. Versions of *dBASE IV* and *Paradox* that can act as SQL front ends, for example, were initially scheduled for release last spring but have yet to hit the shelves.

Development is "a sophisticated, subtle, and complex job," explains Ken Einstein, director of application strategy for Borland. To add to the difficulties, he says, "most of the real data is not on OS/2-based servers but on minis or mainframes." Thus Borland has delayed shipment of *Paradox* for several months to add support for *Oracle Server*, which connects to many of these platforms.

The lack of front ends has been the "number one reason for the slow market," says Richard Finkelstein, president of Performance Computing in Chicago. Until early this year, "if companies wanted to make the commitment to server technology, they had to code in C, and they don't want to do that," he adds. So instead of moving to client-server computing, customers are taking a wait-and-see approach.

Front-End Progress

Ashton-Tate won't commit to a date for the long-awaited front-end edition of *dBASE IV*, but the package is not expected out before the third quarter. Once released, "it will be tightly integrated with *SQL Server*," according to Pamela Goldschmidt, *SQL Server* product manager. "Other companies will take a very generic approach and support a variety of servers," she adds, claiming that the integration won't be as smooth. In a major shift, Ashton-Tate disclosed plans last December to turn over *SQL Server* retail rights to Microsoft.

Some of Ashton-Tate's competitors are having better luck getting products out the door. Revelation Technologies expects to ship *Advanced Revelation 2.0* and a "bond" to *SQL Server* by March, with links to *Oracle Server* and OS/2 Extended Edition to follow. Data-

(see SQL, p. 72)

Users Wait for Front Ends...

Application	Expected release	Servers supported
Advanced Revelation 2.0	February	SQL Server
DataEase SQL	first quarter	SQL Server, Oracle Server, OS/2 Extended Edition
dBASE IV	unavailable	SQL Server
Excel for Windows (with Q+E)	first half 1990	SQL Server
1-2-3 release 3.0 (with Datalens)	first half 1990	SQL Server, OS/2 Extended Edition
Excel for OS/2 (with Q+E)	first half 1990	SQL Server, OS/2 Extended Edition
Paradox	first half 1990	SQL Server, Oracle Server, OS/2 Extended Edition

TIM CARROLL

Most of the long-anticipated major front ends to SQL data base servers should arrive commercially in the next few months.

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...But Servers Are Here Now

Server	Platform	Availability
Gupta Technologies SQLBase	DOS, OS/2	shipping
IBM OS/2 Database Manager	OS/2	March 31
Microrim Vanguard	OS/2	summer
Microsoft/Ashton-Tate/Sybase SQL Server	OS/2	shipping
Novell NetWare SQL	NetWare	shipping
Oracle Server	OS/2	shipping
XDB Systems XDB Server	DOS	shipping

When IBM delivers its Extended Edition update, almost all the major SQL server back ends for high-end PCs will have arrived.

SQL

(continued from p. 70)

Ease International plans to deliver *DataEase SQL* by April, with hooks to *SQL Server*, OS/2 Extended Edition, and *Oracle Server*. Nantucket is enhancing *Clipper* so it can talk with the major SQL servers, with support beginning to arrive in the second quarter. Around midyear, Fox Software will sell *FoxPro 1.1* along with a *NetWare 386* back end (optimized for the dBASE language rather than SQL). On the spreadsheet side, data base server connections for *1-2-3* (via *Datalens*) and *Excel* (via *Q+E*) are also slated for release by July.

Making the right front-end–to–back-end matches will be crucial when the time comes for customers to select products. But it will be years before any one application supports the breadth of servers available, developers say. "Over time you'll see a gradual introduction of bonds to a variety of servers," says David Wolff, Revelation's director of product marketing. In the meantime, however, users may find that their favorite front-end applications don't support the server they've chosen.

Many of the most widely anticipated front ends may prove to be disappointments, Finkelstein predicts. "The former stars in the PC marketplace, such as *dBASE*, are not appropriate for relational data base servers." In his view, truly relational products such as *Paradox* and *DataEase* are better positioned. He predicts that "a new set of wares based on object-oriented programming will become the really popular and usable front ends." *Windows*-based titles such as Precision Software's *Superbase* and Gupta's *SQL Windows* also point the way toward graphical environments.

Kicking Off the Market

What will jump-start server sales? IBM's long-awaited server, arriving by April, could do just that. "It's a very significant part of the corporate mainframe connectivity architecture," says Finkelstein. "Once that product is released, corporate America will start putting its resources into client-server architecture."

"In terms of building production systems, we're just seeing the first ones being implemented," says Borland's Einstein. He expects evaluations to begin in earnest over the next 6 to 12 months.

Adoption will be slowed by the sheer technical complexity of SQL installations, which will make reseller training and support a crucial concern. Additionally, both server and application developers acknowledge that it will be difficult to define service and support responsibilities clearly. To address this problem, some front-end developers will bundle their offering with a server and will support the entire package. This approach should spread among *SQL Server* adherents now that Ashton-Tate has relinquished retail control.

Once installations begin in force, the ranks of data base users will broaden dramatically, predicts Jim Reilly, director of channel programs for Oracle Corporation's desktop products. "Until now, front ends required a sophisticated end user, or an end user supported by a sophisticated user." But servers with friendly front ends will make data much more readily accessible to workers throughout an organization.
—Roberta Furger

TIM CARROLL

PC Discounts Deepen

PC prices continued their slide last fall, according to figures for IBM and Compaq 80286-based desktops. (These costs include a 30MB or 40MB drive, a VGA and monochrome monitor, and DOS.) In some cases, as with the Model 50 Z, new machines were selling for little more than used PCs, notes Alex Randall, Boston Computer Exchange founder. Randall predicts increasing pressure on 386 and 486 pricing as well, as customers realize that "state-of-the-art hardware now offered at retail exceeds the demands of the average user." The reaction, says Randall, "will hit this industry like a ton of bricks." *—E. B.*

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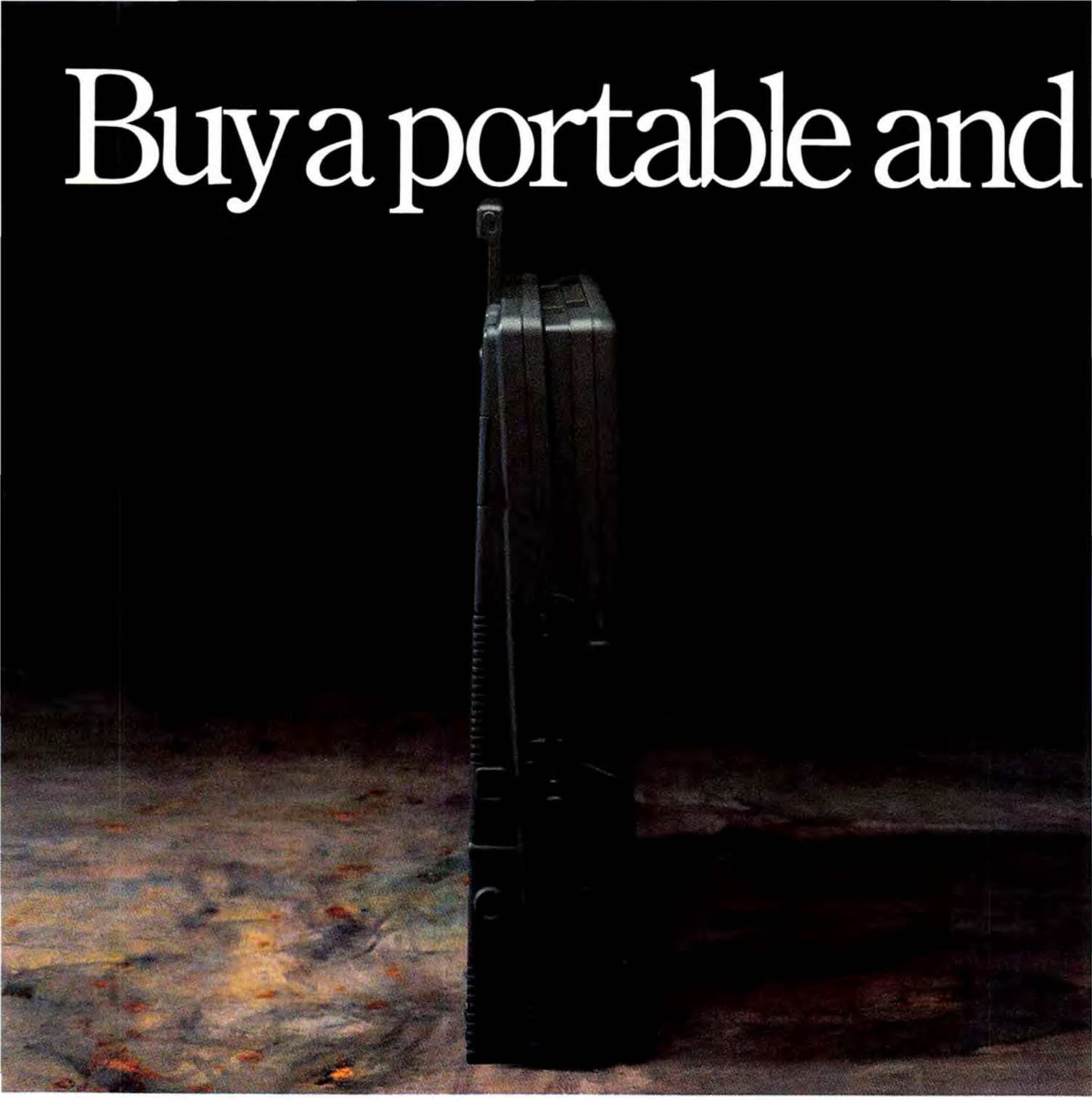

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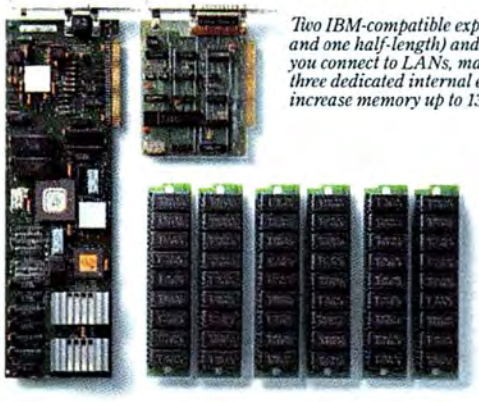

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Compaq's Double-Barreled Server

With its huge memory capacity and sophisticated mass storage, the dual-CPU Systempro is right at home in minicomputer territory.

But until applications arrive, it's just an impressive—and expensive—PC server.

Eric Knorr

TONY CARLSON

PC World offers first impressions of prerelease hardware and software

Ever since the first 386 arrived, PCs have been nipping at minicomputers' heels—today, the processing power of the 486 puts a number of mini CPUs to shame. Compaq's Systempro, the ne plus ultra of Extended Industry Standard Architecture (EISA) machines, complements raw PC MIPS with mini-like memory and mass storage. But the key feature of this hot performer is a dual-CPU option that will make tomorrow's multiuser data bases sing.

The Systempro represents a new breed of network server designed to provide both file *and* processing services to the work group. Its features are in a class by themselves: sockets for *256MB* of CPU-speed RAM, a microprocessor-controlled drive array with blazing performance, and an upgrade scheme that allows you to run the network with a single 33-MHz 386 or 486 CPU board, then add a second CPU board of either type to handle client/server applications.

To exploit both CPUs, you need one of three special operating systems: *Compaq LAN Manager 386/486* or a customized version of either *SCO UNIX System V/386* or Novell *NetWare 386*. The first two should be shipping by the time you read this, while Compaq promises a suitable version of *NetWare 386* for midyear.

The Systempro's pricing signals that times are changing in PC land. The base Model 386-240 costs $15,999 and comes with a 33-MHz 386 CPU, 4MB of RAM, two 120MB hard disks (managed by an intelligent EISA controller), and a 1.2MB floppy drive. All other specs being equal, the top-end Model 386-840 with four 210MB drives costs $25,999; a second 386/33 CPU board costs $3499. The 486 CPUs probably won't arrive before summer, and costs aren't available. Whichever model you pick, at these prices you'd *better* share this system with the work group.

Serving the Future

Consider the Systempro one of the first vehicles designed to carry us into a world still dominated by minis and mainframes, where many users share access to gigabyte-sized data bases manipulated by powerful CPUs. That's where the Systempro's power, particularly its multiple-processor option, is aimed—but Compaq proclaims that the software will be PC vintage, not mini and mainframe applications in new bottles.

SQL Server, NetWare SQL, and *Oracle LAN Server* top the list of back-end data management applications likely to find a home on the Systempro (see "Well-Connected Data Bases," August 1989). In the so-called client/server model of distributed computing, PCs on the net will run the front ends while the Systempro uses its dual CPUs to blaze through heavy transaction-processing operations.

The problem, of course, is that PC data base engines are taking their sweet time arriving—many analysts predict a two-year wait before they dominate multiuser PC data management. Today's LAN applications wouldn't know what to do with more than one CPU, and that leaves the Systempro's dual-processor payoff sitting in escrow until the software arrives.

The most likely early purchasers are those looking for a file server with room to grow. When client/server computing comes into its own, they can then add the second CPU. In the meantime, some cost-conscious folks in information services may pick the Systempro to run UNIX-based mini software, even though Compaq lacks the abundant support services that manufacturers of minis offer.

The EISA Question

The Systempro is both Compaq's first EISA box and its first tower system. The EISA bus provides the necessary throughput for high-performance drive subsystems, network boards, and the like, while the tower has more room for peripherals than any previous Compaq chassis.

SNAPSHOT

Systempro

A towering EISA system with a dual-processor option and impressive multidrive mass storage, the Systempro is one of the first PC platforms designed for server-based computing.

KEY FEATURES

- **Upgradable to two 33-MHz 386 or 486 CPUs**
- **Dual CPUs require special versions of LAN Manager, NetWare, or UNIX**
- **Extended Industry Standard Architecture**
- **256MB memory capacity**
- **Intelligent Drive Array with tailored fault tolerance and multiuser performance features**

AVAILABILITY

33-MHz 386 system shipping now; 33-MHz 486 processor board slated for midyear; dual-processor support for LAN Manager scheduled for February

PRICING

$15,999 to $25,999

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713/370-0670

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The Systempro's seven 8/16/32-bit EISA slots accept EISA boards and old-fashioned AT boards. One of the most impressive aspects of EISA's debut last fall was the number of third-party EISA peripherals announced, including such bus masters as Proteon's token ring card, Distributed Processing Technology's intelligent cache controller, and Codenoll Technology's Fiber Distributed Data Interface for fiber-optic LANs. Pack enough of these high-throughput devices into the Systempro, and the bus's wide bandwidth becomes a necessity.

At this writing, however, none of these boards is shipping. Furthermore, compatibility problems seem inevitable when mixing and matching the first EISA boards and EISA systems. Certain aspects of the EISA spec appear open to interpretation, and one of the chips in Intel's EISA chip set still hasn't shipped, forcing system manufacturers to emulate it with discrete logic on the motherboard. The good news is that Compaq's leadership position virtually guarantees that all third-party EISA boards will run in the company's machine.

Setting up and configuring the Compaq Systempro should be a breeze, thanks to its menu-driven EISA Configuration Utility. As with the PS/2's Programmable Option Select, all EISA boards are electronically encoded with ID numbers that enable EISA systems to identify them. Installation consists of copying configuration files that come on disk with the board. Then you either let the system assign board priority levels or set them yourself manually.

The EISA utility also suggests configurations for most standard AT boards installed. However, you must first identify AT boards by entering their code numbers from a list because they lack ID numbers. EISA systems that hold both AT and EISA boards must

THE MULTIPROCESSING PAYOFF: HOW SIDE-BY-SIDE CPUs WORK

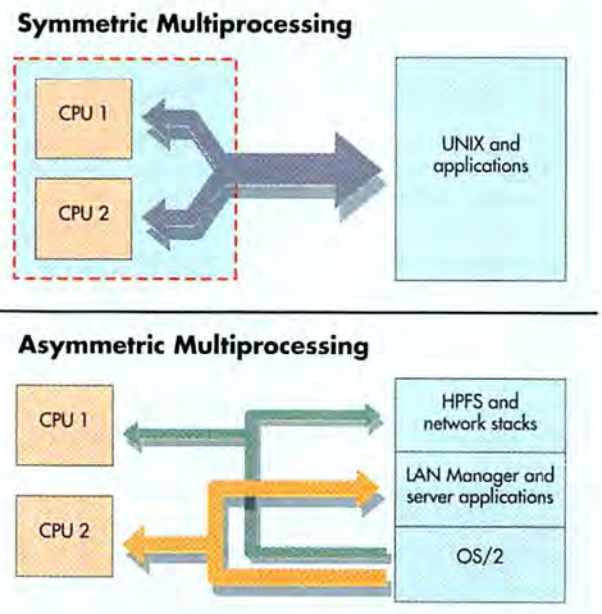
Like most other "new" technology for the PC, multiprocessing has a large-system heritage. Many minis and mainframes offer scalable multiprocessor performance, enabling administrators to add processors as the number of users and the complexity of applications increase.

Whether the platform is a DEC VAX 6000 or a Systempro, multiprocessing requires that the operating system be written to take advantage of multiple CPUs. That may be common on big iron, but with PCs the closest equivalent is software that's written to take advantage of a math coprocessor.

By the time you read this, Compaq should be offering two operating systems designed to exploit the Systempro's dual CPUs: *Compaq LAN Manager 386/486* and *SCO UNIX System V/386*. (A special version of *NetWare 386* is scheduled to ship around midyear, but few details were available at press time.) Running on the Systempro, *LAN Manager* and UNIX demonstrate two fundamentally different multiprocessing schemes.

The Systempro's UNIX implementation performs the classic form of multiprocessing known as *symmetric multiprocessing*. Here, two processors cooperate in the execution of a single stream of code. The CPUs work together to perform operating system and application chores; when you go from one to two processors, you double processing performance.

***LAN Manager* on the Systempro supports *asymmetric multiprocessing*, in which the two CPUs simultaneously but independently run different applications. Memory is partitioned into three sections: One section holds a single copy of OS/2 for use by both processors. Another is devoted to the primary CPU for running *LAN Manager* and server aplications. And the third is allocated to the secondary CPU for running OS/2's High Performance File System and managing network protocol stacks. In this scheme the load is not shared evenly, and so the performance increase is not as great—one CPU may be overtaxed while the second has little to do.**



In a symmetric arrangement, the Systempro's two CPUs cooperate, processing a single instruction stream and sharing the load equally. In an asymmetric arrangement, the CPUs share a single operating system but run separate, often unequal, tasks.

So, do you need multiprocessing? If most of your applications run at the workstation level, probably not. But those who rely on server-based applications will welcome the Systempro's additional muscle. —*E. K.*

manage two different kinds of interrupts, and it remains to be seen how smoothly this will work.

Mainframe-Like Mass Storage

An Intelligent Drive Array (IDA) that exploits EISA's potential comes standard with the Systempro. Like most mini and mainframe mass storage subsystems, the IDA has been optimized for fault tolerance and high performance in a multiuser environment.

The hub of the IDA is an 80186-based bus-master controller, which can use only Compaq's proprietary drive pairs. (You can buy the 420MB drive pair separately for $6999, but the 240MB pair comes only with the lowest-end Model 386-240.) The secret to the IDA's high performance is that it can treat as many as four drive pairs as a single logical drive. The maximum drive configuration adds up to 1.6 gigabytes, which is actually on the low side for some big-company data bases.

With only one person using the system, even a fully loaded IDA would be no faster than a single hard disk with the same basic specs as one of the IDA drives. But if multiple users are generating simultaneous requests, the more drives you hook up, the better the throughput.

When a conventional hard disk—even a fast one—with a 1:1 interleave reads four sectors, it must read them sequentially. But a four-drive IDA can read the sectors simultaneously, thanks to a data-striping scheme that interleaves sectors *across* disks. Compaq includes data-striping schemes for OS/2, DOS, *NetWare*, UNIX, and *Banyan Vines;* you simply tell the EISA Configuration Utility which operating system you want when you install the IDA. The IDA controller's ability to intelligently queue and service multiple requests for data also boosts efficiency.

The IDA's reliability features are just as impressive as its throughput potential. In addition to optional disk mirroring (in which two redundant drives run off the same controller) and duplexing (which adds a redundant controller), the IDA offers *data guarding.*

Data guarding devotes one drive of a four-drive array to maintaining the integrity of the other three. Should any drive fail, the IDA sounds an alarm that identifies the offending drive and pauses the system for 30 seconds. The drive array then continues to function, deriving the dead drive's data from the three remaining drives (with about two-thirds the performance of the full array).

Compaq claims that an IDA with a failed drive can function indefinitely without losing data. When you replace the drive, the data-guard function actually *rebuilds* the drive's data in the background, without network users being the wiser.

The drive pairs fit in nonstandard bays at the bottom of the Systempro's chassis. As a result of cabling requirements, the IDA controller must always reside in the bottom slot in the tower. In addition, the Systempro has one half-height and two third-height drive bays, all of which are externally accessible.

Thanks for the Memory, and the Memory, and...

Of all the Systempro's lofty specs, the 256MB capacity for CPU-speed memory is the one users are least likely to take advantage of. The system comes with one CPU board and one main memory board in two of its four proprietary, 32-bit processor/memory slots. To get to 256MB, you add two $21,999 32MB memory modules to that board (after removing its 4MB). Then add two memory expansion boards (at $799 each, unpopulated), fill them (these boards hold three 32MB modules each), and presto, 256MB.

But no one would want to do this—and not only because it would cost $177,590 (though you may get a pricing break somewhere along the line). Users are far more likely to want to boost performance by using the last slot for a second CPU instead of more memory, limiting the system to 160MB of CPU-speed memory.

Those accustomed to large systems might miss one fault-tolerant feature: Error Correction Circuitry (ECC) memory. NetFrame's servers are the only systems we've seen that offer this minicomputer capability (see last month's preview "A Miniature Mainframe for PC Networks"). Compaq maintains that given the current reliability of PC memory technology, ECC is an unnecessary expense. On the other hand, no one can dispute that the larger the memory, the greater the likelihood of error.

In price/performance, the Systempro may outshine certain members of the DEC VAX 6000 series. But Compaq is moving into mission-critical territory. When a file server goes down, some work may be interrupted or lost, but the situation is usually more of an inconvenience than a catastrophe. When a transaction-processing server drops the ball, however, hundreds of users face a gigabyte-sized corrupted data base—a prospect that would give anyone pause.

In the short run, mass storage innovation and EISA throughput add up to an impressive (if costly) file server. And when the dual-processing options arrive, the Systempro may also welcome a new class of client/server software and steal the thunder from minis. But first Compaq must convince companies that the Systempro can do without the constant support required by large systems yet still be as ironclad as big iron. ●

Eric Knorr is a senior editor for PC World.

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A New Deal for the Hardcard

The original hard disk on a card gets a welcome upgrade—with the performance to fit 286 and 386 systems.

Daniel Tynan

The Hardcard grows up, adding a 16-bit interface and easy installation for DOS, OS/2, or PC LANs.

DEBORAH JONES

The Hardcard, Plus Development's popular hard disk on a board, has spawned a 16-bit sequel. The Hardcard II combines the ruggedness and portability of the original with the high-speed performance that fast 286 and 386 machines demand.

As a fast, easy storage upgrade for a 16-bit system—or the primary hard disk for a stripped-down AT—the Hardcard II should prove hard to beat.

The Hardcard II's 40MB and 80MB versions both feature 1:1 interleave, a 64K static RAM cache, and a 16-bit interface. These boost the effective average access rate to 19ms, making the 80MB model viable for use with small networks. In informal tests on a prerelease unit, the Hardcard II proved roughly twice as fast as the original Hardcard 40.

The new Hardcard retains the original drive's slim 1-inch profile and premium pricing ($849 for 40MB, $999 for 80MB) as well as its rugged construction. It can take operating shocks of 10 g's without losing a byte of data, and it boasts a mean-time-between-failure rate of 60,000 hours—far beyond that of drives costing four times as much.

Reliability is further enhanced by DFI, an error correction scheme that automatically identifies bad sectors and transfers data found there to spare sectors in each cylinder.

Another nice touch is Plus's Photo utility, which takes a snapshot of any hard disk or logical drive and copies its data to the Hardcard II. This is useful for doing quick backups or transferring large amounts of data to PCs lacking portable storage subsystems. On the downside, the Hardcard won't work with disk optimizing utilities such as *SpinRite* that perform low-level formatting.

Less technically proficient users will appreciate the Hardcard's famed ease of installation: Just pop off the system's hood and plug the board into a 16-bit slot. A simple, menu-driven program lets you set up the drive for DOS, OS/2, or *Advanced NetWare 286 SFT* and automatically configures the disk into the largest partitions your operating system allows. The menus also make it easy to partition the disk manually into logical drives. Besides *NetWare*, the Hardcard II supports *IBM PC LAN* and 3Com *3+* networks.

But the Hardcard II's role as a network device is limited. While a system conceivably could hold up to four Hardcards, Plus says the practical limit is two—and you can't daisy-chain multiple drives or combine caches to boost speed. LAN users looking for modular storage would do better with Plus's Impulse drive (see "LAN Storage: It Doesn't Come Easy," December 1989).

Still, for incremental storage upgrades, the Hardcard II is a fast, reliable option. Users with 8-bit PCs will have to rely on the original Hardcard 20 and 40, now priced at $749 and $849, respectively. But 286 and 386 users should find the Hardcard II one sequel that surpasses the original. ●

Daniel Tynan is an assistant editor for PC World.

SNAPSHOT

Hardcard II 40 and 80

The Hardcard gets faster and bigger, storing up to 80MB on a single board with an access rate of 19ms.

KEY FEATURES

- **Menu-driven installation software**
- **Automatically detects bad sectors**
- **Two-year warranty**
- **Works only in 16-bit machines**

AVAILABILITY

Immediate

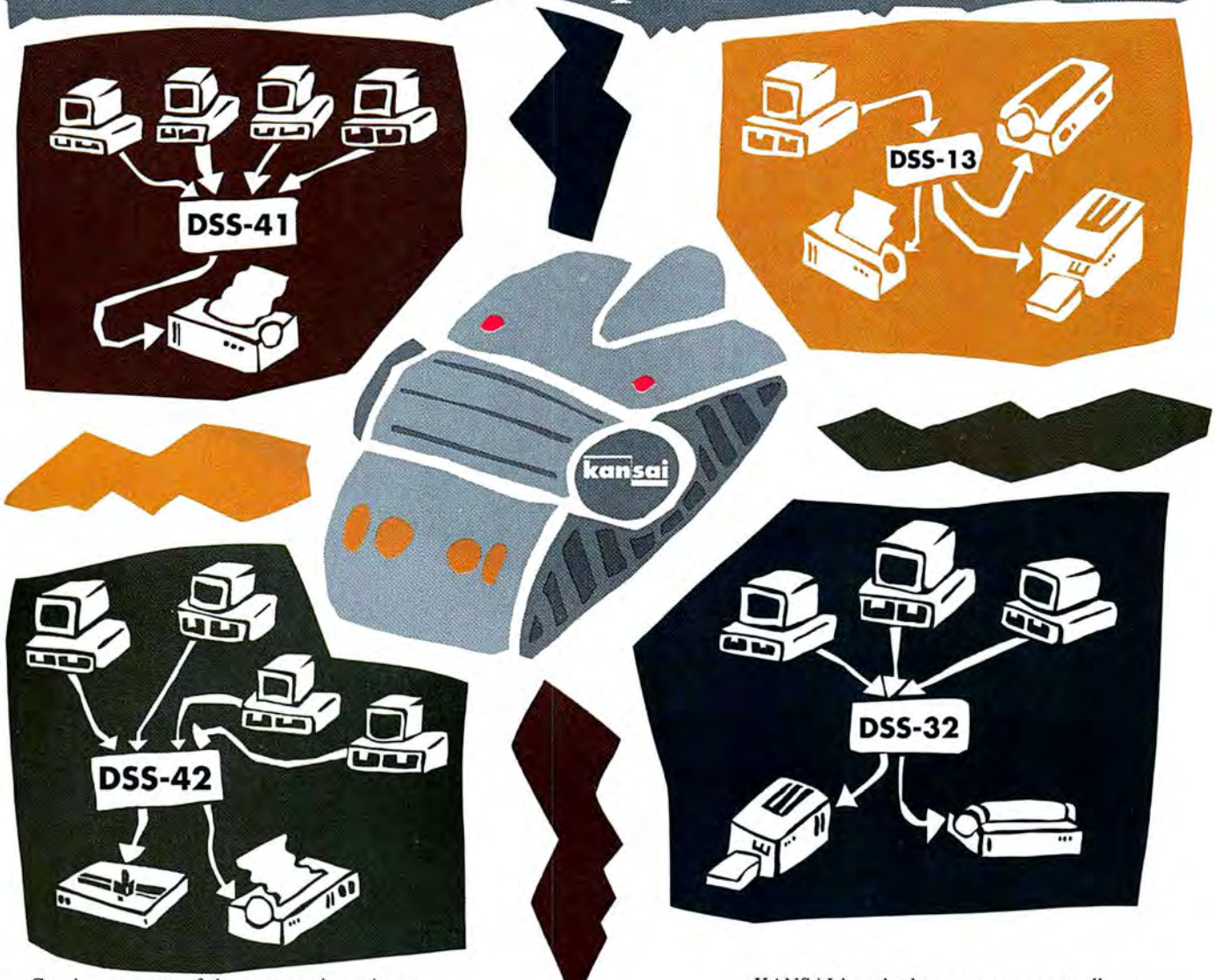
PRICING

40MB $849, 80MB $999

Plus Development Corp.
1778 McCarthy Blvd.
Milpitas, CA 95035-7421
408/434-6900

Reader service no. 765

Share The Peripheral Wealth



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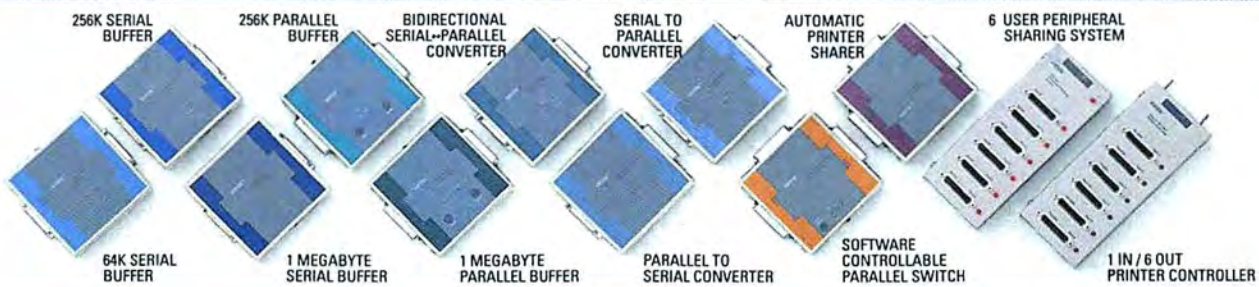

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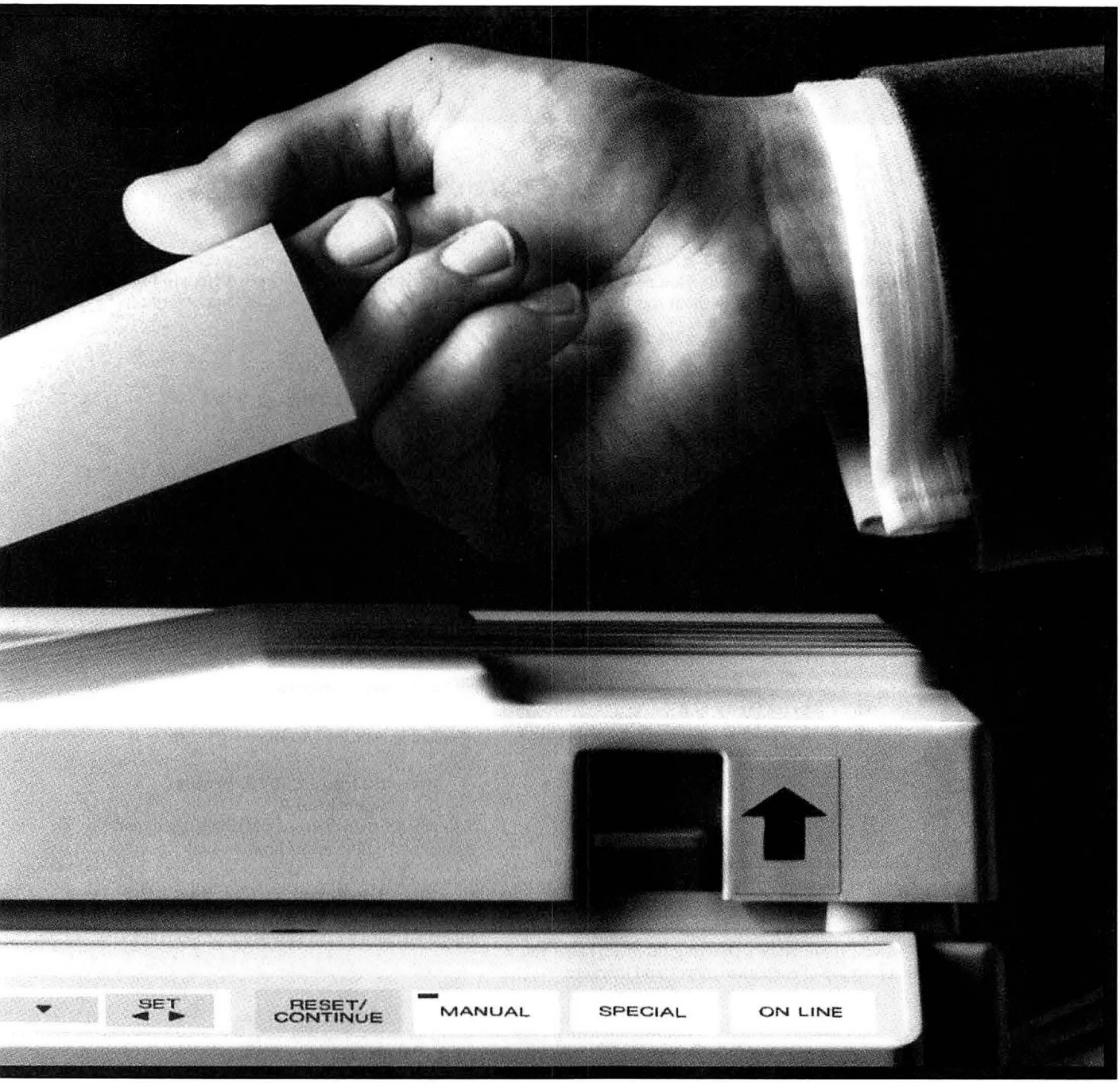

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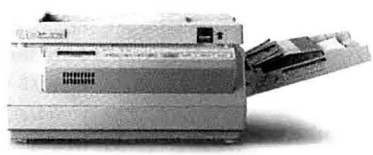

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PRODUCT OUTLOOK

INSIDE PRODUCT OUTLOOK

87 **TurboPS/400**
The TurboPS/400 from NewGen nearly triples your PostScript output without sacrificing quality.

87 **Current**
A welcome change: IBM's *Windows*-based personal information manager adapts to your style.

88 **Drafix Windows CAD**
Engineers and architects will celebrate the design capabilities of this *Windows*-based package.

88 **Super-386c**
An 18-month warranty and optional on-site service add to the appeal of Hyundai's low-cost 386.

90 **Disc Director**
Hard-disk management gets easier with Athena Software's intuitive many-in-one utilities package.

90 **Xerox Gray F/X**
Full scanner control and a gray-scale image editor give desktop publishers professional results—without the cost or hassle of a darkroom.

92 **CompuServe Information Manager**
Navigating CompuServe is easier with this inexpensive custom communications tool to guide you.

92 **Company Ladder**
Power Up Software's charting program helps you keep on top of corporate moves and mergers.

94 **LabelPro**
Sharp laser-printed labels are a snap to produce with this easy-to-use package from Avery.

UPDATE

94 **PaintJet XL**
Built to handle a busy work group's load, Hewlett-Packard's three-jet upgrade churns out sharp, clear four-color graphics twice as fast.

96 **Artisoft Lantastic Ethernet, 2-mbps Adapter, 0.7-mbps Adapter, Z**
This peer-to-peer Best Buy adds Ethernet adapters and a simple zero-slot version.

96 **Microsoft Word Companion Disk**
A pair of disks brings extra help—plus a collection of valuable utilities—to *Word 5.0* users.

98 **Instaplan 5000, Project Scheduler 4**
Two project management packages use expanded memory to pull massive projects under control.

98 **The Graphics Link Plus + 2.0**
Bridge the graphics gap between bit maps and 18 image formats with a handy conversion package.

NewGen's TurboPS/400 laser printer eliminates the PostScript bottleneck by using a 20-MHz Intel 80960KB RISC processor for floating-point math and an 80186 for I/O to process PostScript files 15 times faster.

TurboPS/400

PostScript Laser Sets a Faster Pace

Behind the pretty output of PostScript printers lies some grimy work in file interpretation, floating-point calculation, and rasterization. That heavy back-end work load means that you pay for access to rotatable, scalable fonts with lengthy waits while the page description language does its stuff.

NewGen's TurboPS/400 laser printer blasts through the PostScript bottleneck by beefing up its controller with a 20-MHz Intel RISC graphics processor and an 80186 I/O processor. While the 80186 handles output to an 8-ppm Canon SX laser engine, the RISC chip's floating-point coprocessor takes PostScript files and math to the mat at 20 MIPS in burst mode.

NewGen figures that you can process your average PostScript file 15 times faster—that's effectively triple the output of other 8-ppm lasers. And the tearing pace doesn't force you to sacrifice sharpness; the Canon engine offers 400-dpi resolution for publishing proofs and CAD drawings of very high quality. An upgrade switches the Canon laser on and off at a higher rate, doubling horizontal resolution to produce 800 by 400 dpi.

The TurboPS/400 accepts PostScript files generated for the Apple LaserWriter Plus as well as HP LaserJet IIs, HP plotters, and Epson LQ800 emulations. It lists for $6495 with 3MB of memory, expandable to 5MB. The high-resolution upgrade adds $1995 to the price. NewGen Systems Corp., 17580 Newhope St., Fountain Valley, CA 92708; 714/641-8900, 714/641-2800 (fax). —*Mark Henricks*

Reader service no. 620

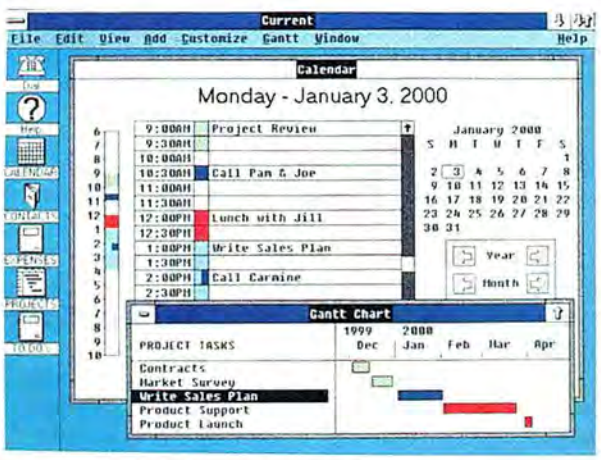
Current

Suit Yourself With IBM's Easy-to-Tailor Personal Information Manager

Many personal information managers handle your information well enough but are themselves unmanageable. They provide plenty of power for data retrieval and analysis but may force you to spend the time you save there on data entry and management. IBM's *Current* makes an appropriate trade-off between data analysis flexibility and data entry speed.

Some PIMs are formless out of the box, requiring you to shape them before you even know how to use them. Others make you change your work style to fit their fields. Inside IBM's new PIM, you'll find files preset to handle appointments, to-do lists, projects, and expenses. Get started with them. If they don't suit your style, you can add new ones, refine the standards, or come up with complete replacements of your own. You also get form letters, a spelling checker with mail merge, an outliner, auto-dial, a pop-up phone log for taking notes, calendars, a calculator, simple Gantt charts, and other functions.

The *Windows*-based interface combined with a powerful data connection capability gives you instant recall with minimal work. For example, you can click on a name displayed in a side menu to call up all letters connected with that subject. Click to a deeper level to retrieve all personnel connected with the project. Moving down another step may call up relevant dates. You make connections once; after that they're automatic.



IBM's Current speeds data entry chores with preset forms for appointments, to-do lists, projects, and expenses, but it's flexible enough to let you customize your information management approach.

And you won't have to devote your vacation to learning to use *Current*, thanks to the graphic interface and context-sensitive help. Two levels of tutorials also help you to get started and, when you're ready, to master advanced functions.

Current supports Dynamic Data Exchange (DDE) hot links with *Microsoft Excel* but no other *Windows* packages. However, you can import and export files in ASCII, DIF, and *dBASE* formats. You need a 286- or 386-based machine with a hard disk, 640K of memory, and DOS 3.3 or a later version. The $395 price also gets you a run-time version of *Windows*. IBM Desktop Software, 472 Wheelers Farms Rd., Milford, CT 06460; 800/426-7699 ext. 294. —*Mark Henricks*

Reader service no. 621

Drafix Windows CAD

Marriage Made in Graphics Heaven

Computer-aided design and *Windows*, a natural couple, meet up in *Drafix Windows CAD*. But Foresight Resources did more than tack the graphic windowing interface onto its current *Drafix CAD Ultra* offering. The new program gives architects, engineers, and other designers access to multiple interactive "viewports" and greatly enhanced drawing manipulation capabilities, all delivered for a moderate price.

Multiple viewports let you show several portions of your drawing at different zoom ratios. If you change, draw, or edit a detail in one viewport, all the viewports reflect it—a feature that's especially important when you're working with complex images. You can even start drawing on an edited image before the screen finishes updating the other windows. Foresight also has augmented the basic *Windows* interface with a modified menu bar that gives you changeable options, mouse prompts, and buttons and boxes for undo and other design-related functions. A new programming language comes with its own set of macros, including one that literally saves you drawing steps—an automatic stair generator that fills in treads and risers wherever you want them.

Drafix Windows CAD lets you control and change dimensions along the horizontal, vertical, rotated, aligned, angular, radius, diameter, ordinate, elevation, and centerline axes. Change any one dimension, and all those linked to it are recalculated. Other features make it easier to hatch and fill drawings and to add notes and symbols.

The program requires an 80286- or 80386-based machine with 1MB of memory, DOS 2.01 or a later version, a mouse or digitizer, EGA or better graphics, a hard disk, and *Windows 2.1*, */286*, or */386*. Files are compatible with the DXF drawing format, which means you can import from *AutoCAD* and *Micrografx Designer* and can export data base information directly to *Excel* spreadsheets.

Drafix Windows CAD not only employs the Windows interface to help you navigate your computer-aided designs, but it also uses the environment's multitasking capability to give you multiple "viewports" for manipulating your drawing from several perspectives at once.

For $695, you get both 5¼- and 3½-inch disks and a General Symbols Library of 400 office-layout, architectural, mechanical design, and electronic symbols. The Professional Symbols Library of architectural, mechanical, and engineering images costs $150. Foresight Resources Corp., 10725 Ambassador Dr., Kansas City, MO 64153; 800/231-8574, 816/891-8018 (fax). *—Mark Henricks*

Reader service no. 623

Super-386c

Hyundai Goes for Simplicity, Service

If the useful life of a desktop computer is about five years, why should a warranty cover only a fifth of that time? Hyundai doesn't go the whole five years, but it has bumped up the warranty for its Super-386c to 18 months with a $179.95 option for on-site service. This top-of-the-line system doesn't break any technological barriers, but it is a reasonably priced, appropriately supported 386 from a financially sound manufacturer. There's nothing as fancy as memory caching here, but the system does achieve 20 MHz with zero wait states, enough to handle hefty DOS or OS/2 applications. The CPU card includes a socket for an Intel 387 math coprocessor and plugs into a passive backplane, offering an easy upgrade path to faster CPUs in the future.

Four half-height drive bays in the Super-386c's 16.5-by-15.9-by-6.2-inch cabinet will accommodate all the storage devices most users will ever need. Six slots, including two 8-bit and four 8/16-bit, give you room to plug in a network card and other options even after one 8/16-bit space is taken up by a video card.

With 1MB of system memory, a 1.2MB 5¼-inch floppy with a built-in controller, DOS 3.3, GW BASIC, and a diagnostic disk, the Super-386c is priced at $2695. A 16-bit VGA board and 14-inch color monitor bundle is $1070. Hard drive options include a $750 40MB or $1500 100MB drive; both have an average access rate of 25ms and include built-in IDE AT-bus interfaces, which means they don't need controllers. Hyundai Electronics America, 166 Baypointe Pkwy., San Jose, CA 95134; 800/727-6972, 408/943-9567 (fax). *—Mark Henricks*

Reader service no. 622

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Circle 210 on reader service card

Disc Director

Hard Disk Manager Adds a Pinch of This, a Dash of That

As more hard disk management utilities appear, the category becomes more difficult to define. Athena Software's *Disc Director* combines most of the features of *Xtree*, Peter Norton's *Commander*, and World Software's *Extend-A-Name*. Then it adds a few tricks of its own for eliminating duplicate files. It's a little hard to pigeonhole, but worth trying out.

Disc Director is a stand-alone application, but it can act as a shell that swaps in and out of memory when you load and unload other programs. It lacks the ability to use virtual disk, expanded, or extended memory for its operation, but it leaves just a 12K kernel in memory when not active.

Disc Director is a little slow coming and going—it can take up to 45 seconds to scan in directory information from a large hard disk on an 8086-based computer. But it's also very intuitive, giving you the option of pulldown menus or <Alt>-*key* combinations, and employs standard conventions—you use the <Esc> key to back out and <F1> to call up context-sensitive help.

One side of *Disc Director*'s display is always a tree directory. The other side provides a variety of user-selectable views. As a default, you'll probably choose the file-list view with the file size and creation date showing. Another view gives extended descriptions of your subdirectories; yet another provides a bar graph of directory sizes, the percentage of your hard disk that each uses, the number of files, and so on.

Like *Commander*, *Disc Director* lets you peek into *dBASE*, *1-2-3*, *Word*, and *WordPerfect* files. But its most helpful feature is its ability to work not just on a file or subdirectory but on a branch of the tree containing several subdirectories. You simply highlight subdirectories, and then you can move, copy, delete, and perform other common DOS operations—even make and unmake subdirectories by moving tree branches around the screen.

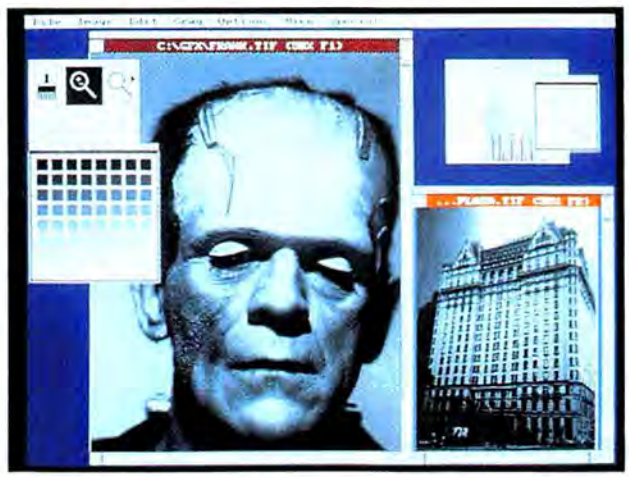
Disc Director also measures the efficiency of drive usage by reporting "slack space"; for example, it will tell you that of 2MB of clusters in a directory, 50K are empty. Unfortunately, the program lacks cluster optimization or other tricks to solve the problems it reports.

The program's one nod in this direction is its ability to search your hard disk quickly for duplicate files; they are then listed in a "phantom" directory that lets you work on the files without constantly relogging on to different

(see Disc Director, p. 92)

Xerox Gray F/X

A Darkroom for the Desktop



An array of scanner controls and gray-scale image editing tools allows Xerox Gray F/X to make photographic-quality images from your graphics files. Change brightness and contrast, crop and size, flip, skew, cut and paste, and overlay using multiple image editing windows.

Problem: You need to enhance photographic images for your desktop-published documents, but you don't want to convert your laundry area into a darkroom. Solution: Combine a scanner and *Gray F/X* into a powerful image-crafting tool kit. *Gray F/X* includes a full array of scanner controls, and you can edit images in 256 levels of gray. You can perform on-line equivalents of the dodging and burning you would do in a real darkroom, and you have more precise control. Starting with a TIFF, HFF, PCX, GIF, or EPS image, you can adjust brightness and contrast, crop, size, flip, skew, mirror, insert, cut and paste, or blur selected portions. You also can overlay translucent layers or mask imperfections with patches perfectly matched to the rest of your image.

You can do all this in multiple image-editing windows of any size, copying instantly from one to another while keeping all in view. Everything is accessed via a graphic interface that exploits command bars, pulldown menus, icons, and a mouse. You need a 286- or 386-based platform, DOS 3.0, 640K of memory, a 10MB hard disk, and VGA or, preferably, Super VGA graphics. The program supports 15 scanners, a score of output printers from Canon lasers to image-setting machines, and even high-end 24-pin printers and a half-dozen mouse devices, Xerox says. The suggested retail price is $495. Xerox Imaging Systems, 535 Oakmead Pkwy., Sunnyvale, CA 94086; 800/248-6550. —*Mark Henricks*

Reader service no. 626

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CompuServe Information Manager

Custom Shell Makes for Smooth Sail Through CompuServe

CompuServe Information Manager automates your E-mail, letting you prepare letters off line with the help of in- and out-boxes, an address book, and a built-in text editor. Its windowed interface lets you use most CompuServe forums and services simultaneously.

Hearing the footsteps of Prodigy, its fast-maturing rival, CompuServe has made its on-line information service easier to use with a custom communications program that guides you through its services via a windowed interface and pulldown menus. Free to new members, *CompuServe Information Manager* is available to subscribers for $24.95, which includes a $15 usage credit.

CompuServe Information Manager automates E-mail tasks while keeping on-line costs to a minimum. Much like *Lotus Express* for MCI Mail, *Information Manager* allows you to use CompuServe E-mail off line and to take advantage of in- and out-boxes, an address book, and a built-in text editor.

Like *Lotus Express*, *Information Manager* polls your mailbox at regular intervals, though it won't send files unattended as *Express* does. Still, menus let you easily select messages to send or receive. All transfers are error protected with the CompuServe B+ protocol.

Information Manager also lets you navigate and multitask between most CompuServe forums and services. Within forums, you can chat on line or read a message in one window while browsing through files in another. A message map displays message threads visually, so you know who's replying to whom.

CompuServe Information Manager doesn't require a graphics adapter, and a mouse is optional. You do, however, need 640K of RAM, DOS 2.0 or a later version, and a Hayes-compatible modem. CompuServe, 5000 Arlington Centre Blvd., P.O. Box 20212, Columbus, OH 43220; 800/848-8199. *—Eric Brown*

Reader service no. 624

Disc Director

(continued from p. 90)

directories. You also can create phantom directories to house the results of *Gofer*-style text-string and file searches using various parameters, although *Disc Director* lacks the "finds" organizational capability of *Gofer*.

The $79 single-user version of *Disc Director* works on DOS 2.0 and all later versions, while a $295 version brings its powers to Novell ELS and SFT networks. Athena Software, 4915 Twin Lakes Rd. #19, Boulder, CO 80301; 303/530-0693, 303/530-0727 (fax). *—Mike Hogan*

Reader service no. 625

Company Ladder

Relieving the Organizational Chart Reorganization Blues

The corporate urge to merge or diverge has never been greater, and the typical organizational chart has become a work in progress. If you're responsible for drawing and filling in all those lines and boxes, consider Power Up's *Company Ladder*. Requiring only 256K, it offers seven chart styles and six box styles and builds charts with up to 2000 positions.

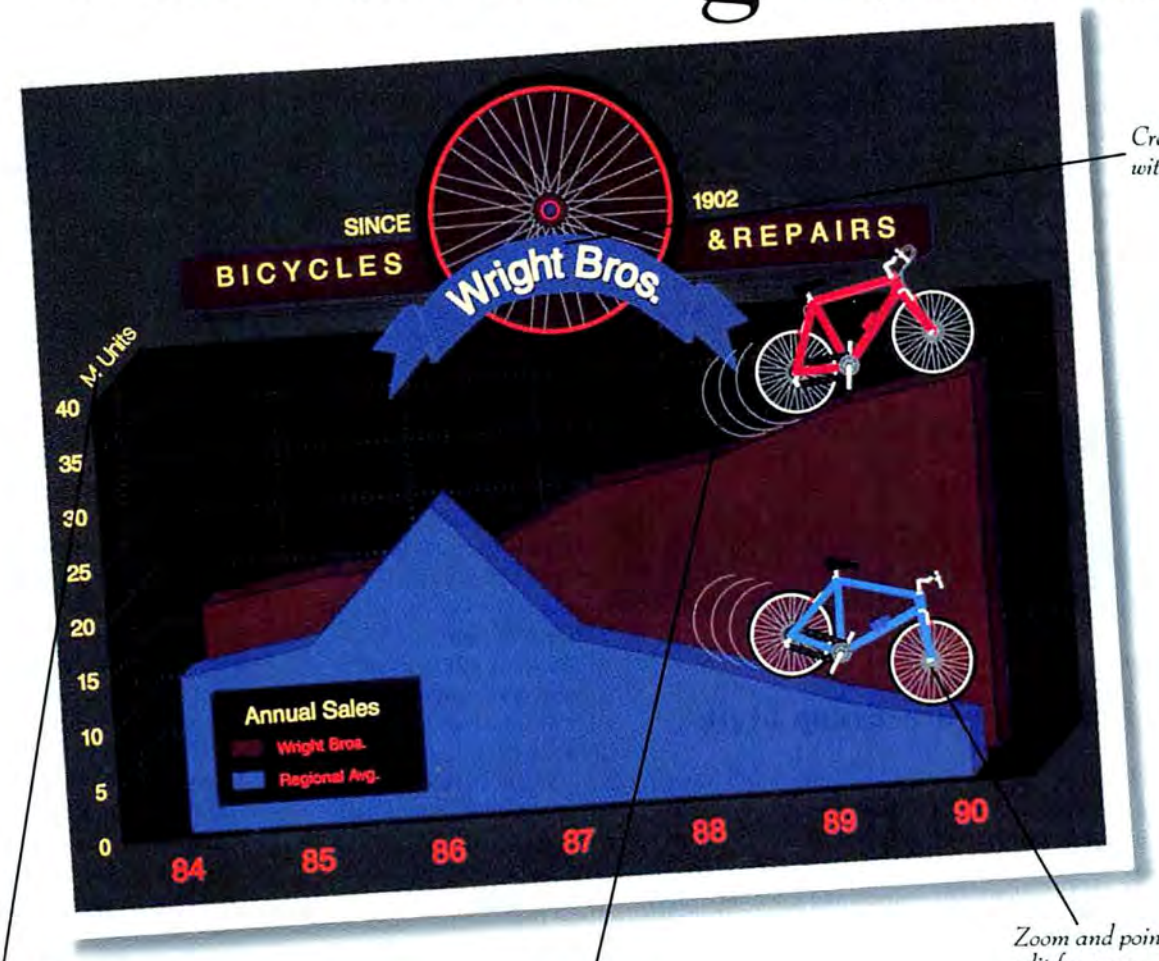
This is more than a charting package; it also lets you turn each box into a small data base record containing up to 26 fields with simple mathematical functions for calculating figures such as salaries and raises. A split screen lets you view the data you're entering and the box's placement on the chart.

At press time, *Company Ladder* offered 300-dpi output with a wide array of proportional and nonproportional fonts that you can select field by field for output to a dot matrix or laser printer. You can plot Helvetica and Times Roman fonts in portrait and landscape modes from an HP-compatible laser printer onto a transparency.

On the downside, *Company Ladder*'s lack of mouse support and cursor key dependence make screen navigation cumbersome. Power Up offers a few function keys that hardly qualify as an easy-to-use interface. Still, if you've been wrestling with a word processor or graphics program to do the job, this $79.95 program should be a corporate bonus. Power Up Software, 2929 Campus Dr., San Mateo, CA 94403; 800/851-2917, 800/223-1479. *—Susan Lusty*

Reader service no. 627

Add These Extras For Nothing Extra.



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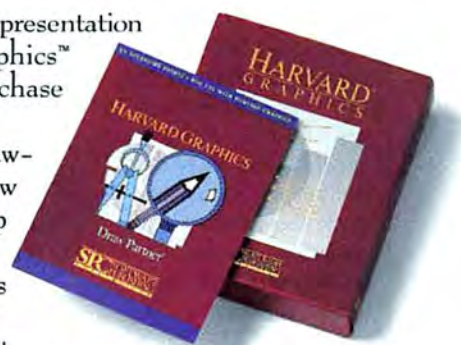
Draw Partner combines the advanced tools you'd look for in a high-end drawing program with the ease of use Harvard Graphics is famous for. Users can now zoom in for detail work. Point edit for finely tuned images. Sweep, rotate or flip text and objects. Even create dazzling logos with circular text. And that's just for starters. Match up Draw Partner with number-one selling Harvard Graphics and you've got the most powerful presentation graphics solution available.

So talk to your dealer and find out how to get a lot of extras for nothing. But do it soon. Nothing this good lasts forever.



SPC SOFTWARE PUBLISHING CORPORATION

Current Harvard Graphics users: see your dealer to purchase Draw Partner separately at a special introductory price.
Runs on IBM PC and MS DOS compatibles. ©1989 Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94039-7210

FOR DEMONSTRATION DISKS CALL 1-800-345-2888 OPERATOR 53.

In Canada call 1-416-566-0566.

Circle 278 on reader service card

LabelPro

From Laser to Labels in One Step

You can create handsome mailing labels with desktop publishing software and a laser printer, but for most jobs that's the long way around the barn.

Label maker Avery has a shortcut. Its *LabelPro* package gives you a simple on-screen, icon-driven formatting process for producing laser printer labels—it uses clip art and variable fonts with data from your existing data base.

You get two typefaces that can be sized from 6 to 96 points and plugged into built-in layouts for 14 sizes of labels in more than 50 predefined formats. For that custom look, scan in your corporate logo, pull something out of *LabelPro*'s bundle of 25 clip art pieces, or import any clip art in PCX format.

You won't have to reenter data that's already contained in *dBASE* or *WordPerfect*, and *LabelPro* imports comma-delimited ASCII data as well via its List Manager function. You needn't input any data at all if the label you want is contained in the program's QuickPrint library of business labels, which includes such standards as Please Rush and Fragile.

LabelPro retails for $99.95 and has a starter set of labels for addresses, disks, shipping cartons, file folders, and overhead transparencies. It requires 512K of memory, DOS 3.0 or a later version, and Hercules, CGA, or better graphics capability. It supports any HP LaserJet, Xerox 4045, Canon, or PostScript printer and compatibles. Avery Commercial Products Division, 818 Oak Park Rd., Covina, CA 91724; 818/915-3851.

—Mark Henricks

Reader service no. 628

UPDATE

HP PaintJet XL

Color Printing, Work-Group Style

Weary of waiting for that four-color sales chart to emerge from your ink jet printer? If you're tired of tedious printing and limited paper options, you'll find Hewlett-Packard's $2495 PaintJet XL a workhorse of a different color.

Designed for work groups, the XL is two to three times faster than the original PaintJet and $1100 more expensive. HP has added the ability to handle B-size (11-by-17-inch) paper, and an automatic sheet feeder that holds 200 pages or 70 transparencies for unattended printing. At 39 pounds, the XL is built to withstand a much heavier work load than its desktop sibling.

Employing one black and three color cartridges instead of the original PaintJet's one color and one black cartridge, the XL can produce an 8½-by-11-inch page of 180-dpi graphics in about 90 seconds. Special Presentation and Transparency modes double the print time but produce smoother color gradations for the sharpest possible output. Logical front-panel controls offer easy switching between modes.

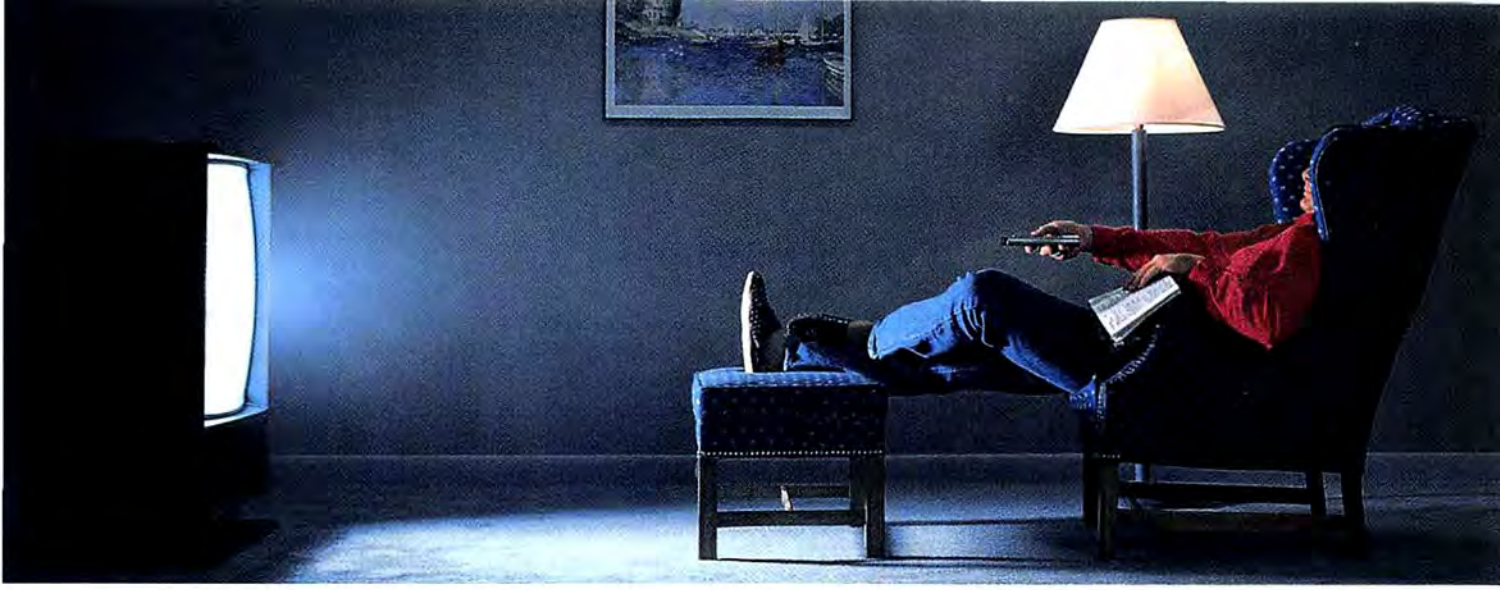
The XL spits out draft text at the same 167 cps as the original but bumps up the downloadable font buffer from 8K to 189K. An optional $225 font cartridge offers 20 fonts in CG Times, CG Triumvirate, and Prestige typefaces. The XL supports Type Director, HP's scalable font library, but you can add a PostScript emulator like QMS's $195 *Ultrascript 2.0* for impressive color output at one-third the cost of a 300-dpi color PostScript printer.

As with the PaintJet, the cost of consumables can mount quickly. Separate print cartridges for cyan, yellow, magenta, and black cost $29.95 each and are good for about 600 pages of color graphics at 13 percent density. For highest-quality output, HP recommends special paper (200 sheets $20.95, B-size $44.95) and transparencies (50 sheets $64.95). An optional tray for feeding B-size paper is $149.95. Hewlett-Packard Inquiries, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900.

—Daniel Tynan

Reader service no. 629

The PaintJet XL is two to three times faster than the original, handles larger paper, has an automatic sheet feeder, and produces smoother color gradations for the sharpest possible output.



Now you can change programs on your computer just as easily.

"Click", spreadsheet.
"Click", word processor.
"Click", database.

Imagine. Now you can change from one software program to another just like changing channels on your television. With Software Carousel,® it's that easy.

No more saving files, exiting programs, loading new programs and retrieving new files, every time you need to change applications.

Simply load your programs in the morning (it handles up to twelve at a time). Then "click" from one to another all day long.

Over to word processing for a quick memo. Into your spreadsheet for budget work. Off to your database for a mailing list update. Return to your word processor, and it's ready to go back to work, right where you left off.

Or load several sessions of the same program, each with a different file, pop back and forth, and work on several spreadsheets, documents, or anything else, all at once.

Why didn't someone do this before?

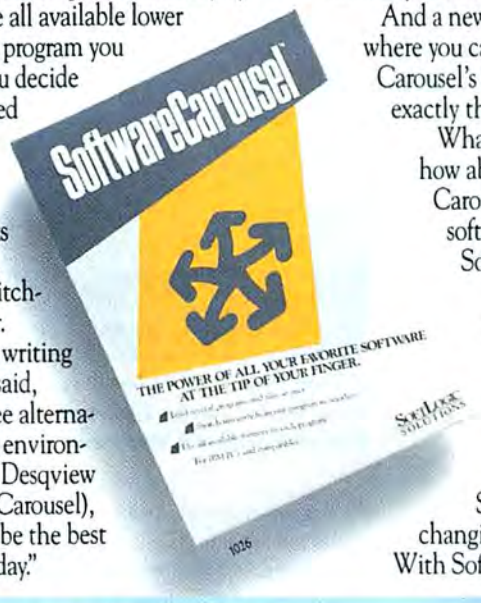
Actually, a lot of people tried. But what they ended with were a bunch of fancy software "environments" that eat up memory, change the way you work, and boggle the mind with complexity.

Plus, a lot of them make you buy new "compatible" software applications. Some even make you buy a bigger computer.

Software Carousel, on the other hand, works with the programs you already own. So you can go on using 1-2-3, WordPerfect, dBASE, SideKick, any program that runs on the computer you use right now. In an absolute minimum of memory. Without changing anything about the way your software runs.

Best of all, Software Carousel makes the most of your computer's memory by letting you use all available lower RAM in each program you use. And if you decide to add extended or expanded memory, Software Carousel works with that too, and makes switching even faster.

Garry Ray, writing for PC Week said, "Of these three alternative operating environments (OS/2, Desqview and Software Carousel), Carousel may be the best choice of the day."



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Like new support for graphics programs. And for PC networks.

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InfoWorld said, "If you're looking for simplicity, Carousel is the environment for you. It's a...program that delivers what it promises; a very good value."

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Circle 275 on reader service card

Artisoft Lantastic Ethernet, 2-mbps Adapter, 0.7-mbps Adapter, Z

Peer-to-Peer LAN Serves Up Additional Options

Lantastic, Artisoft's Best Buy peer-to-peer LAN ("No Pain, Big Gains: Five Low-Cost LANs," November 1989), has broadened its hardware offerings at both the high and the low ends. New products include an Ethernet adapter, an update to the proprietary 2-megabit-per-second (mbps) twisted-pair adapter, a 0.7-mbps entry-level version of same, and a software-only version of the Lantastic network operating system (NOS) that connects two computers via their parallel or serial ports.

The 10-mbps Lantastic Ethernet adapter runs the familiar, easy-to-install Lantastic NOS—only faster. But since it lacks the coprocessor found in the company's 2-mbps twisted-pair adapter, it needs more of your system's RAM. Over RG-58 "cheapernet" (thin ethernet) cable, it can span 300 meters and handle up to 30 workstations before you need repeaters or hubs. With standard ethernet, the limits climb to 500 meters and 100 stations. Unlike Artisoft's other adapters, this one includes support for diskless workstations. Its compatibility with the Western Digital EtherCard Plus provides an easy upgrade path to *NetWare* and other server-based systems.

Enhancements to the Lantastic 2-mbps adapter's software-selectable settings should make it easier to configure. The hardware retains its predecessor's on-board coprocessor, which enables it to offload most network processing and use less of your PC's RAM. It's still limited to 32 stations on the LAN. Total LAN cable length is 300 feet with twisted-pair cables, 1500 feet with Artisoft's shielded cables.

You can plug one of two expansion daughterboards into the LAN. One adds a special 32K expanded memory page that a server can use to move Lantastic's software out of base RAM. The other allows remote booting of diskless workstations.

The Lantastic 0.7-mbps adapter is slower and cheaper than the 2-mbps adapter. Since its coprocessor has only 2K of RAM, the network software takes an extra 15K of system memory.

Otherwise it's functionally identical with the 2-mbps board and accepts the same expansion boards.

Finally, Lantastic offers Z, a zero-slot LAN that connects two PCs via parallel or serial ports, offering those two workstations the same peer-to-peer LAN capabilities available from Artisoft's other products. The kit includes an 18-foot parallel cable and a 25-foot serial cable.

A Lantastic Ethernet Starter Kit of two adapters, one cable, two terminators, and Lantastic NOS software for up to 120 users costs $725. Additional Ethernet adapters are $349. Starter kits for the 2-mbps and 0.7-mbps versions are $525 and $325, respectively, with additional adapters costing $249 and $149. RAM and remote boot boards are $99 each. Lantastic Z is $199. Artisoft Inc., 575 E. River Rd., Tucson, AZ 85704; 602/293-6363, 602/293-8065 (fax). —*Robert Lauriston*

Reader service no. 634

Microsoft Word Companion Disk

Need Help With Word? Stylish Add-In Rides to the Rescue

Microsoft Word Companion Disk gives you an expanded Advanced Quick Help system for Word 5.0 with more information and more extensive cross-references than in Word's standard help.

Rinearson Support Associates has updated its add-in help system for version 5.0 of *Microsoft Word*. Rinearson's *Microsoft Word Companion Disk* lets you replace the context-sensitive help in *Word 5.0* with an expanded Advanced Quick Help system accessible with an <Alt>-H or <Esc>H key combination. Rinearson's help version includes more screens with more information per screen and more cross-references than the standard *Word* help file.

Originally introduced with *Word 4.0*, *Companion Disk* has grown from one disk to a two-disk set that includes sample form letters, more than a dozen ready-made style sheets, and a supplement to *Word*'s spelling checker.

The software also includes hundreds of *Word* macros and a utility that lets you create extensive profiles of *Word* documents and style sheets with information such as a glossary of macros. Rinearson Support Associates, 219 First Ave. N #410, Seattle, WA 98109-4893; 206/726-9200. —*Mike Hogan*

Reader service no. 630

We'll take your stats and make you the most valuable player in your league.

PC MAGAZINE EDITOR'S CHOICE
March 14, 1989

Data analysis software from SPSS gives your PC a winning advantage.

It doesn't matter which field you play hardball in. With the right combination of equipment and ability, you can be a hero.

You get that ability with SPSS. Whether your equipment runs on MS-DOS™ or PC-DOS,™ OS/2™ or a Macintosh.™ So you turn raw data into useful facts. And yourself into a smarter decision maker.

With SPSS and its options, you can interface directly with data from your database, spreadsheet or other application software. Then manipulate it in countless ways. From data entry to advanced statistics, forecasting, presentation and more.

Voted #1 by the fans.

When the readers of *PC Week* chose the top statistical software for "user satisfaction" (12/5/88), their choice was SPSS. And no wonder.

SPSS is designed not only for your computer's operating system, but also for its operator. With menu and help systems, plus an on-line statistical glossary. So you're always in control. For market research, sales analysis, quality control and more.

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Circle 252 on reader service card

Instaplan 5000, Project Scheduler 4

A Pair of Project Managers That Handle the Big Jobs

Fifty tasks in a project plan? That's a pretty average-size plan. But 50 projects with 50 tasks? That's 2500 tasks—a real burden to most under-$1000 project packages. Even for the few that can manage that many activities, linking subprojects simply takes too much time and effort—and recalculating changes in a project that size takes forever. But Scitor's *Project Scheduler 4* and Instaplan's *Instaplan 5000* both turn to expanded memory to expedite subproject linking and recalcs for master projects.

An upgrade of the $99 *Instaplan 2.0*, the workgroup–capable *Instaplan 5000* allows you to import and consolidate a batch of projects from anywhere in your computer or across your network. That way, a project director can quickly collect all the subprojects to find the status of the master project. *Instaplan 5000* handles approximately 2000 tasks for each megabyte of EMS 3.2 or 4.0 memory (up to 2.5MB) and combines several of the add-ons available separately for prior versions, including *Classic PERT* for drawing network logic diagrams.

In addition, because *Instaplan 2.0* and *Instaplan 5000* store a "last date changed" for every task rather than the usual "as of" date for the entire project, you get a higher level of detail—and therefore accuracy—for subprojects across the entire master project.

Already the fastest of any graphics-based project manager available, *Project Scheduler 4* release 2.0 gains greater subproject capacity—up to 6000 linked tasks with 12,000 resource assignments per megabyte of expanded memory up to 8MB. A single project can handle up to 2000 tasks with 500 resource definitions.

To create a master project in *Project Scheduler 4*, you load the subprojects into memory, then reference them in the master without changing the old file versions still on your hard disk. When you save the master project, you save only the references to the subprojects, resulting in a small file that hasn't changed the files to which it refers. You don't need to reload the subprojects unless you leave the application. With *Instaplan 5000*, on the other hand, you need to reload the subprojects every time you ask for a new status report.

Instaplan 5000, which requires 640K of memory, DOS 2.0 or a later version, and a hard disk, is available for $495. *Project Scheduler 4*, which has the same requirements, is $685. —*Mark S. Burgess*

Instaplan 5000, Instaplan Corp., 655 Redwood Hwy. #311R, Mill Valley, CA 94941; 415/389-1414, 415/389-8046 (fax).

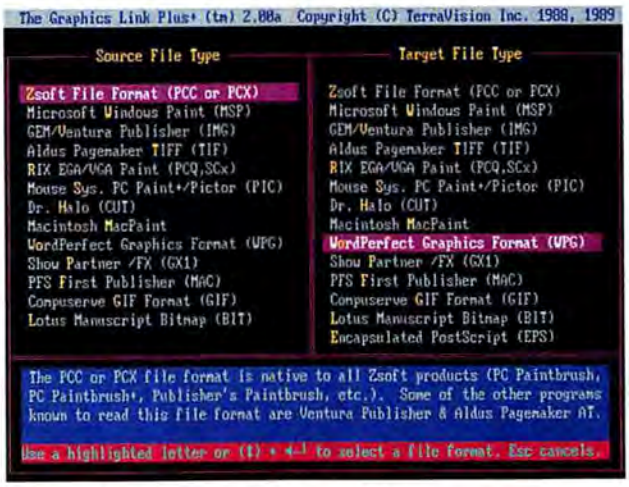
Reader service no. 635

Project Scheduler 4, Scitor Corp., 393 Vintage Park Dr. #140, Foster City, CA 94404; 415/570-7700.

Reader service no. 636

The Graphics Link Plus+ 2.0

Pick Your Style, Transform a File



Graphics Link Plus+ converts 17 bit-mapped file structures into 18 graphics formats and turns color images into gray-scale or black-and-white.

The desktop publishing world lacks a common bit-mapped file format, but with *The Graphics Link Plus+* 2.0, you can be fairly certain that you're positioned at a graphics crossroads. Long distributed via bulletin boards, this graphics conversion utility is now the property of HSC Software, which has moved it into mainstream distribution and added needed features.

The software supports conversions from 17 bit-mapped file structures into 18 formats, ranging from TIFF and PIC to WPP, EPS, and Macintosh. You can also improve your expressive range by converting color images to gray scale or black-and-white for use with a laser printer and desktop publishing package.

Other niceties include the ability to turn those gray-scale images into black-and-white line art for posterization effects. You can automatically trace an outline and reverse-out, rotate, and size an image. There's even a rudimentary slide-show capability.

The Graphics Link Plus+ retails for $149. Registered owners can get upgrades for $40 and a phone call. HSC Software, 1661 Lincoln Blvd. #101, Santa Monica, CA 90404; 213/392-8441, 213/392-6015 (fax). —*Mark Henricks*

Reader service no. 633

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

PREPARE YOUR 1989 RETURN, AND PLAN FOR YOUR 1990 RETURN.

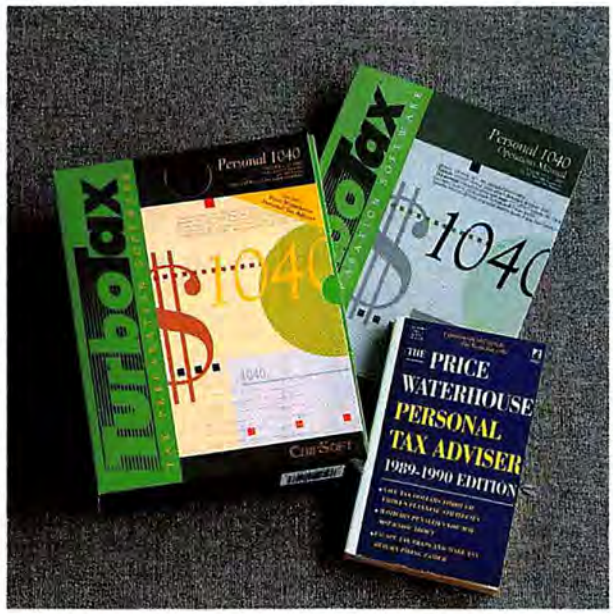
Simply The Finest Tax Preparation Software Available For The PC.

Calculates A Fully Cross-Referenced Return In Just 5 Seconds!

"It was a pleasure looking at the new TurboTax 1989 version. For five years the staff here has been involved with this product, and it has gotten better and more feature-rich with each new edition. The key to this system is its super easy-to-use features that handle actual preparation of tax forms, as well as forecasting and tax planning for the following year. We loved the fast pull-down menu operation, superb screen design, and unique new "Tax Window" that gives you a running synopsis of the tax return at any point during data entry. And this product handles more than 50 IRS-approved forms."

"We were also very impressed with the easy planning features and complete up-to-date financial summaries that TurboTax cranks out. It's an amazing piece of software and our unanimous choice as "Best of 1989" tax preparation package."

—Mark Pacetti,
TigerSoftware Technician



The State of the Art!

Now in its sixth year, TurboTax continues to define the state-of-the-art in Personal Income Tax Preparation by making available the most comprehensive and easy-to-use program possible.

"New Look" pull-down menus and expanded HELP features guide you through more than 50 IRS-approved forms, schedules and worksheets — all can be printed on your personal printer.

The Automatic Interview Worksheet helps you select the necessary forms. The Tax Planning module enables you to analyze BOTH your 1989 and 1990 tax situations. All appropriate entries automatically transfer from form to form as well as from your federal return to your TurboTax State Return Program (available separately). Finally, your complete tax return is calculated in under 5 seconds!

Reduce Tax Deadline Stress!

TurboTax is an effective tool that assists you in tax return preparation, tax planning and tax record keeping. The philosophy behind TurboTax is simple and intuitively appealing. TurboTax displays a facsimile of each tax form on the screen, provides an easy-to-use interface and calculates the form and tax values *FAST*. With on-line help and the various program support services that are available, TurboTax significantly reduces the stress that occurs as April 15th approaches. In addition, the tax planning and record keeping features included in TurboTax can help you opitimize your tax situation for next year.

ChipSoft, Inc.

TurboTax ► Just $65.00

AD 1250 TurboTax IBM 5¼ $65.00
IBM PC, XT, AT, PS/2 or compatibles with two floppy drives or one floppy drive and a hard disk.

TurboTax Features:

- Easy — additional HELP features (with cross-reference)
- Fast — calculates complete return in under 5 seconds
- "New Look" pull-down menu system
- "On-Screen Stickies" — notes for each line item, printable reminder system
- Built-in mouse support
- IRS approved Dot Matrix 1040... also works with LaserJet!
- Quick Look Tax Window
- Expanded depreciation support (with HELP)
- Pop-up calculator
- Full override capability
- 1990 tax planning included FREE
- Data Examiner — to help assess the completeness of your return
- Auto Interview — to help you select which forms you'll need
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- Interfaces with **Quicken, Managing Your Money, Dollars and $ense**
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- Electronic filing (available separately) via your modem.

THE BEST OF 1987 — PC MAGAZINE EDITORS' CHOICE — 1986 PC WORLD WORD CLASS AWARD — 1987 PC WORLD WORD CLASS AWARD — 1988 PC WORLD WORD CLASS AWARD — 1989 PC WORLD WORD CLASS AWARD

"It makes doing your taxes almost fun..." —PC Magazine

"The only thing TurboTax can't do is print the money." —PC World

"Triple Crown: form preparation, tax planning and elegantly written software." —Money Magazine

TurboTax Forms Library Includes All These.

TurboTax includes more forms than any other personal tax program. Each form is format-by-format, line-by-line identical with the IRS, so you don't have to know two sets of forms. Included with the program this year are:

1040 ..... Individual Income Tax Return
Schedule A ..... Itemized Deductions
Schedule B ..... Interest & Dividends
Schedule C (4) ..... Business Income & Expenses
Schedule D ..... Capital Gains & Losses
Schedule D-1 ..... Continuation Sheet for Schedule D
Schedule E ..... Supplemental Income & Loss (rentals, partnerships, S corporations, estates, trusts)
Schedule F (2) ..... Farm Income & Expenses
Schedule R ..... Credit for the Elderly or the Disabled
Schedule SE (2) ..... Self-Employment Tax
Form 2106 (2) ..... Employee Business Expenses
Form 2119 ..... Sale of Principal Residence
Form 2210 ..... Underpayment of Estimated Tax
Form 2441 ..... Child & Dependent Care
Form 3800 ..... General Business Credit
Form 3903 ..... Moving Expense Adjustment
Form 4255 ..... Recapture of Investment Credit
Form 4562 (6) ..... Depreciation & Amortization
Form 4684 ..... Casualties & Thefts
Form 4797 ..... Sales of Business Property
Form 4952 .... Investment Interest Expense Deduction
Form 4972 ..... Tax on Lump-Sum Deduction
Form 6251 ..... Alternative Minimum Tax
Form 6252 (4) ..... Installment Sale Income
Form 8283 ..... Non-Cash Charitable Contributions
Form 8582 ..... Passive Activity Loss Limitations
Form 8606 (2) ..... Nondeductible IRA Contributions
Form 8615 .. Computation of Tax for Children under age 14 who have Investment Income of more than $1,000
Form 8814 ..... Parent's Election to Repeat Child's Interest & Dividends
Form 1040A Individual Income Tax Return (Short Form)
Form 1040A – Schedule 1 ..... Child & Dependent Care Credit, Interest & Dividend Income (Short Form)
Form 1040A – Schedule 2 Computation of Supplemental Medicare Premium (Short Form)
Form 1040ES ..... Estimated Tax
Worksheet ..... Automatic Interview, helps to organize
Worksheet ..... Personal & Miscellaneous Data
Worksheet ..... W-2 Income
Worksheet ..... Dependents on Parents' Return
Worksheet . Taxable Refund of State & Local Income Tax
Worksheet ..... Federal Income Tax Carryover Data
Worksheet ..... D-Extra
Worksheet E1-Extra
Worksheet E2-Extra
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T/Maker.

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CLOSE-UP

Issues Covered by Personnel Policy Expert

- Access to personnel files
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- Bereavement leave
- Conflicts of interest
- Dress code
- Drug & alcohol use
- Drug testing
- Educational leave
- Employee acknowledgement form
- Employee benefits
- Employee conduct & work rules
- Employee welcome message
- Employee reference checks
- Employee relations
- Employment applications
- Employment categories
- Employment termination
- Equal employment opportunity
- Family Leave
- Hiring of relatives
- Holidays
- Immigration law compliance
- Inclement weather
- Introductory statement
- Jury Duty
- Maternity-related absences
- Medical leave
- Military leave
- Nature of employment
- Non-disclosure
- Organization description
- Outside employment
- Overtime
- Pay advances
- Pay deductions & setoffs
- Paydays
- Performance evaluation
- Personal leave
- Personal data changes
- Pre-employment physical exams
- Probationary period
- Relocation benefits
- Resignation
- Rest & meal periods
- Return of property
- Safety
- Security inspections
- Severance pay
- Sexual & other forms of impermissible harassment
- Sick leave
- Smoking
- Solicitation
- Time off to vote
- Timekeeping
- Title page
- Use of equipment & vehicles
- Vacation benefits
- Witness duty
- Workers' compensation insurance

...and more as new policies are added!

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IBM PC, XT, AT, PS/2 and compatibles, 512K RAM.

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The Premier Grammar, Style And Punctuation Checker For Your PC!

RightWriter Helps You Produce Clear, Powerful Writing.

Remember the last time you read someone else's badly written letter?

How did it reflect on him? Now ask yourself a more important question. How does your own writing reflect on you?

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

Works With Just a One-Word Command!

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

Just create your documents as you normally would, then, with a one-word command, RightWriter will check your document and display errors and comments. RightWriter never changes your writing... it only makes recommendations.

A Business Productivity Tool.

RightWriter can pay for itself with a single, well-written sales letter, proposal, report, or manual. Strong, clear writing can make the difference between making and losing a sale. Good writing is good business.

An Ideal Teaching Tool.

RightWriter is also an ideal teaching tool. It's like having a style guide and grammar book right at your fingertips. As it helps you improve a document, RightWriter also trains you in the principles of proper English. So it's an excellent training tool for business and education.

Version 3.1 Features

- *It's easier to use, because it has only one command. Your word processor does the rest.*
- *Inserts messages directly into the text to point out problem areas in letters, proposals, reports.*
- *Now runs from within WordPerfect 5.0!*
- *Indexes measure strength of delivery, readability, use of adverbs, adjectives, jargon.*
- *Uses more then 4,500 rules to make recommendations.*
- *New Menu System allows you to customize RightWriter to meet your particular needs.*

Compatible With These Word Processors...

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

"This superior product is rich in both features and performance." —Info World

"...a must buy for the businessman who writes memos all day. Highly recommended." —John Dvorak

Now Runs From Within WordPerfect 5.0!

This feature makes RightWriter 3.1 the perfect add-in for WordPerfect users.

Highly Acclaimed for Accuracy and Value.

RightWriter recently garnered several impressive awards from the software industry, including *PC World's* World Class Award, *The Software Publisher's Association Gold Seal, Info World's* Excellent Value Award and the 1989/1990 *Classroom Computer Learning Software Award of Excellence.*

Turn certain rules on or off to suit your needs. RightWriter provides the flexibility to improve all of your writing.

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

Readability And Strength Index *The Readability Index shows the educational level a reader requires to understand your writing. Also measures your writing's strength.*

Parts of Speech, Sentence Structure *Other indexes measure your adjective and adverb usage, and use of jargon. Recommendations guide you in how to improve your sentence structure.*

Words to Review *The Words In Review list points out problem words that could cause confusion in your writing.*

RightWriter Now Includes — FREE...

RightWords! *A $30 Value*

Customizes RightWriter's dictionary to fit your needs.

RightWriter vs. The Competition.

Dr. Cynthia L. Selfe, Associate Professor of the Humanities Department at Michigan Technological University independently tested the big three grammar and style checkers. The results? — RightWriter wins hands down!

Researchers at Michigan Technological University tested the three IBM PC-based grammar and style checkers. The following is an excerpt from the cover letter which accompanied their findings...

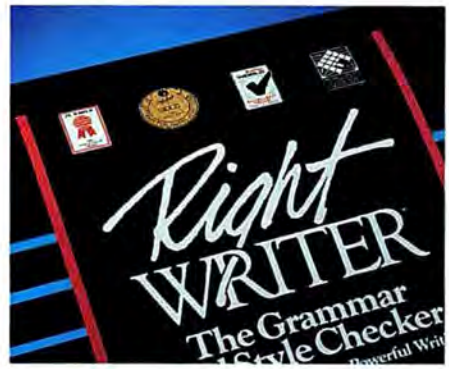
"We've finished our independent tests comparing the performance, accuracy and usefulness of RightWriter 3.1, Grammatik III, and Perfect Grammar on two separate documents. RightWriter impressed us as far as style-analysis programs go: RightWriter correctly flagged 176 errors (with a total error rate of only 8 percent) in an essay that saw more than twenty major revisions.

RightWriter has such a low error rate that the program rewards users instead of overwhelming them. RightWriter's manual was also both easier to read and more informative than either Grammatik's or Perfect Grammar's. Finally, RightWriter's problem explanations form a good refresher course in grammar and style.

We believe RightWriter would be of value to writers interested in improving the surface structure of their writing. We applaud RightSoft's attempts to test their products thoroughly and in realistic situations.

Sincerely, Dr. Cynthia L. Selfe."

Associate Professor, Humanities Department
Michigan Technological University, Houghton, Michigan



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

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And FormTool will print forms sideways, make adjustment of line and character spacing — even print math symbols.

FormTool was designed to meet an urgent need of the business environment: *provide a low-cost means by which users can quickly and easily create their own forms using virtually any equipment — just sit down and create a form.*

Draw Lines, Boxes And Grids — In Seconds!

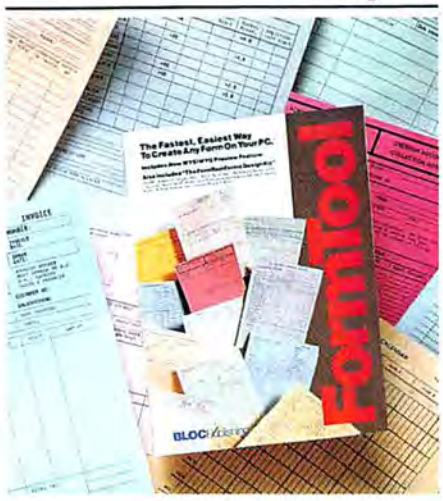
FormTool streamlines the PC's ability to draw — lines, boxes and grids are drawn with just a couple of keystrokes. You can change your grid layout, adjust type sizes, rearrange boxes — in seconds!

An advanced word processor handles word and character wrapping, custom "FastTabs," and the ability to automatically fit text into a defined area — or quickly reformat if necessary.

PC MAGAZINE

"...Its simple, clean design makes it quick to learn and use... We were able to draw our purchase order form in just 6 minutes. Lines and boxes are very easy to draw and erase."

—PC Magazine



"The FormTool Forms Design Kit."

FormTool includes over 120 pre-designed forms ready to use — or modify them to fit your particular needs. Plus, a guide to forms design by forms expert Michael J. McCoy.

Includes Full-Page WYSIWYG Preview!

Preview your forms — full page — with our new WYSIWYG preview capability. Spot errors in spacing, layout, type and alignment before committing the form to paper. This new feature provides WYSIWYG advantages of graphics-based products with the blistering speed of text processing.

See your form on the screen — as it will print!

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AD 1010 FormTool 3½" PS/2 ..... $95.00
AD 1020 FormTool 5¼" PC/Compatible $95.00

IBM PC, PS/2, compatibles with 256K memory. Floppy or hard disk, supports all color or monochrome monitors with or without graphics card and virtually all dot matrix, daisywheel and laser printers.

Anatomy of a FormTool Form

Horizontal And Vertical Line Drawing.
All you have to do is position the cursor where you want to draw a line. Then hit one key, and FormTool will automatically draw the line.

Any Type Style.
Choose from italic, underlined, bold, bold italic, superscript, subscript and user defined styles.

Large Letters.
You can select large letters, and even oversize letters up to one inch tall.

Line Width.
Just specify single, double, or bold lines, and FormTool will draw them. You can also switch between single, double and bold lines with one keystroke.

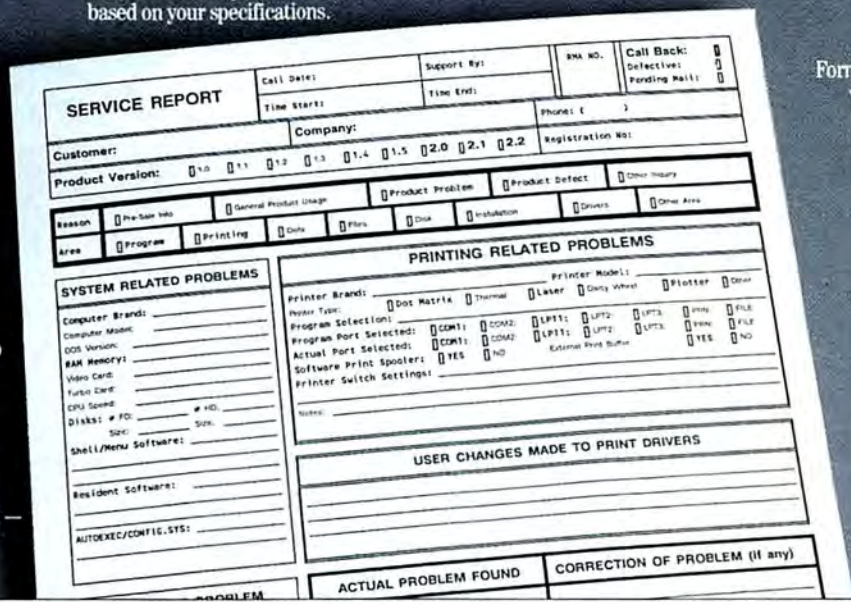
Form Fill-In & Merge.
You can easily set this form up as a template for filling in — to be printed, or stored.

Automatic Grid Drawing.
Drawing a grid is easy — just specify:

- Column width
- Row height
- Number of columns
- Number of rows

Or leave any out, and FormTool will automatically draw the grid based on your specifications.

Form Size.
You can select from any standard size such as letter, legal, or computer. Or, you can specify a custom size from postage stamp to 13½ inches. FormTool also offers automatic sizing, depending on the size of the file.



Speed Characters.
Special characters like this box, □, as well as math symbols and graphic characters are available.

Mix Single and Double Lines.
And they still end in the right place.

Perfect Corners.
FormTool will end every line with perfect corners and T's — everytime. It will even pipe double lines.

Variable Type Sizes.
Variable sizes, and styles are available, and are selected from an easy-to-follow menu.

Variable Spacing.
Specify variable line spacing of 6, 8, or 10 lines per inch and character spacing of 10, 12, 15, or 17 characters per inch, from FormTool's menu.

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CREATE BINDING LEGAL DOCUMENTS ON ANY PC!

Give Yourself Power of Attorney!

Utilizes an Easy-to-Use 'Interview' Format!

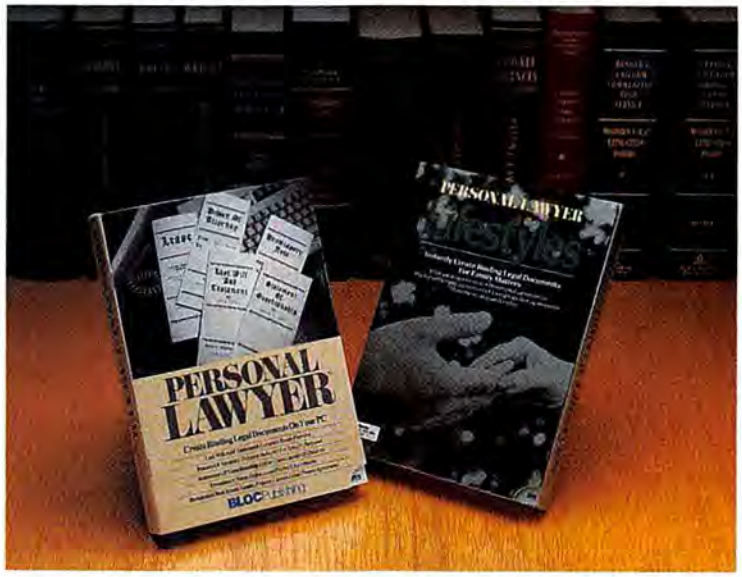
Now There's a Personal Lawyer for Family Matters...

Personal Lawyer has helped thousands of people create their own wills, leases, promissory notes, powers of attorney and other legal documents right on their PCs — in just minutes. Its unique "question and answer" format guides users, furnishing help and background information as they go. Now, BLOC Publishing introduces Personal Lawyer "Lifestyles," a remarkable system that creates pre- and post-nuptial agreements, living-together agreements, marital settlement agreements and statements of guardianship.

Employing the same easy-to-use "interview" format, Personal Lawyer Lifestyles provides plenty of on-screen help to illustrate the concepts involved in creating these types of legal documents. It includes a detailed user guide that provides additional explanations.

These programs have been developed under the supervision of attorney Douglas B. Jacobs and produce legally binding documents. You could save thousands of dollars in legal fees by preparing documents yourselve, quickly, easily — and inexpensively.

Give yourself... the power of attorney — with Personal Lawyer and new Personal Lawyer Lifestyles.



PERSONAL LAWYER

► Last Will And Testament.

The importance of a personal will cannot be overstated and there are many reasons for having a will in today's society. Without some careful thought to the distribution of your estate, it is possible that it might escheat (default) to the State or Federal Government, resulting in higher taxes and/or fees than necessary.

Perhaps most important is to remember those persons who you care about and who care about you, and adequately provide for them. Often, it is important to consider who is to take care of your children if you should die before they are old enough to take care of themselves.

This portion of the Personal Lawyer program permits you to bequeath general or special gifts. It also enables you to specify the executor of your estate, choose a guardian or guardians to care for minor children and make many other decisions for competent estate planning.

► Promissory Note.

Promissory notes provide the written ability to agree to accept a loan on certain terms and to define the payback of the loan.If you have ever borrowed or lent money, you should have a written note outlining in detail the timing and method of payback.

This program will create notes that are paid back with or without interest, with or without installments, with or without balloon payments, or even simple notes payable on demand. You can also write a note that is secured or unsecured and specify the type of security given.

In addition, specific information on all rights and obligations of both borrowers and lenders is provided.

► Power of Attorney

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

There a many times in one's life when you might want such a document; for example, it could be very helpful if you are leaving on a trip for a period of time and need to legally appoint someone to care for your interests while you are gone.

► Statement of Guardianship

This document authorizes temporary consent for certain situations. It can be used to give a neighbor or friend discretion to care for your children in your absence. Such a document is often useful to give your child's teacher or school the requisite authority to take the child on field trips and class outings. This program can be used to give someone general control or to give them only very limited and specific rights.

► Residential Real Estate Lease.

This portion of the program allows you to easily write a legally binding lease for such residential property as a house, duplex, apartment or rental condominium

If you have real property to rent as a residence, or you are a renter of such property, you need the protections of a *written lease*. Using this program carefully will allow you to provide numerous paragraphs to properly structure an enforceable legal document that describes all of the rights and obligations of both the landlord and the tenant.

You can create a lease that allows or disallows such items as: a security or cleaning deposit, pets, payment of utilities by the landlord or tenant, parking privileges, etc. This will insure that the property is not improperly used or harmed, and that both parties are fully legally protected.

PERSONAL LAWYER LIFESTYLES

► Living Together Agreements.

This is a single agreement for two persons wishing to live together, yet who are not married. The agreement contains discussions of the property owned or to be owned by each, their individual responsibilities, issues of support, etc.

It can be used to eliminate the problems sometimes encountered by two people living together — comingling their money and other assets — then later trying to sort out who owns which asset.

► Prenuptial Agreements.

This agreement is designed for two people who are going to be married and wish to write a binding contract that itemizes which property will remain their individual property and which will become community (and owned by both parties) after the marriage.

It is often used by persons who have property before they get married and don't want the other to gain rights to that property.

► Postnuptial Agreements.

Designed for couples who are currently married and living together, this agreement will specify all of the property that they jointly have, and will specify any assets or property that they wish to remain separate.

A common example of the need for this type of agreement is if one person inherits property from a relative and doesn't necessarily want the spouse to gain ownership in that property.

► Marital Settlement Agreements.

This agreement will provide a standard settlement agreement that will allow a couple to define child support, alimony, child custody and visitation rights upon the couple obtaining a divorce.

The program will not handle details of divorce, it simply provides a written statement of (binding) agreement between the partners.

► Statement Of Guardianship.

This document will allow the current guardian of a child to designate a babysitter, schoolteacher, friend, neighbor or other individual the legal authority as limited caretaker or temporary guardian of a minor child or children.

A parent or parents leaving their children with a babysitter for the evening can specify that the babysitter can consent to emergency medical treatment at a local hospital, or that a school teacher can take the children out of school on a field trip.

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AD 2255 Personal Lawyer 3½ Diskettes $59.95
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IBM PC, XT, AT, PS/2 and compatibles. Requires minimum 256K RAM, one floppy drive and an 80-character display. Supports color or monochrome and fully supports virtually ALL printers.

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GIVE YOUR PC XT THE POWER OF A 386!

A Breakthrough Software Package. Instantly Makes Your PC Run Up To 60 Times Faster!

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Results of Our FAST! vs. 386 Performance Tests...

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

A Stock IBM XT vs. a Compaq 386!

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

How Is It Possible?

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

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

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

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

On a standard data transfer performance test, FAST! is 18 times faster than a standard AT — and 5 times faster than the leading competitor. In fact, and IBM XT with FAST! is faster than a Compaq DeskPro 386!

Don't Buy More Equipment!

You could spend thousands of dollars trying to achieve the speed required for truly efficient computing. Items like high-speed drives, turbo boards — even complete system upgrades try to overcome your system's inherent slowdown — waiting for disk reads.

FAST! is the only product that eliminates this processing tie-up and gives you top performance using only 8K — for $99.95. And FAST! will work with conventional, extended, or expanded RAM.

Imagine What FAST! Can Do for a 386!

FAST! will deliver spectacular results on your IBM PC, XT, AT and PS/2, but imagine how much faster the "new generation" of ultra high-speed processing technology like the Compaq 386 or Intel's 386 Above Board will run using FAST! — they instantly leap into a new computing class!

In addition, FAST! supports 'hot key' controls for instant response and installation — saving even more time and allowing you to be more productive, FAST! supports EXPANDED memory — but is not required!

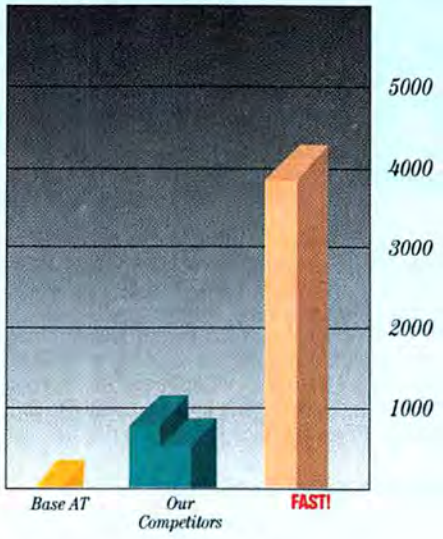
Our Performance Benchmark...

The technicians at TigerSoftware tested FAST! by matching it against the power of the 386.

They took an ordinary XT with a 10mb hard drive and loaded FAST! Alongside it, a Compaq 386, 25Mhz speedster. The task: transferring a few megabytes in a standard performance benchmark.

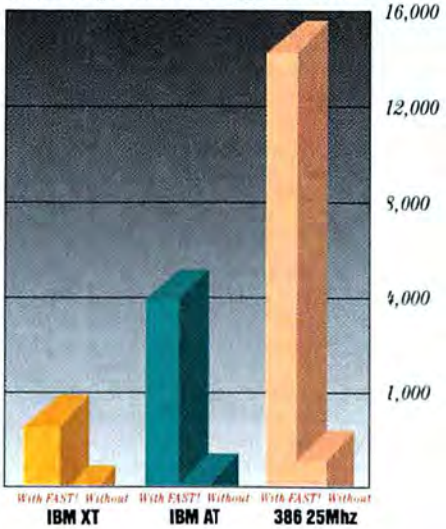
The XT with FAST! outran the Compaq by over 3 seconds! Here are the results:

Data Transfer Rates In Kilobytes Per Second



With FAST! vs. Without FAST!

Data Transfer Rates In Kilobytes Per Second



CLOSE-UP

"Disk-Caching"

FAST! uses a RAM management technology called "intelligent caching" to eliminate downtime from the central processor's performance.

Improvements in processor technology have brought about CPU's with blazing speed; however, their real performance is limited to that of the slowest component in the system. Floppy and fixed disk drives, which have much lower data transfer rates than the central processor, are notorious for the drain they impose on the overall system performance.

FAST! works by "uploading" data into a RAM cache before the CPU calls for it. While this RAM management technique is not unique to FAST! (in fact, it's been employed by mainframe applications for years), the particular genius of FAST! is its ability to find and load significant file data rather than merely reading in sectors of data randomly. This "intelligence" is the key to why it offers performance vastly superior to other caching software products.

FAST! also represents a superior alternative to hardware upgrades like turbo boards, enhanced processors, and high-speed drives, at a fraction of their cost. Given the virtually infinite combinations of hardware configurations and applications programs, FAST! will provide different performance enhancement specific to each situation.

You'll be astonished by the improvements in your desktop publishing, word processing, and graphics software performance. You'll find that any software runs faster with FAST!, even DOS. It also eliminates wait by saving files instantly to the RAM cache, downloading to disk only at opportune times, rather than holding up processing speed. And FAST! enhances even floppy-based systems, without hard drives. There's simply no better or more cost-effective way to enhance your system's speed.

FUTURE

FAST!
Disk Performance Utility
Just $99.95

AD 3850 FAST! IBM PC 5¼" $99.95
AD 3855 FAST! PS/2 3½" $99.95

FAST! will run on the IBM PC, XT, AT, PS/2 and compatibles with 128K RAM and DOS 2.1 or greater. Supports fixed or floppy disk systems and conventional, expanded or extended memory.

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WORDPERFECT 5.1 — FAST, POWERFUL AND FRIENDLY!

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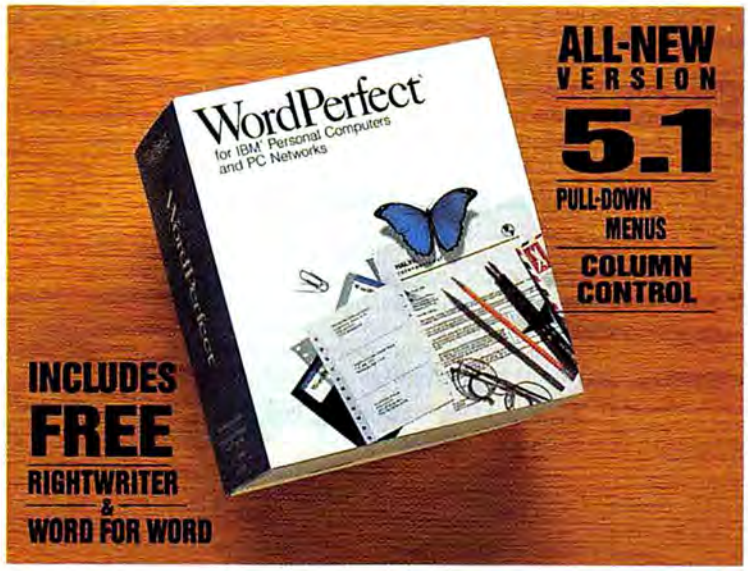
Includes FREE RightWriter and Word For Word Professional!

There's only one way we could think of to improve WordPerfect 5.1 — and that is to include RightWriter and Word For Word Professional — so we did! We call it "The WordPerfect Writer's Pack," everything you need to create magnificent documents, check them for errors in grammar, style, word usage and punctuation—even use existing documents created on other word processors. That's over $200 of award-winning software FREE!

WordPerfect is considered the standard in word processing software for the business environment (with its advanced network support), and this brand new version has been streamlined even further, making it faster and simpler to use. Now users of any expertise level can fully enjoy the amazing functionality of WordPerfect.



What's New In Version 5.1?

For starters, WordPerfect 5.1 features the most elegant pull-down menu system we've seen in word processing. It is so well designed, it glides the user through any task, and makes every document you create clean and professional. You'll love the new features for quickly setting up columns and rows, and the ability to adjust your text in seconds when making revisions, wrap text in-column, around graphics, charts or call-outs. No other system allows so much flexibility in page layout and merging information, tabs, equations and more — all without the usual plethora of cryptic commands.

And this powerful new version contains volumes of context-sensitive help. Inexperienced users can simply begin working — anything they'd need to know, for anything they want to do — is just a keystroke or mouse-click away. Speaking of mice, version 5.1 supports whatever mouse you're using.

There's more. WordPerfect now allows you to have longer file names — up to 40 characters. No more hieroglyphic file names or sophisticated codes. You can name your file "Letter from Mr. Hart to Mr. Burn," instead of "HartBurn. ltr."

Now you can easily retrieve data directly from your spreadsheet for use within WordPerfect. Charts and graphs can be quickly integrated into letters, proposals and reports that clarify and strengthen your message.

In fact, WordPerfect has over 30 new features. That's a lot of efficiency, power and productivity.

Thirty New Features and Still Just 384K?

That's known as elegant programming. Efficient use of the power harnessed within WordPerfect 5.1. With heavy demands on memory by today's application software, efficient design is critical. WordPerfect Corporation has a reputation for excellence — version 5.1 is a masterpiece.

Speller, Thesaurus and Dictionary Hyphenation.

WordPerfect provides a 115,000-word spell check dictionary that quickly detects errors in spelling, typographical errors, double words and aids in hyphenation. And Version 5.1's Speller and hyphenation dictionary have been combined into one file, requiring less disk space than previous versions.

WordPerfect's hyphenation is now dictionary-based, rather than algorithm (a mathematical "best guess"), hyphenation in your documents is much more accurate.

And when you're in search of "just the right word," WordPerfect puts an extensive array of synonyms and antonyms at your fingertips with its thesaurus. WordPerfect 5.1 is a powerful writing tool.

The Power & Efficiency of WordPerfect

- **Pull-Down Menus, Anyone?** WordPerfect 5.1 gives you the flexibility to use your keyboard's function keys, a handsome new set of pull-down menus or your mouse.
- **View Document.** Now you can display an entire page of text and graphics at one time. You can view facing pages together, or zoom in on a single page for a closer look.
- **More Control Over Your Columns.** You can create up to 24 newspaper-style (snaking) or parallel (side-by-side) columns at any point in preparing your documents. The columns appear on the screen exactly as they will print.
- **Tables/Spreadsheets.** The genius of the WordPerfect design continues. The unique new Tables feature allows you to quickly create up to 32,765 rows and 32 columns of tabular data automatically enclosed in graphic lines. You can perform math functions on the numeric data in a table, and import spreadsheets into a table — or anywhere else in WordPerfect.
- **Printer Support. Font Support.** WordPerfect supports more than 450 dot-matrix, daisywheel and laser printers. Fonts may be mixed and changed at random, without affecting margins, tabs or column definitions. And WordPerfect's character set of more than 1,700 symbols, characters and mathematical operators can be printed on any printer—even if the printer doesn't support them.
- **Text and Graphics — Fast & Simple.** The ability to integrate text with graphics makes it easy to produce any type of document that requires figures, diagrams, logos or pictures. Compatible with most popular graphics programs, WordPerfect allows you to place graphics anywhere in your document.

CLOSE-UP

WordPerfect 5.1 Features

- Columns
- Context-sensitive help
- Cross-referencing
- Document comments
- Document compare
- Document summary
- Enhanced file management
- Equation editor
- Fonts—supports SoftFonts and cartridges
- Foot/endnotes
- Headers/footers
- Hyphenation—dictionary based
- Index generation
- Integrated text and graphics
- Labels
- Locked documents
- Macros—new and improved!
- Math
- Merge—simplified!
- Outline
- Page numbering
- Pull-down menus, mouse support
- Search
- Soft keyboard
- Sort
- Speller
- Spreadsheet import
- Styles
- Table of authorities
- Table of contents
- Thesaurus
- Timed backup
- View document
- Word search

WordPerfect CORPORATION

WordPerfect 5.1 Just $398.95

AD 8400 WordPerfect 5.1 5¼" $398.95
AD 8405 WordPerfect 5.1 3½" $398.95
IBM PC, XT, AT, PS/2 and compatibles. Requires minimum 384K.

FREE RightWriter & Word For Word
With the purchase of WordPerfect

For details see page 101 for RightWriter; see page 113 for Word For Word. A Value of $178.00

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The Professional Mail List Manager. Simple, Fast — And Powerful!

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At just $79.95, FastPak Mail Does More Than Other Packages Costing TEN TIMES As Much!

Manage Your Mail Lists — Simply!

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

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

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

FastPak Mail is so advanced, you can give it a zip code, and it will automatically look up the city, state and area code — then insert it directly into your list, or print a label or envelope.

Now You Can Start Doing That Newsletter!

Experts agree that one of the most cost-effective methods of promoting your business is to prepare and mail a newsletter to your existing customers (or to a list of prospective customers) on a consistent basis. News relating to your particular industry, questions and answers, new product announcements and "how-to" articles can boost customer awareness and help increase sales. Newsletters keep your name in front of your customers without appearing to be junk mail. Using FastPak Mail, you can reduce the time you spend mailing your newsletters, and mail them more often—that's the key, consistent, professional mailings.

Timely Press Releases.

FastPak Mail is also a great tool for use in mailing press releases. Because they usually contain time-sensitive information, press releases must be mailed immediately. FastPak Mail gives you the power to get the job done—now.

Ready To Print Lists And Labels.

FastPak Mail will support virtually any label made — by any manufacturer. Choose from predefined formats available from the menu, or quickly create your own format to fit your particular needs.

Print labels 1, 2, 3 and 4 across in dozens of sizes and shapes. FastPak Mail supports all popular continuous feed label brands.

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

Merge Information — In Minutes.

FastPak Mail will allow you to easily merge names and addresses into the body of any letter. You can quickly produce custom mailings to selected lists — even merge information into the body of your letter.

And if you have existing lists stored in other applications, they can be quickly and accurately converted for use in FastPak Mail.

Automatic Proper Name Capitalization.

FastPak Mail will print the first letter of proper names in capital letters — automatically — regardless of how they appear in the list or database file — eliminates embarrassing errors in your mailings.

Bulk Mail Sorting, Printing And Preparation.

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

FastPak Mail even produces sack labels — all you have to do is drop it off at the post office!

Addresses Express Shipping, Airbills, UPS C.O.D. Labels.

You can use FastPak Mail to finish up mailing chores by addressing Federal Express airbills, U.S. Post Office Express Mail airbills — even UPS C.O.D. labels. The pre-designed templates for these forms are available from the menu and will support virtually any printer.

FastPak Mail will also print shipping labels using a pre-defined format — or create your own.

Laser Printing Capabilities.

FastPak Mail supports all Hewlett-Packard compatible laser printers. Now everything you mail can be crisp and authoritative, taking full advantage of laser technology's broad range of fonts, sizes and formats. FastPak Mail will support all printer fonts as well as downloaded fonts — even print sideways!

And FastPak Mail includes an innovative print spooling feature that rivals many stand-alone packages.

BLOCPublishing

FastPak Mail ► Just $79.95

The Professional Mail List Manager

AD 4550 FastPak Mail IBM PC 5¼" $79.95
AD 4555 FastPak Mail PS/2 3½" $79.95

IBM PC, XT, AT, PS/2 and compatibles with 256K. Supports hundreds of dot matrix or laser printers.

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CONNECT TO A DISTANT PC VIA MODEM.

Operate Any Computer Anywhere in the World — By Remote Control!

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It's Time to Get Serious About Remote Computing!

CO/SESSION allows you to quickly connect your computer to a distant PC (on a phone line) and run that remote computer as if you were right there — at the keyboard! From a laptop in a hotel room, you can control your PC back at the office — even if it's more powerful — provide training, or troubleshoot a customer's system from your office.

You can even print documents on either, or both systems simultaneously. And CO/SESSION 4.0 includes an all new *"windows-like"* interface for speed and convenience, plus error-checking, seven advanced new security features, EGA, VGA and Hercules support (for graphics) and much more.

The best package available for *remote computing, remote customer support, background file transfers and remote network access.* Easy to use — just install it — CO/SESSION sits in the background using only **51K.**

And CO/SESSION transfers files up to *20 percent faster* than even its closest competitor — with screen updates over *400 percent faster!*

Examine the Tremendous Advantages of This Easy-to-Use Critically-Acclaimed Remote Control Package.

The future of computing hinges on the concept of connectivity. The ability to access computers from a remote location opens a world of productivity that until now, has been unimaginable.

CO/SESSION 4.0 runs in the background of both machines until called up by using hot keys. Both the remote (your computer) and host computer (the computer you're calling) can initiate calls using the convenient dialing directory. You'll control the distant PC with speed, safety and convenience. And CO/SESSION is fully compatible with all leading software like Lotus, WordStar, WordPerfect, dBase IV, SideKick, Norton Utilities, etc. Imagine the time savings you'll enjoy working on your office PC — *from your home!* You can print documents, transfer files — even work together with an associate or customer — remotely!

Printing Features.

Printer output can be directed to the host and remote machine — simultaneously. The remote user may spool the output for later printing.

Voice/Data Switching.

Toggle back and forth between voice and data (using just ONE phone line) or, start with a voice call, load CO/SESSION during the conversation, then switch to a CO/SESSION data connection. It also offers a COM port window — handy when setting up a non-Hayes modem. A "chat window" allows users to send and receive messages on-screen.

Smooth, Fast File Transfers and Error-Checking.

Copy data files in both directions — so you can work at home — without transporting diskettes!

CO/SESSION's powerful error-checking capabilities allow you to call your office PC and copy an entire APPLICATION FILE to your home computer.

Advanced Security.

CO/SESSION protects your data with features like: dual-passwords, password-checking and data encryption. You can restrict the ability to send or receive files on the remote PC, blank the other computer's screen — even disable its keyboard to prevent unauthorized access. So if you're doing support on a remote PC, you can work in complete privacy — users or passers-by will not be able to see what you're doing. And CO/SESSION includes a "dial-back" feature that provides an additional level of security and reverses phone charges (for long-distance sessions) and unmatched error-checking for data safety.

Fastest Remote Software Available.

CO/SESSION transfers files up to 20% faster — updates screens up to 400% faster than competitors! In fact, CO/SESSION was proclaimed "Fastest Remote Software Package" by *Infoworld* in March, 1989!

Now Available — SESSION/XL for Automatic Operation.

Now you can transfer files at two o'clock in the morning while you sleep! SESSION/XL is the perfect complement for CO/SESSION, adding a powerful scripting language for automating communications between remote PCs.

CO/SESSION Features Summary:

- **Home-to-Office Computing.** Never worry about leaving disks at the office, working there late or coming in on weekends. Do it all remotely, any hour of the day, any day of the week.
- **Office-to-Office Computing.** Share updated information instantly between offices, troubleshoot computer problems remotely, download files, train personnel and more.
- **Field-to-Office Computing.** Take advantage of all your office computer power while on the road. It's like traveling with full office support in your laptop.
- **Remote Support & Diagnostics.** Train and support PC users from your office. Troubleshoot remote users' applications and quickly determine whether problems are hardware-, software or user-related without leaving your office.
- **High-Speed File Transfers.** Save time and money with rapid background file transfers enabled by a proprietary protocol featuring automatic data compression.
- **Bulletin Board Access.** Dial into most popular bulletin boards, including Dow Jones, MCI Mail, Compuserve and Lexis.

A Comparison of Background Functions

	CO/SESSION	Carbon Copy	CloseUp	pc Anywhere
Transfer Files	**YES**	*YES*	*NO*	*NO*
Change Directories	**YES**	*NO*	*NO*	*NO*
Display Directories	**YES**	*NO*	*NO*	*NO*
Display Files	**YES**	*NO*	*NO*	*NO*
Delete Files	**YES**	*NO*	*NO*	*NO*
Rename Files	**YES**	*NO*	*NO*	*NO*

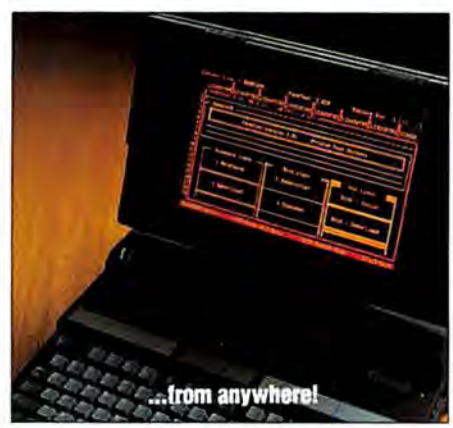
TRITON

CO/SESSION ► Just $199.95

AD 3800 CO/SESSION (2-user) IBM 5¼" . . $199.95
AD 3805 CO/SESSION (2-user) PS/2 3½" . $199.95
AD 3830 SESSION/XL $175.00
IBM PC, XT, AT, PS/2, compatibles with 256K RAM (host PC requires only 50K). Supports virtually any dot matrix printer or lasers.

Operate this computer...

...using CO/SESSION...


...from anywhere!

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THE POWERFUL, VERSATILE LIBRARY MANAGER FOR YOUR DISKETTES.

Organize, Create Custom Labels, And Produce Reports For Your Entire Library of Diskettes!

Produce Custom Labels And Reports For 3½" And 5¼" Diskettes.

DISKETTE MANAGER 3 helps you print labels (both 5¼ inch and 3½ inch) and generate library reports for everything on your diskettes. Just read your diskettes into the system; each diskette directory (including subdirectories) is instantly cataloged, you can then print labels and reports showing the contents of each diskette — or your entire library.

DISKETTE MANAGER 3 will accept all diskette types and sizes recognized by DOS including 5¼ or 3½ inch, fixed disks, tape backups, 360K, 720K, 1.2 Mb, 1.44 Mb, etc. Catalogs of your files can be created to contain up to 500 diskettes and 32,000 files. You can choose from several predesigned label formats for your diskettes, or design your own.

Printer Support.

All printers are fully supported. All printer codes, font types and sizes may be used for printing labels.

Catalog Capacity.

Each catalog may contain up to 500 diskettes and 32,000 files. An unlimited number of catalogs can be created. Catalog size limited only by disk space. Diskette Manager 3 will print any label that your printer will accept. The diskette title will hold up to 20 characters (upper and lower case). The date and sequential serial numbers may be automatically added.

File names can occupy up to 66 lines on a 4"×1½" label, and unlimited file names using additional labels. Comments can occupy up to eight 57-character lines.

FREE
20 5¼" And 20 3½" Blank Labels.

BLOCPublishing
Diskette Manager 3
Just $39.95

AD 2220 Diskette Manager 3 5¼" & 3½" . $39.95
IBM PC, XT, AT, PS/2 or compatibles, 256K RAM, 2 floppy drives or one floppy drive and a hard drive, or any laptop (3½). Works with any parallel or serial printer. Number of files listed on a label is a function of the character size available on your printer.

CREATE CLEAN, PROFESSIONAL-LOOKING ORGANIZATIONAL CHARTS - OR ANY TYPE OF CHART!

Organizational Charts, Procedure Diagrams, Decision Trees And More!

The Organizational Chart — A Valuable Management Tool...

How Do You Describe Your Company to New Employees or Prospective Clients?

Chances are, you devote pages of text in personnel manuals and sales presentations to management levels and work flow. Since a picture is worth a thousand words, the organizational chart is an ideal method of depicting a hierarchy, procedure or method — but charts involve making a layout, setting type, inking boxes — and revisions are murder!

Fast Charts for Any Purpose!

Now you can create charts in a matter of minutes — to illustrate anything! Policy making, responsibility delegation, authority levels, flow charts, procedure diagrams, 'decision trees' — or for use in sales presentations.

Simplicity Equals Speed.

We completed our first chart in 11 minutes after opening the box! Sleek, easy-to-use box drawing capabilities make Corporate Ladder simple — just type your text and one keystroke draws a box around it! Group boxes with another keystroke and revise charts in seconds. Change paper — and Corporate Ladder adjusts the chart size automatically! It even has an on-screen WYSIWYG display!

Use Charts to Increase Productivity.

Create popular "Decision Tree" charts that lead employees and associates through "if-then" decision-making choices. This type of chart is designed to reduce administrative time and increase individual productivity.

The "Procedure Diagram" illustrates sequential steps to follow when undertaking a certain task.

Unique "Finishing Touches" Feature.

Once you've completed the layout of the chart, Corporate Ladder will automatically center text, center lines and align boxes. It even consistently spaces the elements of the chart.

If you need to make revisions, simply insert your new boxes or text, hit the "Finishing Touch" command, and the chart is re-aligned and perfectly spaced. That's the beauty of Corporate Ladder — the ability to actually see what your chart will look like as you work.

Supports most dot-matrix and laser printers. Even supports plotters!

Includes Laser Font-Pack — A $29 Value.

FREE! The Laser Font-Pack includes two additional typefaces (Courier and Modern Letter Gothic) and allows four additional sizes ranging from tiny (25 cpi) to oversize (8 cpi). All fonts supplied in normal and sideways formats.

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Corporate Ladder
with FREE Laser Font-Pack!
Just $79.95

AD 4950 Corporate Ladder
IBM PC 5¼" and 3½" $79.95
IBM PC, XT, AT, PS/2 and compatibles with 512K RAM. Supports virtually any dot matrix printer — including the HP Laser-Jet Plus or Series II.

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IF YOU USE LARGE DOCUMENT FILES — DON'T BUY AN "ABOVEBOARD," GET AboveDISC!

Get Up To 32Mb of Expanded Memory — Without Buying Any Hardware!

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AboveDISC 3.1 — Converts Extended Memory or Hard Disk Space Into Expanded Memory — For Just $119.00.

Break the 640K Barrier with AboveDISC 3.1

Now you can run memory-hungry applications like spreadsheets, large desktop publishing and text files, Windows, "new-generation" TSRs — even more sophisticated CAD drawings — *without buying any new hardware — saves expansion slots!* It's ideal for laptops.

AboveDISC 3.1 utilizes previously unused portions of your Extended Memory located on the motherboard — *OR employs your hard disk* — to *simulate EXPANDED Memory.* It accesses up to 32 megs of paged memory and supports EMS 3.2 & 4.0.

You could spend $1000 for just ONE MEGABYTE of Expanded Memory — or you could buy AboveDISC — *and get up to 32 MEGS* — for just *$119.00!* If you use a PS/2 with 1 or 2 megabytes of Extended memory, and want to fully utilize it — or you'd like to increase the RAM capacity of your current PCs, XTs and ATs — AboveDISC is the ideal, *inexpensive solution* (without sacrificing precious expansion slots). Installs in seconds.

AboveDISC Turns Your Hard Disk Into Expanded Memory!

AboveDISC seeks out all the memory available on the motherboard beyond 640K, all the RAM on your extended memory board (much of it completely unused), or up to 32Mb of memory on your hard disk and uses it to simulate expanded memory. So you'll use memory you simply never had before — *to run faster, more powerful, applications and create larger spreadsheets, drawings or databases.*

CLOSE-UP

Why RAM Expansion?

Most AT and PS/2 compatible personal computers are purchased with additional memory or can accept additional memory. Allowing the user to use more than 640Kb was one of the major selling points for the AT-style computers. It is now common for an AT-type computer to come standard with 1024Kb on the motherboard alone.

Unfortunately, PC/MS DOS cannot make use of this additional memory directly, as well as the application programs running under DOS. This type of additional memory is called *EXTENDED* memory, and it is most commonly used as a RAM disk, for print spooling, or with other utility programs designed for a specific, non-application oriented task.

Why? Because many software application programs running under PC/MS DOS, such as spreadsheets, word processors, and data bases, use some RAM memory.

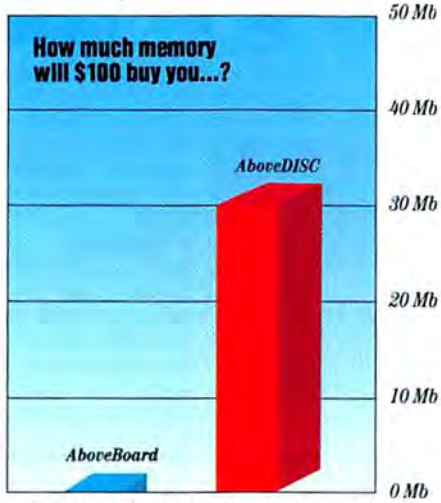
When users began experiencing memory limitations from overcrowded base memory (the lower 640Kb), Lotus, Intel, and Microsoft came to the rescue with the LIM EMS 3.2 specification for hardware based EXPANDED memory. Since then, the specification has been updated to EMS 4.0 (LIM EMS is the abbreviation for LOTUS/Intel/Microsoft Expanded Memory System). Users could have spreadsheets 2 megabytes or larger by using this expensive hardware based EXPANDED memory solution.

Why Pay the Astronomical Price of Memory Boards?

...When for just $119.00 you can simulate Expanded Memory — and get the same fast, smooth performance. Here's a comparison of AboveDISC software vs. hardware.

Megabytes per 100 Dollars

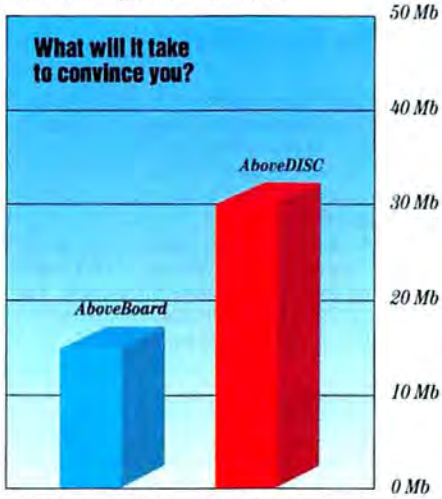
AboveDISC software vs. hardware



You'd spend up to $1000 to equip your system with Intel's AboveBoard — and get ¼ meg of Expanded Memory per $100, vs. AboveDISC's 32Mb!

Potential Capacity

AboveDISC software vs. hardware



With the Intel board, you're limited to 16 Mb of Expanded Memory. With AboveDISC, you can gain up to 32Mb and use the larger programs!

AboveDISC Features:

- 32 megabytes of EMS memory.
- Supports the Lotus, Intel, Microsoft EMS 3.2 and 4.0.
- Compatible with all versions of DOS 3.1 and higher.
- Supports all existing IBM PC or compatible processors and busses (8088, 8086, 80286, 80386).
- A new self configuring installation means you can be using your new memory in less than three minutes.

So, before you trash your extended memory card or non-expandable machine, get AboveDISC, the most incredible software to come along in years.

NEW! Memory Management Features:

- Above LAN: Moves Novell LAN network drivers (36K) to extended memory
- Above MEM: Increases speed and memory (64K) for Lotus 1-2-3 (2.01 & 2.2) users
- Above 640: Increases conventional memory to 736K on systems with EGA/VGA video adapters
- Disk Spillover with Cache when emulating from hard disk

Compatible with Theses Applications:

- Lotus 1-2-3, release 2.01 and 2.2
- Lotus Symphony
- Microsoft Excel
- Quattro
- Aldus Pagemaker
- Wordperfect 5.0 and 5.1
- SuperCalc 5 Revision B
- Ashton Tate Framework II

Goes to Work Immediately!

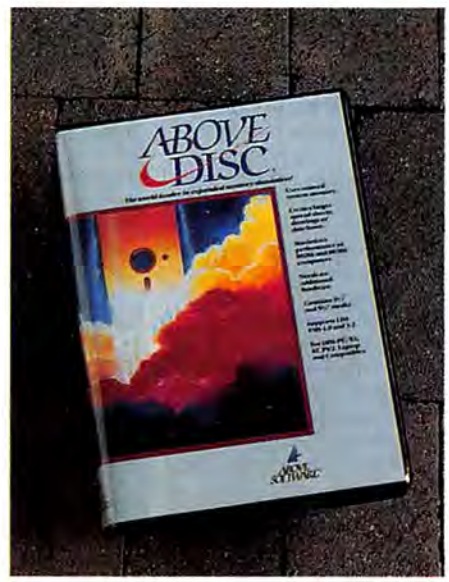
- Menu-driven installation program.
- Self-configures in seconds.
- Fully-reconfigurable without rebooting.
- Operates on any IBM-compatible regardless of speed.

ABOVE SOFTWARE™

AboveDISC 3.1 Expanded Memory Simulator Just $119.00

AD 6550 AboveDISC IBM 5¼" and 3½" . . $119.00

Runs on IBM PC, XT, AT, PS/2 and compatibles. Requires 512K memory. Uses as little as 14K of lower 640K memory. MS-DOS or PC-DOS, version 3.1 or greater.



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Most Popular PC Entertainment Software. Just $59.95!

FAMILY FUN SPECIAL – Save $30.00!!
With the purchase of Fun Pack recieve the Family Pack for only $69.95! A $30.00 savings.

Tiger proudly presents five of the hottest-selling PC entertainment titles in one package!

► **Chuck Yeager's Advanced Flight Trainer.** From the edge of space you scream toward Earth at Mach 3. Suddenly, your $30 million needle of rocket-fueled titanium spins violently out of control. You have only 8 seconds before you dig a fiery hole in the desert!

Learn advanced flying the Yeager way. Unique windscreen cursors teach you as you soar through flawless takeoffs, landings, aileron rolls, Cuban 8's — even hammerhead stalls! Includes 14 different aircraft. Plus, a great manual with loads of background information.

► **Airplane Factory.** And while you're flying with the legendary Chuck Yeager, you can mastermind the design of your own airplane, that you can fly in Chuck Yeager's Advanced Flight Trainer! Strap yourself into a classic Sopwith Camel with the power of an F-16, or a P-51D Mustang.

► **Superstar Indoor Sports.** Action-filled Air Hockey, Darts, Ping-Pong and Bowling — all featuring superb graphics and split-second control! This package has been highly acclaimed for its exceptional screen design. Each game is a stand-alone program with multiple levels of play.

Includes Five Smash-Hit Games!

► **Test Drive.** You'll actually feel the power and performance of five of the world's most exotic (and expensive) sports cars! Your adrenaline will rush through you as you take the wheel of a *Ferrari Testarossa, Lotus Turbo Esprit, Porsche 911 Turbo, Corvette and Lamborghini Countach.*

► **Paperboy.** A monster arcade hit! Hop on your bike for a free-wheeling ride through the "burbs." You've got papers to deliver — but robbers, tough guys and zany obstacles are lurking everywhere!

HEADSTART® TECHNOLOGIES CO. The Fun Pack

Just $59.95 A $169 VALUE!

AD 5250 Fun Pack IBM 5¼" and 3½" $59.95

IBM PC, XT, AT, PS/2 and compatibles with 384K and CGA.

AUTOMATE CHECK WRITING CHORES AND HOME FINANCES.

"I Look Forward to Paying My Bills!" (I Never Thought I'd Hear Myself Say That!)

Now, Spend About 15 Minutes a Month Pay Your Bills!

"As a Seasoned Quicken User...

...I can tell you that this product makes writing checks and paying bills fun — and if that sounds preposterous, keep reading.

Quicken is so simple, I started using it immediately — when I booted it up, Quicken asked me for my beginning balance. I entered my balance, then my mortgage and car payments and printed them right away. That's it! — nothing to learn, no set up time. My checks were beautiful, my balance was automatically updated, and I was almost disappointed to be done so quickly.

But then the skeptical side of me took over. "What about reconciling my statement!"

I was astounded. I reconciled not only my current statement, but the two I've been putting off doing for the previous months — all in about 15 minutes!

Since I started over four months ago, I've completely organized my credit card accounts, set up a budget for my expenses and more importantly, turned all my regular monthly bills over to Quicken.

I now have a great overview of my financial activities — where I'm spending (and over-spending), keeping track of my loan balances and my investments — I even calculated my net worth. Pretty good for a guy who used to hate doing anything with his checkbook!

I go shopping and write paper checks at the store, and simple enter the amount when I return home — my balance is automatically updated. The fact is, I don't even have a checkbook anymore!

Sounds crazy, but I love to pay my bills!"

—Fred Gibson, Quicken user

We Guarantee You'll Save Time...

Quicken doesn't force you to learn a clumsy accounting system, it simulates your normal checkbook routine — but it does all the work for you. Your finances are always up-to-date. For regular monthly payments, just confirm the payment amount and print — Quicken performs 14 bookkeeping steps and seconds later produces a finished check already addressed for mailing.

Organize Your Credit Card Accounts.

Simply enter your charges — and Quicken does the rest! Keep track of all charges, or just a few. Your balance is always current — and your can print detailed reports of all transactions to separate business and personal expenditures.

Intuit Quicken Just $49.95

AD 7500 Quicken 5¼" & 3½" $49.95

AD 7550 Quicken Macintosh $49.95

IBM PC, XT, AT, PS/2 and compatibles with 320K RAM — works with any monitor and printer.

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THE MEMORY MANAGEMENT DEPARTMENT.

For The First Time – Now PopDrop Can Load RAM-Resident Programs Into EXPANDED Memory!

Introducing PopDropPLUS... A Breakthrough Concept!

► **PopDrop** for Managing RAM-resident programs in conventional memory.

► **PopDropPLUS** includes PopDrop *and* PopLoad — for loading RAM-resident programs into Expanded Memory.

(Pop Drop available separately for users without Expanded Memory)

Shatter the 640K Barrier.

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

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

The Memory Limits of DOS.

As software applications like word processors, databases and spreadsheets have become more powerful and productive, they have become more money-hungry as well.

The Solution.

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

Fatten Your RAM.

Your lower 640K of "conventional memory" is free to handle your larger applications without conflict or interference.

With PopDrop and new PopDropPLUS, "RAM-resident" is no longer a dirty word.

Eliminate RAM-Resident Conflicts.

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

PopDrop will support networks and won't interfere with any of your other programs.

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

Create batch files to remove layers one at a time, several, or all of them at once.

And while other products gobble up to 40K, PopDrop needs just 1K!

Above And Beyond... Expanded Memory (EMS)

PopLoad allows you to load megabytes of TSRs into Expanded memory and simply hit a hot-key to use them—from within any application. Your TSRs don't even have to support Expanded memory for PopLoad to load them into Expanded memory.

Now you can load 50 of your favorite TSRs and keep them just a keystroke away—so your conventional memory remains free to provide adequate workspace for your larger application programs.

Up To 640K... Conventional Memory

The limits of DOS are legendary. And with powerful new application software being introduced, (along with higher memory requirements), useful TSRs can't be used. By loading your TSRs into expanded memory, you can keep your larger applications in conventional memory and keep TSRs out of your way.

Simple to Use — No Commands to Learn.

Use your TSR's normal hot-keys to activate and deactivate them from within expanded memory. No cryptic commands — and nothing to learn!

Efficient, Sensible Use of RAM.

PopDropPLUS uses memory efficiently and only on demand. EMA is not allocated for a RAM-resident program until it is activated. When that occurs, PopDropPLUS loads the RAM-resident program from its original location on the disk. By handling executable file address location itself, PopDropPLUS eliminates the need to create and save a memory image file. In addition, loading on demand avoids committing memory for RAM-resident programs which may not be used in the session.

PopDropPLUS vs. The Competition.

This is the only product that truly shatters the 640K barrier while still delivering instant control of RAM-resident programs...

The memory requirements for five popular TSRs (SideKick, SuperKey, Turbo Lightning, SETUP2 and XDIR) versus PopDropPLUS:

Task	PopDropPLUS	Competition
Conventional Memory Used	27K	93K
Expanded Memory used with 5 TSRs loaded	344K	508K
Disk space used for swap files for 5 TSRs	0	581K
Keyboard "slowdown"	No	Yes

Use of Features	PopDropPLUS	Competition
DOS commands to configure 10 TSRs	1	50
Number of TSRs per configuration list	50	32
Self removal supported	YES	No

BLOCPublishing

PopDrop & NEW PopDropPLUS Just $49.95 and $99.95

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EVERYTHING YOU NEED TO KNOW ABOUT DOS...

Learn DOS Hands-On! The Fast, Informative, Fun Way to Get the Most From Your Computer!

Great For Beginners, Or As A Refresher Course.

DS TUTOR presents a very simple, systematic approach to learning the Disk Operating System on your PC. It's easy to understand, and it leads you into a well-rounded awareness of DOS, its power and numerous possibilities.

Hands-On DOS Training.

DS Tutor uses plain and simple language to help you develop your understanding, skills and confidence in using DOS. You'll learn about the modern database, spreadsheet and word processing systems as well as Random Access Memory (RAM), batch file techniques, and more. Detailed information on specific hardware and software applications is also provided.

BUY MAVIS BEACON ▸ G E T ◂ DS TUTOR For an additional $10!

2 FREE GIFTS!

- **DS HELP!** Pop-up reference system to explain any DOS command. Explains *Alternate Path Searches, Backup, Restore Disk, and dozens more.*
- **Dictionary!** The 400-page, 4,500 entry, *Webster's New World Dictionary of Computer Terms.*

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DS Tutor & 2 FREE Gifts!
Just $39.95
AD 1480 DS Tutor 5¼" $39.95
Requires minimum 256K RAM. Supports color.

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Customized Lessons Increase Speed & Accuracy.

So fast and easy — you'll be touch typing with speed and accuracy in just a few short lessons! MAVIS BEACON TEACHES TYPING! is the premiere touch-typing self-help program that uses carefully planned lessons and drills — perfect for beginners, or typists who want to improve their speed and accuracy.

Four different "learning centers" provide an entertaining, informative experience. This program was awarded The Software Publisher's Association "Best Home Learning Software of 1987."

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MAVIS BEACON TEACHES TYPING! begins by outlining the lesson plan and evaluating your typing for speed, accuracy or particular problems. A chalkboard appears on the screen displaying Mavis Beacon's comments. From there, each lesson is custom designed to work on these problems. If your speed is poor, MAVIS BEACON will prescribe drills for increasing speed. If accuracy is your weakness, MAVIS will help you work on that.

Awarded The Software Publisher's Association "Best Home Learning Software of 1987."

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Norton Utilities

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AD 4210 Advanced Edition $99.95
AD 4220 Commander $99.95
AD 4230 Backup $119.95

Introducing the All-New Norton Backup.

Peter Norton Computing adds the Norton Backup to its remarkable series of software utilities. Norton Utilities has won virtually every major technical achievement honor, including Best Utility and Best Technical Achievement for 1988, by the Software Publisher's Association. It rescues lost data, manages, diagnoses and finds what's wrong with your disk — automatically. And it does it all with unparalleled ease, grace and dependability.

► The Norton Utilities Standard Edition.

The breakthrough package that gave "UnErase" to the world — it recovers data your PC gives up for dead. Its is data recovery at its finest, combined with state-of-the-art disk management.

Now, Norton Standard Edition includes Quick UnErase, a speedy shortcut to data recovery. Includes a newly-designed interface with pop-up menus and dialog boxes for data display and error notification, hot keys for menu selection, speed searches and graphic tree displays for changing directories. Norton Standard Edition also includes a host of tools for tracking data and locating files.

► The Norton Utilities Advanced Edition.

This Edition contains more data recovery tools and disk management features — including the innovative new Disk Doctor. Disk Doctor will instantly diagnose and automatically repair everything from bad partition tables and boot records to mangled root directories! It can even reformat bad sectors and write back the old data.

In fact, The Norton Advanced Edition contains over 20 superbly crafted utilities. The new Speed Disk feature is the world's most powerful disk tuner — optimizing your disk's speed and performance. The Format Recover feature actually unformats accidentally reformatted hard disks.

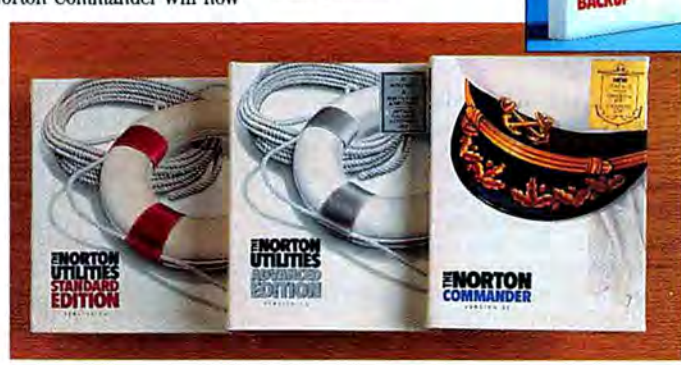
► The Norton Commander.

The ultimate DOS manager — quickly and easily organize, view and send your data electronically. Whatever you do with your data, Norton Commander simpifies it. Norton Commander will now automatically send and receive messages and data via MCI Mail. Commander Mail lets you exchange files, faxes, telexes and E-mail with any MCI subscriber anywhere in the world.

Also features QuickView, the fastest way yet to browse through your data and applications.

► Just Released — The Norton Backup.

Who's backup program would you trust? The leader in data recovery now presents the newest family member. The Norton Backup allows the fastest and most reliable backups of hard disks, floppies and other DOS-format media available. New proprietary technology allows dual-DMA disk writing techniques, advanced skewing control, optimized data compression algorithms, full mouse control and custom setup files for automatic operation.



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VERSION 4.0 — TRANSLATES BETWEEN 5 DIFFERENT FORMATS!

Quickly Convert Files Between Word Processor Formats!

Use All Existing Files When You Change Word Processors.

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

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

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

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

Supports Navy DIF, Peachtext and Enable, RapidFile and WANG PC.

Converts ALL Attributes!

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

Protect Your Investment!

WORD FOR WORD is a powerful, yet flexible file conversion utility that enables you to protect prior investments in document files. It saves the time of re-inputting and extensive re-editing when the need arises to either convert or to communicate with another word processor software program.

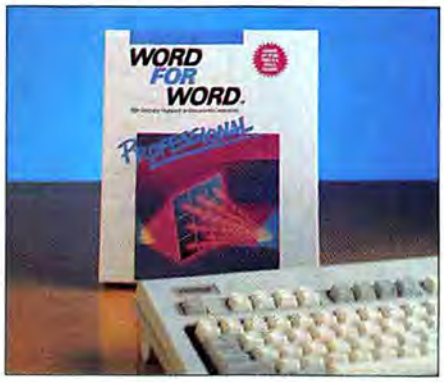
Power Features

- **Batch Processing Ability.** Converts up to 200 files in a single session. Supports DOS Wildcard conventions and full directory pathing.
- **Speed.** You can convert a 25-page, full-formatted document in less than one minute on a standard PC.
- **Context-Sensitive Help.** A single keystroke accesses HELP screens from any screen in the program.
- **Exception Reporting.** For non-convertible features, you can print an exception report or choose to view the embedded codes in the context of the document.
- **"Smart" ASCII.** Allows you to import any standard ASCII file to a supported word processor — and preserves all page formatting features.
- **"Stripped" ASCII.** Eliminates unnecessary characters and control features, allowing smooth importation to DTP and typesetting systems.
- **Lotus 1-2-3 Import.** Converts Lotus WKS and WKI data into any word processor format, retaining row and column integrity. Cell formatting retained.

CLOSE-UP

Power Benefits

- **Easy to Use.** You'll be converting documents in minutes with WORD FOR WORD's menu driven interface.
- **Fast.** Quick and accurate conversions save you valuable rekeying and editing time.
- **Complete.** WORD FOR WORD operates in either batch or interactive mode, supporting most word processors and data communication formats.
- **Powerful.** WORD FOR WORD solves word processing incompatibilities — protecting your prior investments in files.



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IBM PC, XT, AT and compatibles with 256K RAM.

"WORD FOR WORD is the fastest conversion software we tested. A 25-page, fully-formatted document can be converted in less than one minute! With all attributes intact."

Convert in Either Direction Between Any of These Formats:

- ASCII (smart, stripped*)
- Displaywrite 3, 4 (DCA/RFT)
- EBCIDIC
- Enable 1.1, 2.0, 2.15
- Framework III 1.0, 1.1
- HP AdvanceWrite Plus
- IBM Writing Asst. Plus
- Lotus 1-2-3 1A, 2.0
- Lotus Manuscript 2.0, 2.1
- Microsoft Word 3.0, 3.1, 4.0, 5.0
- Microsoft RTF
- MultiMate 3.3
- Multimate Advantage I &II
- Navy DIF
- OfficeWriter 4.0, 5.0, 6.0, 6.1
- PeachText 5000
- pfs: First Choice 1.0, 2.0
- pfs: Write (version C)
- Professional Write 1.0, 2.0, 2.1
- Q&A Write 3.0
- RapidFile (Memo Writer) 1.2
- Samna Word IV 1.0, 2.0
- Samna Word IV Plus 1.2, 2.0
- Volkswriter Deluxe 2.2
- Volkswriter 3, 1.0
- Volkswriter 4
- WANG PC 3.0
- WordPerfect 3.0, 4.1, 4.2, 5.0
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- XyWrite III, III Plus

**The new "stripped" ASCII is designed for the needs of typesetters and desktop publishers. It contains less formatting recognition than standard ASCII.*

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Pack More of Your Data onto Less Disk Space!

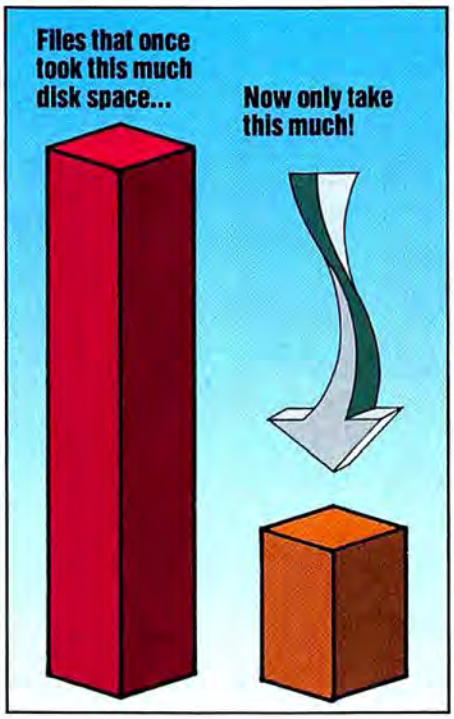
Now Get up to Twice the Capacity from All Your Storage Media.

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

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

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

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



What Is CUBIT?

In brief, Cubit is an advanced software tool that automatically reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved. It's sort of like taking the air out of a spare tire while it's in your trunk, then reinflating it when you need it.

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

How Much Disk Space Will You Save?

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

Storage Media Compatibility.

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

Pop-Up Cubit at Any Place... at Any Time.

Once a file is compressed with Cubit it automatically decompresses when you use it, then automatically recompresses when you're finished.

Cubit works with all magnetic media, including hard disks, floppies, and tape cartridges. And Cubit is ideal for long term archival storage.

Compatible with All Software.

Cubit performs smoothly with all kinds of data — particularly text files and databases. But now, Cubit is an effective software product for compressing your Lotus worksheets.

Cubit achieves an average of 70% compression for both Lotus 1-2-3 and Symphony files. Cubit can, in effect, turn your 20 megabyte disk into a 60 megabyte disk!

Cubit is the only product we tested that can compress all files — not just Lotus files.

Save Time and Money on Telecommunications.

While more people are discovering the convenience of communicating by modem, they're also discovering something else-bigger phone bills. Whether local or long-distance, the line charges add up fast.

Cubit can help. It contains UNCubit — a unique program that lets others decompress files that you compressed with Cubit — even if they don't own Cubit themselves. You may make copies of UNCubit and distribute them as you wish.

With UNCubit you can communicate compressed files and save up to 50 percent in transmission expenses. The person reiving the compressed file types "UNCubit" to decompress it. This is a feature unique to Cubit-no other similar product has this innovative, money saving feature.

Now you can communicate economically!

How Much Can I Save?

Cubit Compression Percentages

Depending on the type of application you're working with, compression can be substantial. Here are some average percentages of space savings for various applications.

File Type	Disk Space Saved
Spreadsheets	70%
Word Processors	55%
Database Managers	40%
Accounting Packages	40%
Graphics/Program Files	26%

Technical Features:

- Reduces 1-2-3 worksheet files by an average of 70%.
- Reduces word processing and text files by an average of 55%
- Reduces data base files by an average of 45%
- Reduces program and other binary files by an average of 25 to 35%
- Compresses files that are greater than one disk cluster (typically 2K-4K) in length
- Reduces transmission time and line charges for telecommunications applications
- Enables users to transmit files to receiver who can de-compress files (via UnCubit) without owning a copy of Cubit
- Automatically decompresses files for use and recompresses them for storage

SOFTLOGIC SOLUTIONS

Cubit ► Just $69.95

AD 3310 Cubit IBM 5¼ $69.95
AD 3315 Cubit PS/2 3½ $69.95

IBM PC, XT, AT, Compaq and other closely compatible microcomputers. PC-DOS/MS-DOS 2.0 or higher, 128K RAM.

FREE WITH CUBIT!

YOUR CHOICE OF DOUBLE DOS...

Load and operate two programs at once! True multi-tasking for your PC — double your productivity!
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...OR MAGIC MIRROR

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DISK OPTIMIZER 4.0 REDUCES THE RISK OF HARD DISK FAILURE.

Please Read This Page Carefully If You Own A Hard Disk.

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Your Hard Disk Is A Time Bomb!

Fragmentation Is Inevitable And Fatal!

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

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

So, Who Needs Disk Optimizer, Anyway?

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

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

After un-fragmenting with Disk Optimizer, a file that once occupied twenty different sectors in twenty different locations is now back in one contiguous piece. The next time your drive reads it, there's just one place it has to look. Performance times may be cut by as much as two thirds!

Absolutely, Positively Disaster Proof.

Lately, we've heard some people are reluctant to un-fragment their disks for fear they'll lose data if something goes wrong in the process. But have no fear with Disk Optimizer. Nothing will go wrong because nothing *can* go wrong. Even if you yank the plug from the wall in the middle of the program. It's because only Disk Optimizer is designed to copy each file, piece by piece, then thoroughly check the un-fragmented version for completeness and integrity. Then — and *only* then — does it go back and erase the fragmented version.

Here's How Disk Optimizer Helps You Avoid Disaster!

1. The New Hard Disk.

This is a brand new hard disk. As you begin to create files, they are stored on the disk randomly. Each occupies a place on the sparsely-populated disk. At this point, disk performance is at its peak. A 256K file or program can be retrieved in just a few seconds. Wear and tear on your equipment is minimal.

2. Fragmentation Begins.

As you edit these existing files, DOS will store your additional data in the same random manner. If you delete a file, a "hole" is left where that file had been stored. DOS will fill that hole with parts of other files. Fragmentation has begun. Your hard disk is running considerably slower.

More and more files are added, edited and deleted. There are pieces of your files and programs scattered all over the disk. Your hard disk's head spends more time "dragging" across the surface of the disk, endangering the media — and the data.

Under these conditions, the risk of a hard disk crash is high, and the wear and tear on your disk's moving parts and magnetic media is severe. And it's slower than ever!

3. After Using Disk Optimizer.

Disk Optimizer assembles the pieces of your fragmented files and stores them as ONE FILE. Just a couple of keystrokes will help your hard disk run up to 300% faster! And all of your data is 100% safe. Your hard disk and your data are safe.

Disk Optimizer contains features such as "Data Guardian," that can recover files and unformat accidentally formatted hard disks — plus a dozen new utility features.

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

Maintenance Features:

- **TrackSaver.** Protects the surface of your disk from excessive wear by preventing the head of the drive from spinning over the same track for too long.
- **Refresh.** Prevents bad spots that develop on disks due to fading magnetic charges. It's like a tune-up for your hard disk.
- **Advanced New 'Data Guardian.'** Instantly restores an accidentally deleted file, directory or hard disk — up to 255 days after it was erased! Accidentally format your hard disk? Just select Data Guardian's UNFORMAT feature and it's instantly restored!
- **Analyze.** Graphical displays show how much fragmentation has taken place on your hard disk.
- **KillFile.** Completely delete sensitive files to prevent unauthorized access.
- **FindFile and FilePeek.** Misplace a file? FindFile will perform a "wildcard" search with just a couple of keystrokes. Then get a "quick look" with FilePeek.

SOFTLOGIC SOLUTIONS

Disk Optimizer Just $69.95

AD 3280 Disk Optimizer 4.0 IBM 5¼" $69.95
AD 3285 Disk Optimizer 4.0 PS/2 3½" $69.95

Runs on IBM PC and compatibles. Supports DOS 2.1 and above.

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A COMPLETE GENEALOGY SYSTEM FOR YOUR PC...

Organize and Document Your Family's History and Records

Have Fun Constructing and Updating Your Family Tree!

Turn your home PC into a genealogy lab and provide hours of enjoyment for the entire family. FAMILY REUNION organizes all important documents and events in your family's history (birth, marriage and death certificates, descriptions of events, etc.) and assembles a database of the information.

FAMILY REUNION then allows you to store it, display it, chart it on paper (including several "family tree" formats) — even create mailing lists and keep track of birthdays. And FAMILY REUNION lets you chart your lineage as far back as you can trace it. A captivating "research adventure" for children of all ages, and a wonderful gift for future generations.

FAMware
Computer Software For The Family

Family Reunion Just $69.95

AD 4970 Family Reunion 5¼" . . $69.95
AD 4975 Family Reunion 3½" . . $69.95
IBM PC, XT, AT, PS/2 and compatibles.
Requires 256K.

Chart the Lives of Your Ancestors!

With FAMILY REUNION, you can easily print a chart tracing your direct ancestors for up to six generations on a single page. Prints the direct descendents of any selected ancestor in any of the following formats: direct line, descending tree, columnar or side-by-side. Organize reunions and print labels for everyone.

Children can develop a senses of personal history by researching and organizing individuals and events. Great for class projects, gifts and as a keepsake for *their* children. Very easy to use, Family Reunion includes an informative user's guide.

THE FULL-FEATURED FAMILY FINANCIAL ORGANIZER.

You Control the Destiny of Your Family's Fortune!

Plan for the future, control your finances, weigh financial alternatives — and stay organized. Family Fortune is actually 10 useful programs in one. It answers financial questions in seconds — so you can make sound decisions.

Before You Buy — Check with Family Fortune.

Every family faces financial decisions — buy a new car, or fix up old faithful and wait until next year? Vacation in Disney World or Yellowstone? Launch that family business? Family Fortune helps identify alternatives, weigh values and make, informed decisions.

Create a budget, save for the kids' college education or new house. Handle everyday financial tasks like balancing your checkbook, paying off debts, managing your credit spending — and more.

Family Fortune also keeps track of your family's stuff... from video tapes to magazine articles and immunization records. Make a household inventory list.

Family Fortune does many other interesting things, too. Like organize and analyze loans, prepare charts and create slide shows, sorting and merging names, addresses and other pieces of information. There's an entire section on creating a realistic budget and sticking to it.

A great companion product to Family Reunion.

FAMware
Computer Software For The Family

Family Fortune Just $69.95

AD 4980 Family Fortune 5¼" . . . $69.95
AD 4985 Family Fortune 3½" . . . $69.95
IBM PC, XT, AT, PS/2 and compatibles.
Requires 256K.

STOP WAITING (...AND WAITING) FOR YOUR PRINTER!

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

PrintRite Gives You More Control With Less Work.

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

PrintRite Features:

- **Easy-To-Understand User Interface!** PrintRite's sleek interface makes it ready to use — right out of the box. Everything you need to know is contained in its convenient help screens and all functions are accessed by a modern pull-down menu system.
- **Queue Management with No Cryptic Commands.** While our competitors throw confusing abbreviations and highly technical terms at you, PrintRite uses plain simple English to describe its functions.
- **Fast "Hot Keys" Control.** PrintRite features built-in hot keys that make light work of your printed tasks. From anywhere, you can press a hot key to rearrange your printing order, or add a job to the queue, specify the number of copies you need, switch between printers — or stop printing.
- **Automatically Compresses Spooled Files.** PrintRite is the only product that compresses your spooled files. PrintRite draws on advanced mainframe technology to compress files and store them each in one file on the disk — this eliminates fragmentation and speeds processing time. Competitors create one large spool file that is clumsy and slow — and contributes to ever-increasing disk fragmentation.
- **Select Portrait or Landscape on Any Laser Printer.** Just try to specify sideways printing using a competitive product... it can't be done. Only PrintRite allows you to select sideways printing for specific documents — with just a keystroke — from within any program. Instantly convert characters to support different laser printers' symbol sets. It also supports an unlimited number of printer drivers — with over 30 formats built-in!
- **Handles up to 225 Entries in Print Queue.** PrintRite allows you to continue to work while having up to 225 jobs in queue and printing!
- **Helpful Displays Show All Printing Activities.** You'll be in touch with all printing tasks with PrintRite. It displays spool file names or source application names in the queue, the time and date for each entry, the status of each item to be printed, the total pages (or pages per file) to be printed, allow you to view any print task on screen.

BLOC Publishing

PrintRite ► Just $99.95

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

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► **Supports up to 5 Printers**

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

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Fill-In Any Form Regardless of Its Complexity.

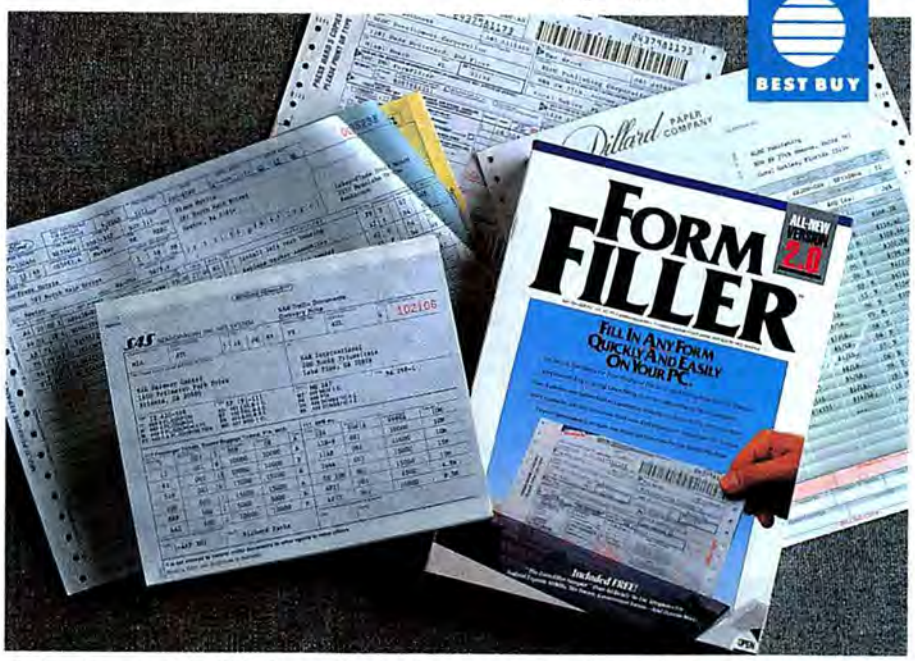
Here's an interesting fact: Of the total cost to produce, process and archive a form, 4 percent is devoted to creation, 8 percent to archiving, and 88 percent is devoted to filling it in and processing it. Clearly, filling in forms is a time-consuming, tedious task. Waste, error and inefficiency can grind the flow of information to a halt, and cost thousands of dollars in time and unproductive work.

FormFiller is the only system specifically designed to accurately fill in forms with pinpoint-precision. It contains a host of features that streamline the process—and it can handle any form, including multi-page, double-sided and interleaved carbon forms, while providing over 40 math and financial functions for use within the form. No other system available provides the power and flexibility of FormFiller.

FormFiller supports virtually any hardware configuration, and is perfectly at home without a graphics adaptor, or any additional equipment. You'll breeze through invoices, insurance and medical forms, shipping airbills, government, legal and industrial forms in a fraction of the time you're spending now.

July 1989, PC World

PC WORLD BEST BUY



Here's How FormFiller Works.

FormFiller begins by printing a grid on your pre-printed form. From this grid, FormFiller creates a "master template" of your form, and establishes positions for each blank on the form. The form is then represented on the computer screen, providing a friendly, "word-processor-like" feel for data entry personnel. You can insert non-printable notes to guide data entry, and create custom help screens for any situation that may arise. To fill in the form, simply call the template, insert the pre-printed form into your printer, and tab from blank to blank—each entry will appear in exact position. When data entry has been completed, FormFiller will check the form for completeness and accuracy.

FormFiller is the only system that synchronizes your computer and printer for exact positioning anytime you print the form. FormFiller also contains a convenient "look-up" table that can store and instantly retrieve frequently repeated information (like part numbers, customer codes, wholesale and retail prices, etc.). A couple of simple keystrokes, and FormFiller will instantly find the data you need and automatically enter it into the proper position on the form. And FormFiller can handle an unlimited number of fields per page.

Powerful Import Capabilities.

FormFiller will quickly import/merge/export information from your database or spreadsheet (DIF, dBASE II, III, Lotus 1-2-3, WKS, WK1, ASCII), eliminating time-consuming re-entry of data, without conversion. Now, you can virtually fill-in forms directly from your database, or export data gathered by your forms back to your database.

Unmatched Math And Financial Functions.

FormFiller has a complete set of math and financial functions that can actually perform calculations for you, then automatically enter totals for you. For example, numbers or prices appearing in fields you specify can be totalled, a conditional discount can be automatically figured and deducted, and the grand total will be automatically printed into position. If one number changes, FormFiller will instantly re-calculate, and re-enter the new values. Calculate percentages, loan and amortization amounts, depreciation, present and future values—dozens more.

Full Printer And Attribute Support.

Any font, attribute or format you need is supported by FormFiller. And it now offers full support for the Hewlett-Packard LaserJet Series II Duplex printer.

In addition, FormFiller sports a new 200 column by 300 row work area for easy viewing and rapid movement throughout the form.

FREE Bonus From Tiger — The FormFiller Sampler!

Includes "The FormFiller Sampler"—Over 40 Ready-to-Use Templates! Just pop a Federal Express form into your printer—and fill it in! The sampler gives you a "quick start" introduction to this remarkable product.

FormFiller Features:

- **Precise Spacing Control.**
  FormFiller allows pinpoint-precise spacing for absolutely any form. Since most forms were designed to be filled in by hand, they do not share a standard spacing pattern. This makes typewriters, or word processors on a PC simply inadequate to do the job efficiently. FormFiller can adjust spacing in any direction, with accuracy as fine as 1/720th of an inch.
- **Designed To Make Data Entry Simple!**
  FormFiller features a friendly word-processor-like environment. Data entry personnel simply tab from blank to blank. Even novice computer users can quickly enter data, prompted by help screens and on-screen notes.
- **Data Formatting Speeds Fill-In Time.**
  For example, you can simply type "1234567890" and FormFiller instantly formats it as: "(123) 456-7890." You can format all information to refine data-entry to a minimum. Includes auto-centering, left and right alignment, forced upper and lower case, copy or repeat data and more. Contains over 100 date formats.
- **Expanded Printing Capabilities.**
  FormFiller 2.0 features support of virtually any printer, including the Hewlett-Packard Series II Duplex printer. New extended character and line-printing controls, built-in letter-quality support and full printer font support.
- **Extensive Math Features**
  Dozens of spreadsheet-like math and financial functions are available for use within the form. Specify certain entries to be added and FormFiller will automatically fill-in the correct sum into the appropriate blank on the form. Advanced math features include: interest, annual percentage rate, depreciation, principal, exponents, present/future values and more.

  Includes conditional "if-then" testing to automatically figure and deduct discounts.

BLOC Publishing

FormFiller 2.0 Just $149.00
With FREE FormFiller Sampler!

AD 8002 IBM PC/Compatible 5¼" $149.00
AD 8120 PS/2 3½" $149.00

IBM PC, XT, AT, PS/2 or compatibles with 512K, DOS 2.0 or greater and 2 floppy drives, or one floppy drive and a hard disk. Supports virtually all printers. Includes "The FormFiller Sampler"— sample templates, user guide, help cards and spacing grid.

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INCLUDES **SideKick** *SOFTWARE FROM BORLAND (A $79.00 VALUE!)*
ALSO INCLUDES **PC Advantage** *FROM TRAVELLING SOFTWARE (A $130 VALUE!)*

The Hand-Held PC!

Download Notes, Numbers — Even Your Existing PC Software.

The Personal Organizer Package!

What Will It Take to Put a Personal Organizer In Your Pocket?

First, there was the mainframe computer. A mammoth structure filled with hundreds of miles of wires, cables and tubes. Then came the mini. A slimmer, more compact version of the mainframe — containing the same power — but in a smaller container. Then the micro, or desktop personal computer, swept into homes and businesses everywhere, offering the vast power of its ancestor, the mainframe, in just a couple of square feet.

With the power of computing came the need to take that power with us. On the road, where many of us actually work — not just in the office.

We proudly present the Personal Organizer. The hand-held personal computer that fulfills the promise of "portable computing power."

This little powerhouse allows you to quickly key-in information on its remarkably fast keypad — anywhere. You can then use the information you've collected on your desktop PC. Just download your data, using the cable that's included.

FREE SideKick and PC Advantage.

Collect names and addresses and find them with just a keystroke, using the software included.

Speaking of software, the Personal Organizer includes SideKick from Borland, and PC Advantage from Travelling Software. That's over $200.00 of software absolutely free.

More than just an electronic notepad, the Personal Organizer is a real computer with a powerful processor that reacts quickly when you need information. The software included is real PC software that runs on your IBM PC or compatible.

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

You've Got to Have a Personal Organizer! Just $99.00 — But You'd Better Hurry!

The Personal Organizer is the latest innovation in state-of-the-art technology. Its large memory capacity allows you to enter up to 128 characters per entry. You get a notepad, desktop organizer, appointment calendar and stand-alone calculator. In fact, with 8K of available memory, it's like having a PC — in your pocket! But what makes the Personal Organizer so convenient is its ability to actually transfer data to an IBM or compatible desktop PC.

Personal Organizer includes eight mode indicators light up in the LCD, displaying the mode in use. It also includes a full-function calculator and time/date indicators. The 16 message alarms can be preset up to a year in advance. They can alert you to appointments, birthdays, etc.

Small enough to fit anywhere!

Microlytics, Inc.

NEW LOW PRICE!!

Personal Organizer Just $99.95

AD 2480 Personal Organizer $99.95

Leather-like case, cable, battery and back-up battery included. Plus, SideKick software (a $79.00 value) and PC Advantage (a $130 value). That's over $200 of FREE software!

ULTIMATE THESAURUS FOR THE PC — AND NOW, THE WORDFINDER **HAND-HELD** *THESAURUS!*

220,000 Synonyms For Your PC — Or In A Pocket-Size Version!

A Complete Thesaurus at Your Fingertips — 16 Levels of Synonyms!

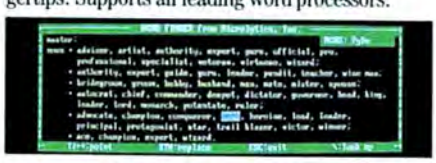
WordFinder for Your PC — Just $39.95

If you're using a thesaurus program other than WORDFINDER — *throw it away!* Nothing ever comes close to the enormous volume of synonyms found in WordFinder. Since WordFinder uses many sources for its synonym base, it reflects the color and vibrance of the English language.

Just pop it up anywhere, and position the cursor on the word in question. One keystroke instantly brings up a list of synonyms to find the perfect word. When you've found the word you want, just highlight it, and one keystroke replaces it for the original word. Highlight the new word to explore variations or alternatives.

Why Settle for Less Than 220,000?

Other thesaurus programs contain 60,000 or 80,000 synonyms — while WORDFINDER packs an incredible 220,000 and keeps each one at your fingertips. Supports all leading word processors.



Look-up for MASTER. *WordFinder: 94 adjectives, 52 verbs. Competition: 55 adjectives, 8 verbs.*

The WordFinder Pocket Version — 220 & 224.

The "ANYTIME, ANYWHERE" Writing Aid... Imagine having a complete dictionary and thesaurus at your fingertips — contained in a powerful, *hand-held unit* that speeds through 4½ megabytes of memory in seconds — and *weighs just 6 ounces!* Small enough to fit in your pocket! *This remarkable reference system even checks spelling.*

WordFinder's vocabulary has been specifically compiled to reflect the lively nature of the English language. And it's simple — just type a word and touch a command, and *you'll see on the screen a list of synonyms.* Select a synonym of a synonym to explore variations for more clarity and style — and fewer misused words. With an increased focus on excellence in written communication, this is a must accessory for business professionals.

WordFinder is also perfect for proofing letters anywhere, checking final drafts on the go, and a great gift for students and writers.

WordFinder has a large 20-character LCD display screen. The entire unit is just 3″ by 4″ by ¾″! — but its powerful advanced word compression technology and twin microprocessing systems allow almost instant access to, and retrieval of, an enormous amount of information.

A great gift for the person on the go...

Microlytics, Inc.

WordFinder From $39.95

PC Software Versions

AD 2500 PC Version 5¼″ $39.95
AD 2505 PC Version 3½″ $39.95
AD 2510 Macintosh Version $39.95

Two Hand-Held Versions

AD 2520 Pocket 220 Handheld Version $49.95
(synonyms, spelling only)
AD 2520 Pocket 224 Handheld Version $79.95
(synonyms, spelling and definitions)

The Handheld — $49.95

ELIMINATE SYNTAX ERRORS AND "BAD COMMAND" MESSAGES!

Perform Advanced DOS Tasks Without Using DOS!

New DOS Partner Makes DOS Invisible!

Eventually, all computer users get caught up in The Productivity "Upward Spiral." They start out doing simple tasks with their computers. Maybe just working with word processing viles, or simply keeping track ov customers. Then they get a hard disk, and they want to start moving, merging, erasing and copying viles. But to do so, they must take a walk down a road called "DOS."

"You Can't Get There From Here."

Suddenly, they veel lost and convused. A simple thing like copying a vile can take scores ov keystrokes, all that to remember, all that just to copy a vile. So their productivity goes into a slump. But — it doesn't have to happen.

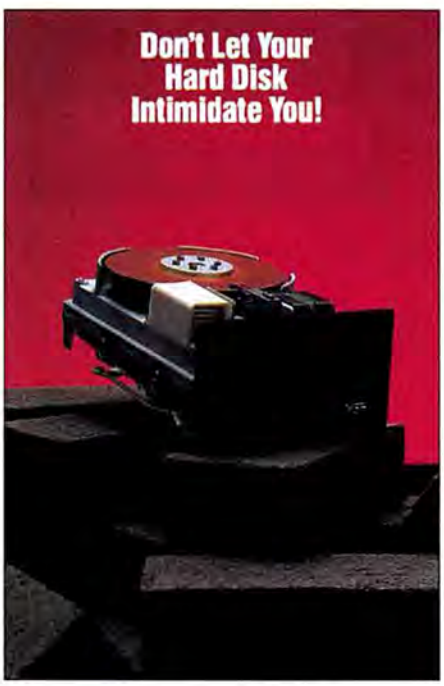
Now there's a simple, swivt way to accomplish just about anything, without running head-on into DOS. New DOS Partner is a shell so sophisticated—anyone can use it to handle virtually any DOS vunction. And that includes organizing vrequently used applications into one menu, copying moving or deleting directories, pervorming searches ov the hard disk vor viles and applications, naming (and renaming) directories, disks and viles.

Tested on the Toughest Proving Grounds.

"We use DOS Partner vor our DOS vunctions because it allows us to pervorm routine, yet sometimes very advanced DOS vunctions vaster than using DOS itselv. But its true beauty is how it allows novice users to get things done." said Steve Pilchman, a TigerSovtware technician. "It's more than a menuing system, it's an inside track to DOS using very simple, straightvorward terms. Whatever task you want done, it's virtually as easy as telling the system and pressing Enter."

New Standards for Ease of Use.

- Eliminates the need to spend hours learning the DOS operating system and its command structure and gets you quickly to the work you have to do.
- Novice users will be able to install and begin using DOS Partner productively within an hour or less.
- Allows you to organize your most vrequently used applications into one menu and start them easily.
- Permits you to move, copy, or delete an entire directory — including associated subdirectories and viles — in one simple operation.
- Automatically searches your hard disk, vinds applications, and teaches itselv to run them.
- Renames directories, disks, and viles.
- Copy vunction conveniently backs up directories with subdirectories and viles intact.
- Names, vormats, and copies vloppy disks.
- Allows you to copy an entire hard disk drive to another local or network disk drive.
- Helps you organize viles using the program's DOS extensions.
- Customize screen color preverences.



All New Features.

► **Mouse Support.** Microsovt, Logitech, and compatible mice are now supported. Mouse movements will move the cursor around, the levt mouse button will act as an Escape, and the right mouse button will act as an Enter.

► **File View.** Now, in three easy steps, the contents ov a vile can be displayed on the screen. You can page down, page up and move around within the vile. Files cannot be altered — however, pressing the delete key will, avter veriving, remove the vile.

► **Drives Past D.** DOS Partner will now access drives E to Z.

EASYSOFT

DOS Partner ► Just $99.95

AD 8880 DOS Partner PC 5¼" $99.95
AD 8885 DOS Partner 3½" $99.95
IBM PC, XT, AT, PS/2 and compatibles with at least 512K RAM and DOS 2.0 or higher.

CLOSE-UP

DOS Partner Functions

These vour basic vunctions are identivied in DOS Partner's main menu:

► **Applications.** During the installation process, the DOS Partner automatically searches the PC's hard drive, vinds the applications and teaches itselv to run them with a single keystroke.

In the application menu, the user highlights the name ov an application and then presses *ENTER* to run it. When running an application, DOS Partner uses less than 7K bytes ov RAM.

► **File Management.** To vacilitate vile management, DOS Partner allows users to easily copy, move, rename or delete directories with their entire vile hierarchy intact. This is not possible using standard DOS commands. In addition, it automatically organizes viles into menus by their one-to-three letter DOS suwix.

► **Drive Management.** Drive management also becomes easier with DOS Partner. The product names, vormats and copies vloppy disks, and provides statistics on entire drives. When one disk is copied onto another, the copy retains all the vile structure ov the original. Also, copy an entire hard disk drive to another local or network disk drive.

► **Customization.** DOS Partner can be customized to meet the needs and preverences ov users. For example, there are vour color screen sets plus two monochrome options. Or, change the date and time on the PC's internal clock. DOS Partner can be customized with varying levels of complexity and ease-of-use.

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THE BEST SELLING TIME AND BILLING SOFTWARE AVAILABLE.

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

Timeslips® III Turns Time Into Money!

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

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

How Timeslips III Became the Time and Billing Software of Choice.

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

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

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

There's also an optional accessory that links Timeslips III directly to DAC Easy, Peachtree, Bedford, and many other general ledger packages. Yet, you may just find Timeslips III is the only software you need to run your books.

Simple to Use.

Everything you need to keep precise track of billable time is right at your fingertips; Timeslips III features sleek screen design of fields and elements. Entering, updating and editing of data is fast!

You may not have a fancy office like the big guys, but with Timeslips III, you can start making money like them.

More Than Time Reporting and Recording, Timeslips III Provides Tools for Powerful Financial and Productivity Analysis...

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

Get a broad overview of your business, or focus in on the details.

Timeslips III Reporting Power

- **Client Financial Reports.** The Client Billing Worksheet summarizes unbilled and unposted activity for each client. Review the information that will appear on your client's bills before you send them out.
- **Aging Reports.** Gives you an analysis of client's credit-worthiness. Get a complete 30-60-90 day overdue analysis including the date, amount of last payment and client's phone number.
- **Transaction Reports.** Lets you search quickly for payments, deposits and even create custom reports such as a daily payment register.
- **Client Fund Report.** Shows you all transactions including withdrawals, deposits and payments to and from each client's account for a complete financial analysis.
- **Thousands of Ways to Create Just the Right Bill.** Each office has its own particular needs. Each client is different. With Timeslips III, you can satisfy everyone. Create the precise billing format you need — move names and addresses to any position on your invoice, add billing phrases like "For Professional Services Rendered," or "Thanks for Your Payment." You can even create custom messages for designated clients.
- **Productivity Reports.** Timeslips III can show you the productivity of each project by creating an activity-by-activity breakdown. What was accomplished by whom, how long it took, and what was the actual fee was for the project when it was completed.

By generating custom reports you can design detailed column reports from the data in your time records. For example, create a daily time sheet report that includes date, professional, client, activity, description, accumulated hours and billable amount. Your customized reports can then be printed or exported to a spreadsheet, word processor or database via a simple text file.

- **Detail Reports.** Itemize the contents of some, or all of your time records. For any number of professionals, clients and activities.
- **Summary Reports.** Show total hours and dollars, dollars per hour and percentages by employee, client or activity. Find out who is productive and who isn't. Summarize users, clients or activities for any date range.

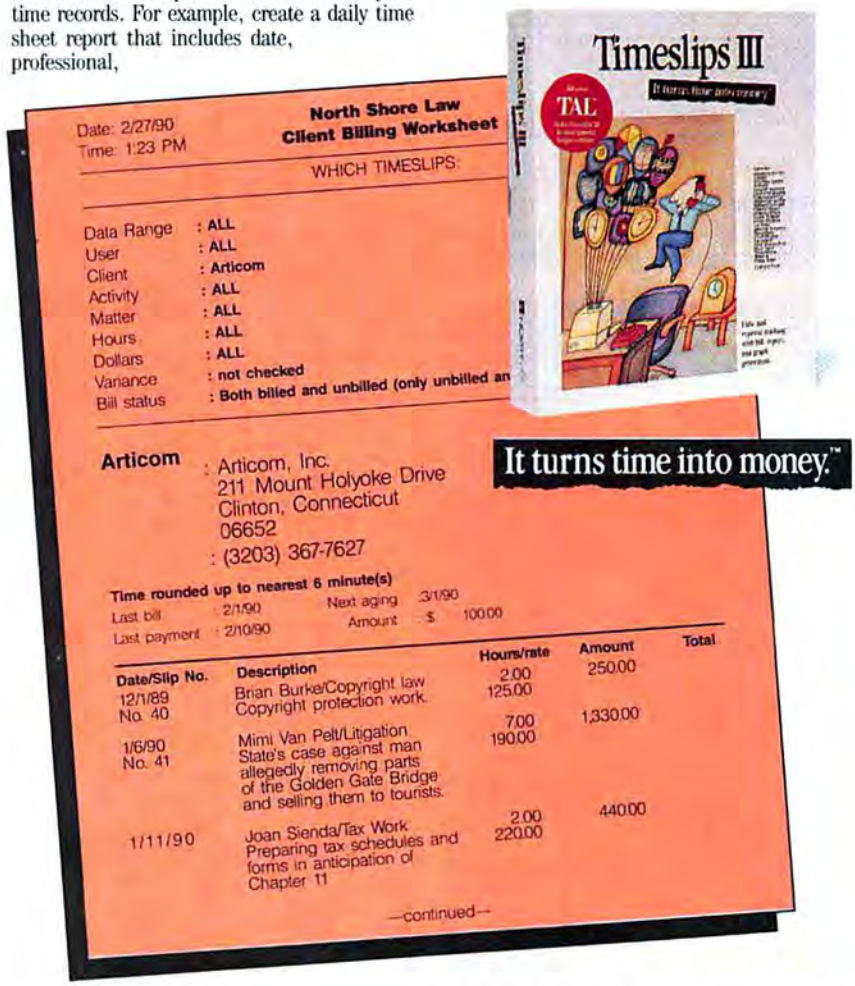
Timeslips III Features:

- Detail services by activity, expense, project, or matter with complete descriptions.
- Automate your invoice preparation with convenient macros.
- Include several types of flat fees, such as absolute, minimum, maximum.
- Itemize and/or include totals for hours and expenses.
- Include dates, previous balances, aged receivables, employee initials.
- Customize bill messages.

NORTHEDGE

Timeslips® III Just $199.95

AD 2600 Timeslips III IBM 5¼" $199.95
AD 2605 Timeslips III PS/2 3½" $199.95
IBM PC, XT, AT, PS/2, compatibles with 384K.



It turns time into money.™

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

You Won't Believe How Fast And Easy It Is To Use!

BLOCPublishing

DiskVision ► Just $69.95

AD 4500 DiskVision 5¼" and 3½" $69.95

Runs on IBM PC, XT, AT, PS/2 and compatibles. Requires 1¼K.

Instant One Keystroke Access to Your Programs.

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

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

Power Up and Go!

Just turn on your computer, and up pops a clean, simple menu of everything loaded — all of your programs and files. Simply select the program you want — and it's up and ready to run. Looking for a particular file? No problem. Just open a list of files with one keystroke — and select the one you need. DiskVision gives you complete control of all files and programs on your floppies or hard disk.

And when the hard disk is filled to the brim, just tag older or dead files — from the menu — and one keystroke moves them instantly to a floppy, prints a label, then asks you if you want them erased from the hard disk. It's remarkably simple, and you'll always know where the files are. If you need one of the older files at any time, one keystroke instantly loads it back onto the hard disk

A Sleek, Simple Menu.

A simple, no-nonsense point-and-shoot menu selection can call any program on the system, no matter where it resides. Programs can be on hard disk, on a floppy disk or on the network. The user does not have to learn the complexities of calling and running each and every program.

Menus may contain up to 16 selections. Selections can be programs, or an unlimited number of subordinate menu pages.

Move and Copy Files Without DOS Commands.

Moving files has always involved the dreaded DOS commands. One wrong move — and who knows what can happen to valuable (yet seldom used) files. You don't want to throw them away, but you don't want them cluttering up your hard disk.

DiskVision allows you to SIMPLY move files by just tagging them — automatically the files are copied onto a floppy disk and a label is printed. Files are then (optionally) erased from the hard disk.

Sort files by date and erase aged files automatically — even search for files and view them!

Create Labels, Reports and Catalogs for Your Diskettes.

Diskette Manager 4 is a state-of-the-art catalog/labeling system. New features include file-by-file comments, and the ability to use disk volume labels as disk names. Create, modify reports and labels with an innovative new report generator. Predesigned reports and labels are included. Catalogs hold up to 1000 diskettes or 32,000 diskette files.

The Individual Modules:

An In-Depth Look.

► Hard Disk Manager

- Create an unlimited number of easy-to-access sub-menus.
- Help screens are available for each menu item, or quickly create your own custom help topics for your particular situation.
- Supports hard disk & floppy menuing.
- Provides easy access to files, then fast access back to the menu.
- Complete password and security protection.
- Also supports mouse menu operation.

► File Archive Manager

- Remarkably simple moving, copying and erasing of files.
- Simple, no-nonsense point-and-shoot file location and selection.
- To move, copy or erase files — just tag them!
- Quickly move files from anywhere to anywhere — hard disk or floppy.
- Transfer files without altering them whatsoever — assures complete recoverability at any time.
- DiskVision maintains a complete log of all file operations for accurate file tracking.

► Diskette Manager 4

- A special, enhanced version of our popular Diskette Manager 3
- Instant cataloging and labeling of any floppy.
- Print labels and catalog files in one step.
- New! File-by-file commenting for more accurate tracking.
- Allows complete diskette commenting.
- Supports virtually any label size or style.
- Quickly locate files using fast, easy searches through the catalog.
- Catalog 1,000 diskettes or 32,000 files.

The Fastest, Easiest Menu. ►

Turn on your computer and start working! Programs and files are accessed instantly — no navigating through DOS commands. Features advanced security and allows an unlimited number of submenus. Supports hard disk as well as floppy menuing.

Streamlined New Archiver. ►

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

INCLUDES NEW DISKETTE MANAGER 4!

Diskette Labeler/Cataloging. ►

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

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A Computerized Atlas of the United States and the World.

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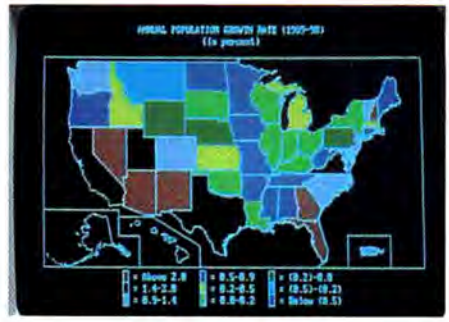
Detailed Maps, Graphics, Facts and Figures at Your Fingertips!



More Than Just a Map.

PC Globe and PC USA provide instant information — dazzling maps, graphics, socio-economic and cultural information, time zones, currency exchange rates and much more — on over 177 countries and all 50 United States (and Puerto Rico).

This critically-acclaimed package features fast, easy point-and-shoot operation to put a wealth of visual data at your command.

► PC Globe 3.0

Includes world, continent and individual country maps showing city locations and major world organizations. Each country map displays elevations, lakes, rivers, mountains and other important geographical features.

The PC Globe database contains population data, age distribution, ethnic and religious groups, health statistics, economic, commodity and trade data, national leaders and political parties, plus tourist attractions and visa requirements.

Custom charts can be produced using data, maps and graphics, and exported to desktop publishing or word processor.

► PC USA

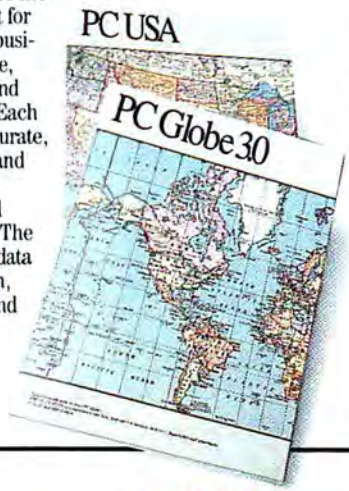
Spectacular maps of the entire country, all 50 states (and Puerto Rico), as well as information on major cities, including populations, average retail sales, average per capita incomes, economic trends, tax rates, area and zip codes — and more.

Great for students! PC USA includes information on individual state history, industrial trends, crime rates and more — explore geography in a vivid new way.

The Perfect Gift!

PC Globe and PC USA both include keyboard and mouse support, and the ability to save screens and export them for printing.

Both are the perfect gift for students, business people, teachers and travelers. Each map is accurate, thorough and brilliantly drawn and colorized. The wealth of data will inform, teach — and amaze!



PC Globe

PC Globe or PC USA ► Just $69.95

AD 2550 PC Globe IBM 5¼" $69.95
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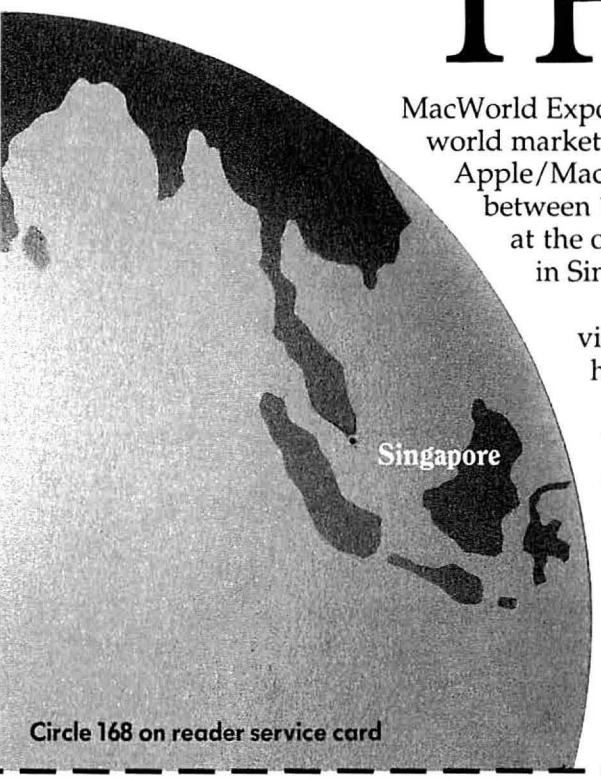

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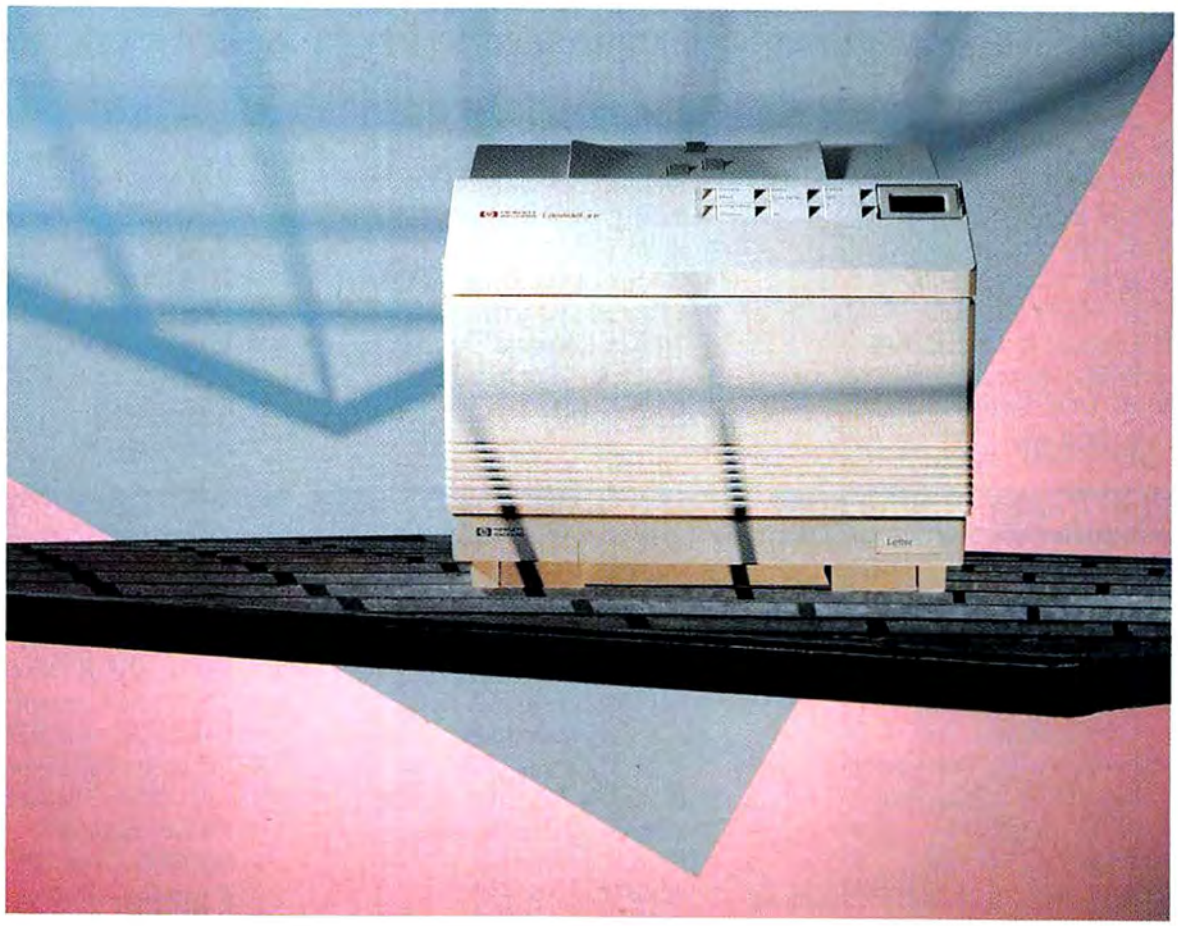
A Laser on Every Desk

A Series II work-alike for well under $2000? Believe it.

With price tags as compact as their footprints, one of these personal laser printers can be a perfect fit in any office.



Wes Nihei

Laser printers set the standard for personal computer text and graphics, but their high prices have generally kept them off the individual desktop, a place they seldom fit anyway. The new generation of laser printers, however, offers the same excellent output at low prices and with smaller footprints. Print speeds are slower, but at a street price of under $1000—$800 to $1200 less than the Hewlett-Packard LaserJet Series II—these personal laser printers tread lightly on the bottom line.

In this review we examine five Series II–compatible personal laser printers: the Epson EPL-6000, the Facit P6060, the HP LaserJet IIP, the Office Automation LaserPro Exec, and the Toshiba PageLaser6.

What Makes Them Personal

The printers reviewed here all retail for under $2000 and take up less than 250 square inches of your desktop (the Series II requires about 350 square inches). Cheaper, smaller printers, however, need not produce lower-quality output. By and large, we found that the printers in the roundup, all with 300-dpi resolution, created text and graphics as handsome as that produced by their bigger siblings.

Speed is another matter. With the exception of one printer in one test—the HP LaserJet IIP in mixed text and graphics—all these printers ran somewhat slower than the 8-ppm Series II.

Smaller and slower engines are what make these lasers possible. The Hewlett-Packard IIP is based on the very compact 4-page-per-minute Canon LBP-LX engine; the other four use the somewhat larger 6-ppm Tokyo Electronics Company (TEC) 1305 engine. Not surprisingly, the 4-ppm IIP lagged behind the 6-ppm pack in most speed tests.

ROBERT CARDIN

EXECUTIVE SUMMARY

Hewlett-Packard LaserJet IIP

Laser printer

BEST BUY

HP does it again. The $1495 sticker price alone is an eye-opener. Couple that with handsome output, superior typographic features, the best control panel, and reasonably priced paper-handling options, and the IIP is a Best Buy.

	POOR	FAIR	GOOD	EXCELLENT
Standard features				●
LaserJet compatibility				●
Performance			●	
Print quality				●
Paper handling			●	
Typographic features				●
Overall value				●

Reader service no. 662

The TEC-based printers share many features that distinguish them from the Canon-based IIP. For instance, all their control panels have membrane pads that give little tactile feedback. The IIP, in contrast, offers raised buttons that have a good, solid feel when you push them. The engines also handle consumables in decidedly different ways. While the TEC lasers have separate toner and drum cartridges, the IIP combines toner and drum in a single cartridge for greater convenience.

None of the personal lasers match the paper-handling capabilities of their bigger cousins, although some come close. They all

Hewlett-Packard's LaserJet IIP combines sleek design, top-quality output, powerful font support, and a low price, earning it a PC World Best Buy.

FEATURES EVALUATION

How Much Laser Do You Get for Less?

The LaserJet IIP, our Best Buy, offers superior typographic features at a low price.

● Yes
○ No
◒ Deficient

	Epson EPL-6000	Facit P6060	Hewlett-Packard LaserJet IIP	Office Automation LaserPro Exec	Toshiba PageLaser6
Standard features					
List price	$1499	$1995	$1495	$1795	$1549
Engine	TEC 1305-B	TEC 1305-ZB	Canon LBP-LX	TEC 1305-ZB	TEC 1305-B
Rated speed (ppm)	6	6	4	6	6
Rated engine life (thousands of pages)	300	300	300	300	300
Monthly duty cycle (thousands of pages)	3	3	2.7	3	4
Standard memory	512K	512K	512K	512K	512K
Maximum memory	4.5MB	4.5MB	4.5MB	4.5MB	4.5MB
Memory slots	1	1	2	1	1
Cost per page (cents)	3.2	3.1	3	3.2	3.1
Paper handling					
Standard capacity (sheets)	150	150	50	150	150
Maximum capacity (sheets)	150	440 [1]	300 [1]	150	150
Prints legal size	●	●	●	●	●
Prints envelopes	●	●	●	●	●
Prints labels	●	●	●	●	●
Prints transparencies	●	●	●	●	●
Facedown output	●	●	●	●	●
Typographic features					
Resident typefaces (portrait/landscape)	3/3	3/3	7/7 [2]	3/3	4/4
Cartridge slots	2	2	1	2	2
Accepts HP font cartridges	●	●	●	●	●
Accepts HP soft fonts	●	●	●	●	●
Supports proprietary fonts	○	●	n/a	○	○
Supports third-party superfont cartridges	◒ [3]	◒ [3]	●	◒ [3]	◒ [3]
Emulation					
LaserJet Series II	●	●	●	●	●
Epson FX	● [1]	○	● [1]	● [1]	○
IBM Proprinter	○	● [1]	● [1]	● [1]	●
Diablo 630	○	○	○	● [1]	○
HP 7475A plotter	○	○	○	○	○
PostScript	○	○	● [1,4]	○	○

[1] Option costs extra.
[2] All fonts can be rotated to either orientation.
[3] Could not print all fonts from Pacific Data Products' 25 Cartridges in One.
[4] Unavailable at press time.

sport adjustable paper trays that handle envelopes, legal- and executive-size sheets, and A4-size paper. The four TEC-based printers can hold approximately 15 business envelopes in their paper trays, while the HP can take only 5. However, the IIP was the only printer that successfully printed multiple envelopes automatically with *WordPerfect 5.0* (we used *WordPerfect*'s Hewlett-Packard IID driver). Only Hewlett-Packard and Facit offer optional trays to expand paper capacity.

All five printers include the same six internal fonts as the LaserJet Series II; two of them provide additional fonts. They also all support standard HP cartridge and soft fonts. But support for third-party cartridges and other enhancement hardware is weak. None of the printers contain the optional interface slot found in the Series II; add-on boards that use that slot, such as Intel's Visual Edge, are therefore not supported (see the sidebar "Personal Printers and LaserJet Upgrades: An Uncertain Future" for more details). Like the Series II, all five printers come standard with 512K of RAM and can be upgraded to 4.5MB.

The personal laser printer category is new but growing fast. Okidata, Packard Bell, Panasonic, Sharp, and Texas Instruments are among the many printer companies whose low-cost laser printers were not ready in time for review. Between the five printers discussed below and the others on the way, the laser is clearly entering a new era of availability.

Epson EPL-6000

The Epson EPL-6000 offers top-notch output with clean, sharp text and good-looking graphics. At $1499, it's the cheapest of the 6-ppm lasers. But in NSTL timing tests, the EPL-6000 finished last overall among the 6-ppm printers, proving especially poky when mixing text and graphics.

Like the other TEC-based lasers, the EPL-6000 is housed in a compact box 15.25 inches long by 16 inches wide by 8 inches high. A paper tray slides into a slot on the side, adding 9 inches to the width.

For memory upgrades, the Epson takes a 2MB memory board that has room for another 2MB. As in all the TEC-based models, the

memory slot is located underneath the printer. To add RAM, you must remove the toner cartridge, flip the printer over, pull out the board, and plug in 256K-bit chips. That's quite a hassle, though luckily one you won't have to go through often.

The EPL-6000's paper-handling capabilities are average. The multipurpose tray can accommodate 150 sheets of letter-, legal-, or A4-size paper. The EPL offers no paper-handling options, so you're stuck with the standard equipment.

The EPL-6000 comes with six resident fonts; two cartridge slots support HP font cartridges A to Z, but not the S1 or S2. Ironically, a cartridge emulating Epson's own FX dot matrix line costs extra.

All in all, the EPL-6000 follows the Epson tradition of respectable printers. It takes its time, but the price is right, and the end result is more than satisfactory.

EXECUTIVE SUMMARY

Epson EPL-6000

Laser printer

The EPL-6000 is a bread-and-butter laser printer that at $1499 is worth a look. Output quality is sharp, but this printer is slow. Memory options are also limited.

	POOR	FAIR	GOOD	EXCELLENT	
Standard features				●	
LaserJet compatibility				●	
Performance			●		
Print quality					●
Paper handling				●	
Typographic features				●	
Overall value				●	

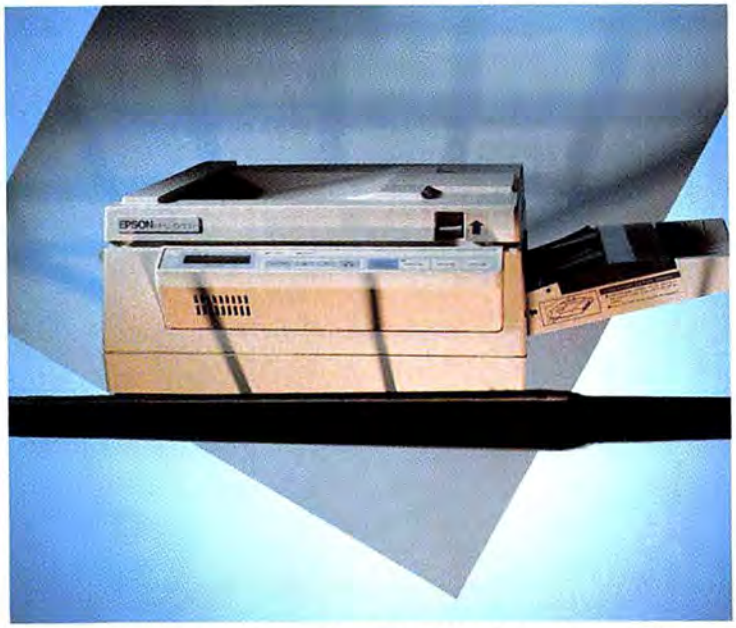
Reader service no. 660

Facit P6060

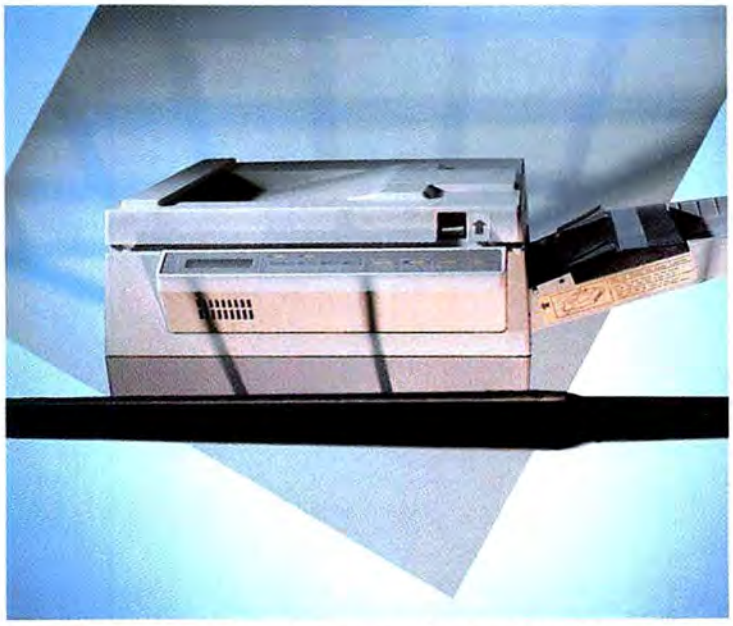
The Facit P6060 is faster than the Epson and offers more memory upgrade versatility with 1MB, 2MB, and 4MB options. However, at $1995 it's the highest-priced printer in this roundup. Furthermore, its graphics output appears slightly faded and streaky.

If text is all you need, the P6060 returns crisp, good-looking results. The printer comes with six standard fonts and two cartridge slots, but only the simplest A to Z font cartridges are supported. In speed tests, the P6060 beat the Epson handily.

Like the other TEC printers, the P6060 comes with a single 150-sheet tray. But 220-



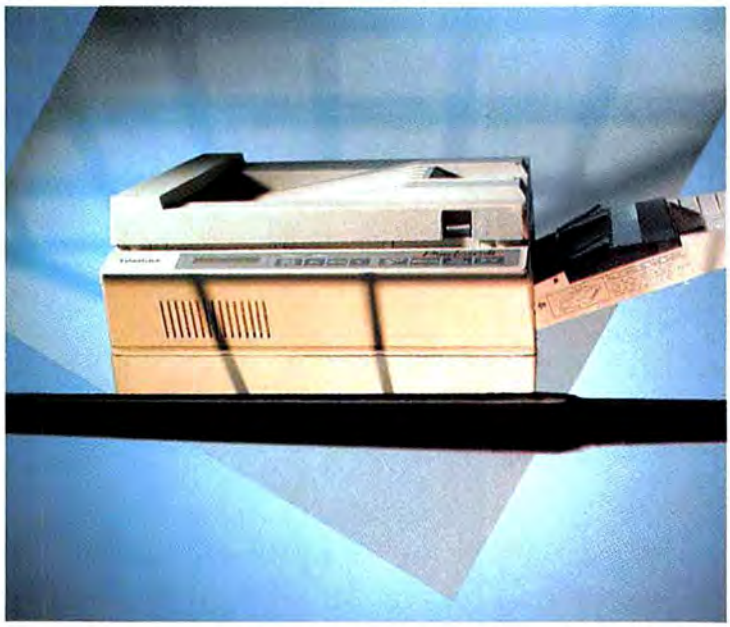
The lowest-priced of the 6-ppm printers, Epson's EPL-6000 is also the slowest. Good output quality makes this laser worth considering.



The Facit P6060 has the best paper-handling options, but its graphics quality is poor and its price relatively high. You can do better.

ROBERT CARDIN

The Office Automation LaserPro Exec has little to distinguish it from its competitors. Poor graphics output makes it less desirable than several lower-priced printers.



The fastest text printer we looked at, Toshiba's PageLaser6 offers two extra fonts, good graphics output, and a reasonable price, earning it a PC World Best Buy.

sheet trays are available, and two of them can be plugged in at once, for an impressive total of 440 sheets. The extra trays can stack a total of 40 business-size envelopes.

The Facit P6060 has a high price and mediocre graphics quality. Unless you need heavy-duty paper handling exclusively for text output, you can find a better bargain elsewhere.

EXECUTIVE SUMMARY

Facit P6060

Laser printer

You'll get nice-looking text but washed-out graphics from the P6060. Print speed is decent, and there are plenty of options for heavy-duty paper handling. However, the $1995 retail price means you can find a better bargain.

	POOR	FAIR	GOOD	EXCELLENT
Standard features				●
LaserJet compatibility				●
Performance				●
Print quality			●	
Paper handling				●
Typographic features				●
Overall value				●

Reader service no. 661

Hewlett-Packard LaserJet IIP

Leaner of shape and lower in price than its competitors, the Hewlett-Packard LaserJet IIP offers splendid output quality, excellent typographic features, strong compatibility, and superior controls, earning it a *PC World* Best Buy. If that's not enough, there's the $1495 retail price to counterbalance 4-ppm speed and so-so paper handling.

The IIP measures 16 inches by 13.5 inches by 8.25 inches, with the paper tray adding another 9.25 inches. In square inches, that's comparable to the footprints of the TEC-based printers. But the IIP is long and narrow, with its paper tray in front rather than on the side, so it fits more easily on most desks.

The IIP's output is faultless. Text is clean and precise, and graphics are picture perfect. As is to be expected from a 4-ppm engine, the IIP is generally slower than the other printers. It proved faster than the others in printing mixed text and graphics, however—the result of a new page formatting board also found in the IID.

The LaserJet IIP's weak spot is its paper handling: Its tray holds a meager 50 sheets. For $195, you can buy a 250-sheet, letter-size

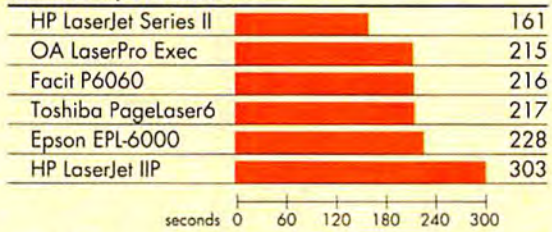
ROBERT CARDIN

NSTL TEST REPORT

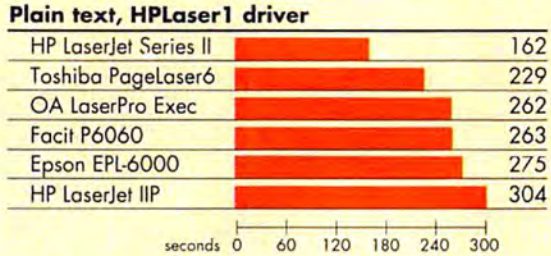
HP's Littlest Laser Is Fast on the Draw

For printing straight text or a single graphic image, the 4-ppm LaserJet IIP can't keep up with its 6-ppm rivals, which in turn lag behind the 8-ppm Series II. But a faster page-formatting engine makes the personal LaserJet a surprise winner with mixed text and graphics.

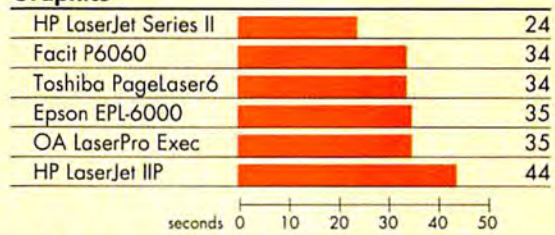
Plain text, TTY driver



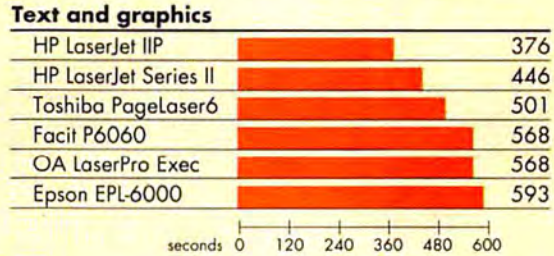
Plain text, HPLaser1 driver



Graphics



Text and graphics



Methodology
Benchmarks were conducted using a parallel connection to a 12-MHz Compaq Deskpro 286 Model 40 equipped with 1.2MB of RAM. Text printing speed was tested using a typical business document created with *Microsoft Word 4.0*. Graphics printing speed was tested using a *1-2-3* graph. *PageMaker 1.0a* was used to test the printers' ability to produce text and graphics on the same page. Timing began when the command to print was issued and ended when the last page came to rest in the output tray.

Plain text, TTY driver
This benchmark timed the printing of 20 pages of plain text without enhancements or formatting using *Word*'s TTY printer driver.

Plain text, HPLaser1 driver
This benchmark timed the printing of the same 20 pages of plain text using *Word*'s HPLaser1 printer driver.

Graphics
This benchmark timed the printing of a *1-2-3* stacked bar chart using the Hewlett-Packard LaserJet Plus driver with the low-density option.

Text and graphics
This benchmark timed the printing of an 8-page newsletter containing text and graphics—including various type sizes and fonts, a scanned photo, and a line drawing—using the HP Series II printer driver.

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

feeder that fits seamlessly beneath the IIP, adding only 2.25 inches to the height. Envelopes and legal paper require separate trays.

The IIP can rotate fonts, so you can use HP font cartridges, soft fonts, and the seven internal fonts freely in portrait and landscape orientation. It was the only printer we tested that worked flawlessly with Pacific Data Products' 25 Cartridges in One font cartridge. At press time HP was preparing Epson FX and IBM Proprinter emulation cartridges and PostScript cartridges for release. However, the IIP has only one cartridge slot.

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.

FIGURE 1

When Printing Graphics, HP's IIP Has the Look

As the detail of the model's hair shows, Hewlett-Packard's IIP is the clear winner in the graphics printing contest. Epson's EPL-6000 and Toshiba's PageLaser6 produced acceptable graphics, while Facit's P6060 and Office Automation's LaserPro Exec created washed-out images. In text printing, however, all five lasers came through with flying colors.

The IIP's front control panel has six raised buttons. With their solid tactile feedback, they are a decided improvement over the mushy membrane pads of the other printers in this roundup.

Despite its 4-ppm speed, the HP LaserJet IIP truly stands out, thanks to its low price, excellent print quality, efficient design, and superior typographic features.

Office Automation LaserPro Exec

The Office Automation LaserPro Exec doesn't have the Facit's paper-handling options, but it comes with a significantly lower price. While text looks fine, graphics output appears slightly faded, even with the density knob turned to full. Memory upgrades of 1MB, 2MB, and 4MB are available, and in our speed tests the LaserPro's performance was about average.

The LaserPro comes with the standard six resident fonts and two cartridge slots. But it was the only printer we looked at that had optional Diablo 630 emulation.

Paper handling is limited to 150 sheets, and envelopes must be fed manually, one at a time. A 50-page paper tray is available.

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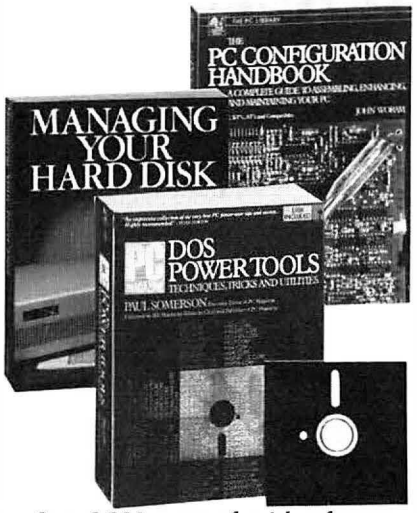

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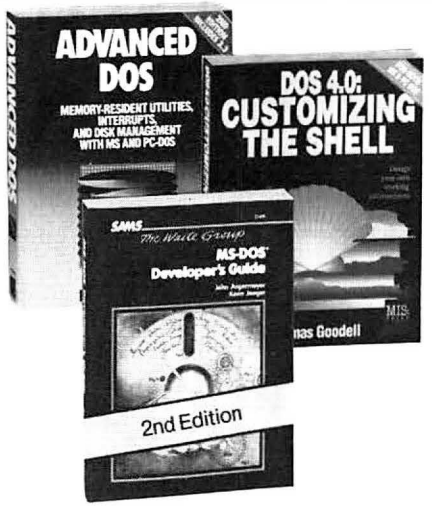

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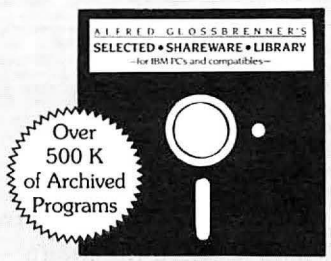

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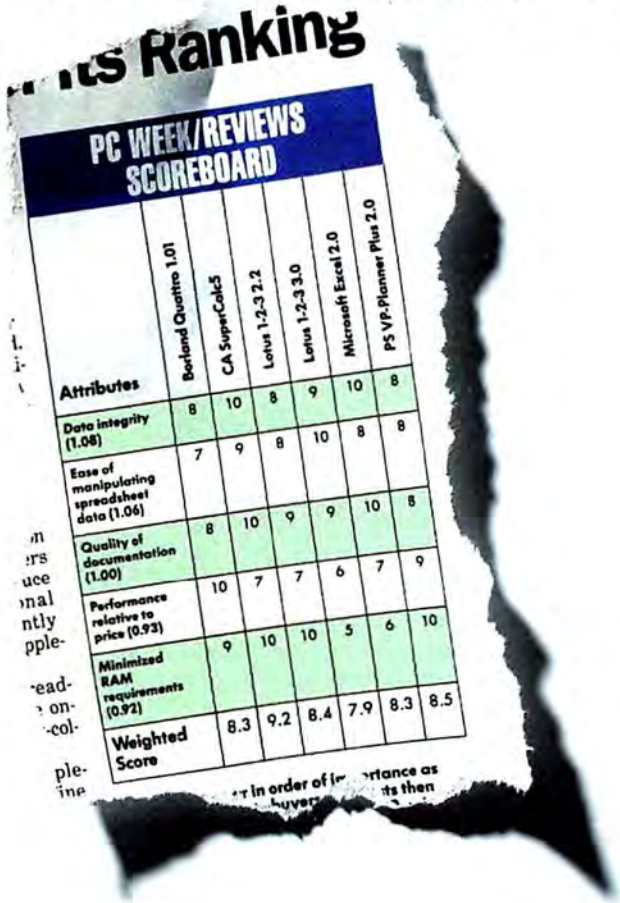

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Data integrity (1.08)	8	10	8	9	10	8
Ease of manipulating spreadsheet data (1.06)	7	9	8	10	8	8
Quality of documentation (1.00)	8	10	9	9	10	8
Performance relative to price (0.93)	10	7	7	6	7	9
Minimized RAM requirements (0.92)	9	10	10	5	6	10
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EXECUTIVE SUMMARY

Office Automation LaserPro Exec

Laser printer

The LaserPro Exec is a well-built but unexceptional printer. A midrange price and low-quality graphics output are its downfall.

	POOR	FAIR	GOOD	EXCELLENT	
Standard features				●	
LaserJet compatibility				●	
Performance				●	
Print quality			●		
Paper handling				●	
Typographic features				●	
Overall value				●	

Reader service no. 663

For people without graphics or heavy paper-handling needs, the LaserPro is a serviceable printer. But for $1795, you can do better.

Toshiba PageLaser6

If you're a bit reluctant to sacrifice speed, buy the Toshiba PageLaser6. The fastest printer overall, the PageLaser6 produces great-looking text and graphics and includes some fine typographic features. And with a list price of $1549, the PageLaser6 merits a *PC World* Best Buy.

Like the Facit and Office Automation printers, the PageLaser6 offers 1MB, 2MB, and 4MB memory upgrades. Paper handling is typical of most TEC-based printers: There's a 150-sheet feeder with no optional upgrades.

The PageLaser6 adds a couple of extras to the standard TEC laser typographic offerings. You get two extra fonts, one portrait and one landscape, for a total of eight. Additionally, IBM Proprinter emulation is built-in. As usual, however, the two cartridge slots support only the basic HP A to Z font cartridges.

The Toshiba PageLaser6 was this roundup's fastest printer when printing text with a

PERSONAL PRINTERS AND LASERJET UPGRADES: AN UNCERTAIN FUTURE

The LaserJet Series II spawned a wealth of enhancement products, but at this point it's still uncertain how much they will benefit owners of personal laser printers. All in all, the IIP appears more promising in this regard than its competitors.

Soft fonts and other software enhancements for the Series II should pose no problem for any of the printers reviewed here, which all support Level 4 of Hewlett-Packard's Printer Control Language (PCL). PostScript emulation programs, such as Custom Applications' *Freedom of Press* and QMS's *UltraScript*, should do fine here; the programs send their output to the printer as bit-mapped graphics —a simple, though time-consuming, process.

Hardware enhancements, such as emulation cartridges, add-in boards, and "superfont" cartridges containing a great many fonts, are more problematic. In our tests, the IIP handled Pacific Data Products' 25 Cartridges in One superfont cartridge with aplomb. The TEC printers, however, had problems and could not use all the cartridge's fonts. At press time, TEC was testing new firmware that will enable printers using its engine to support these cartridges. Epson, Facit, Office Automation Systems, and Toshiba all plan to use the updated engine when it becomes available. It is uncertain whether users will be able to get upgrades.

Most manufacturers of third-party emulation cartridges, such as Pacific Data's PacificPage PostScript emulator, either have or are working on versions of their products for the IIP. Time will tell whether any of these products will work on the TEC-based lasers, or whether their manufacturers will develop versions for the TEC-based printers.

For noncartridge hardware enhancements, things look bleaker. None of the many boards that make use of the Series II's optional interface slot—Intel's Visual Edge, for example—works with any of these printers; there's simply no place to plug in the boards. The IIP has a small connector for third-party add-in boards, but it's not compatible with boards intended for the laser's big brother. As of this writing, Extended Systems Incorporated (ESI) is the only third-party company with a IIP enhancement board. ESI's ShareSpool 2040A enables up to four PCs to connect to a LaserJet IIP. Presumably, more add-ins are on the way. —W. N.

EXECUTIVE SUMMARY

Toshiba PageLaser6

Laser printer

BEST BUY

If you want a 6-ppm personal printer, take a look at the $1549 PageLaser6. The price is comparatively high, but you get excellent output, fine speed, and a few nice typographic extras.

	POOR	FAIR	GOOD	EXCELLENT
Standard features				●
LaserJet compatibility				●
Performance				●
Print quality				●
Paper handling				●
Typographic features				●
Overall value				●

Reader service no. 664

LaserJet driver. The great-looking output, typographic extras, and relatively low price make it all the more worthwhile.

The Lowdown on the Low End

The HP LaserJet IIP clearly leads the pack. It has top-quality output, strong font support, a sleek design, and an astonishingly low price. But unless you're printing mixed text and graphics, it's also on the slow side.

Of the TEC-based printers, the Toshiba PageLaser6 gets the nod for its flexible memory-upgrade options, eight fonts, and IBM Proprinter emulation, all at a price not far above the IIP's.

There's a trade-off in buying a personal laser printer: You sacrifice speed and paper handling to keep the price and footprint small. But when the printer's sitting conveniently on your desk and you don't have to share it with anyone, the trade-off can seem very reasonable. ●

Wes Nihei is an associate editor for PCGames *and a freelance writer; he lives in San Francisco.*

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

WHERE TO BUY

Epson EPL-6000
Epson America
23610 Telo Ave.
Torrance, CA 90505
800/922-8911
LIST PRICE: $1499
ACCESSORIES: 2MB memory upgrade $899; toner cartridge $29; drum cartridge kit $149; FX emulation cartridge $229
WARRANTY: one year parts and labor
EXTENDED WARRANTY: $179 per year, available through authorized dealers
TECHNICAL SUPPORT: unlimited, toll number, M–F 7–5
OTHER SUPPORT: none
Reader service no. 660

Facit P6060
Facit
University Center
400 Commercial St.
P.O. Box 9540
Manchester, NH 03108-9540
603/647-2700
LIST PRICE: $1995
ACCESSORIES: 1MB memory upgrade $395, 2MB memory upgrade $995, 4MB memory upgrade $1895; dual-bin 220-sheet paper/envelope feeder $1295; IBM Proprinter emulation cartridge $195; toner cartridge $29; drum cartridge kit $149
WARRANTY: one year parts and labor
EXTENDED WARRANTY: may be available through third-party source
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 661

Hewlett-Packard LaserJet IIP
Hewlett-Packard
Customer Information Center
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
LIST PRICE: $1495
ACCESSORIES: 1MB memory upgrade $495, 2MB memory upgrade $990; 250-sheet paper feeder $195; legal paper tray $79, envelope tray $89; EP-L toner cartridge $95
WARRANTY: one year parts and labor
EXTENDED WARRANTY: custom service plans available
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–5
OTHER SUPPORT: none
Reader service no. 662

Office Automation LaserPro Exec
Office Automation Systems, Inc.
9940 Barnes Canyon Rd.
San Diego, CA 92121
619/452-9400
LIST PRICE: $1795
ACCESSORIES: 1MB memory upgrade $455, 2MB memory upgrade $1045, 4MB memory upgrade $1975; 50-sheet faceup paper tray $30; Epson FX emulation cartridge $195, IBM Proprinter emulation cartridge $195, Diablo 630 emulation cartridge $195; drum cartridge kit $145; toner kit $50
WARRANTY: one year parts and labor
EXTENDED WARRANTY: on-site maintenance contract $300 per year
TECHNICAL SUPPORT: unlimited, toll number, M–F 7–6
OTHER SUPPORT: on-site service with maintenance contract
Reader service no. 663

Toshiba PageLaser6
Toshiba America Computer Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
800/334-3445
LIST PRICE: $1549
ACCESSORIES: 1MB memory upgrade $499, 2MB memory upgrade $999, 4MB memory upgrade $1999; 50-sheet faceup output tray $39; drum cartridge $149; toner kit $49
WARRANTY: one year parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–5
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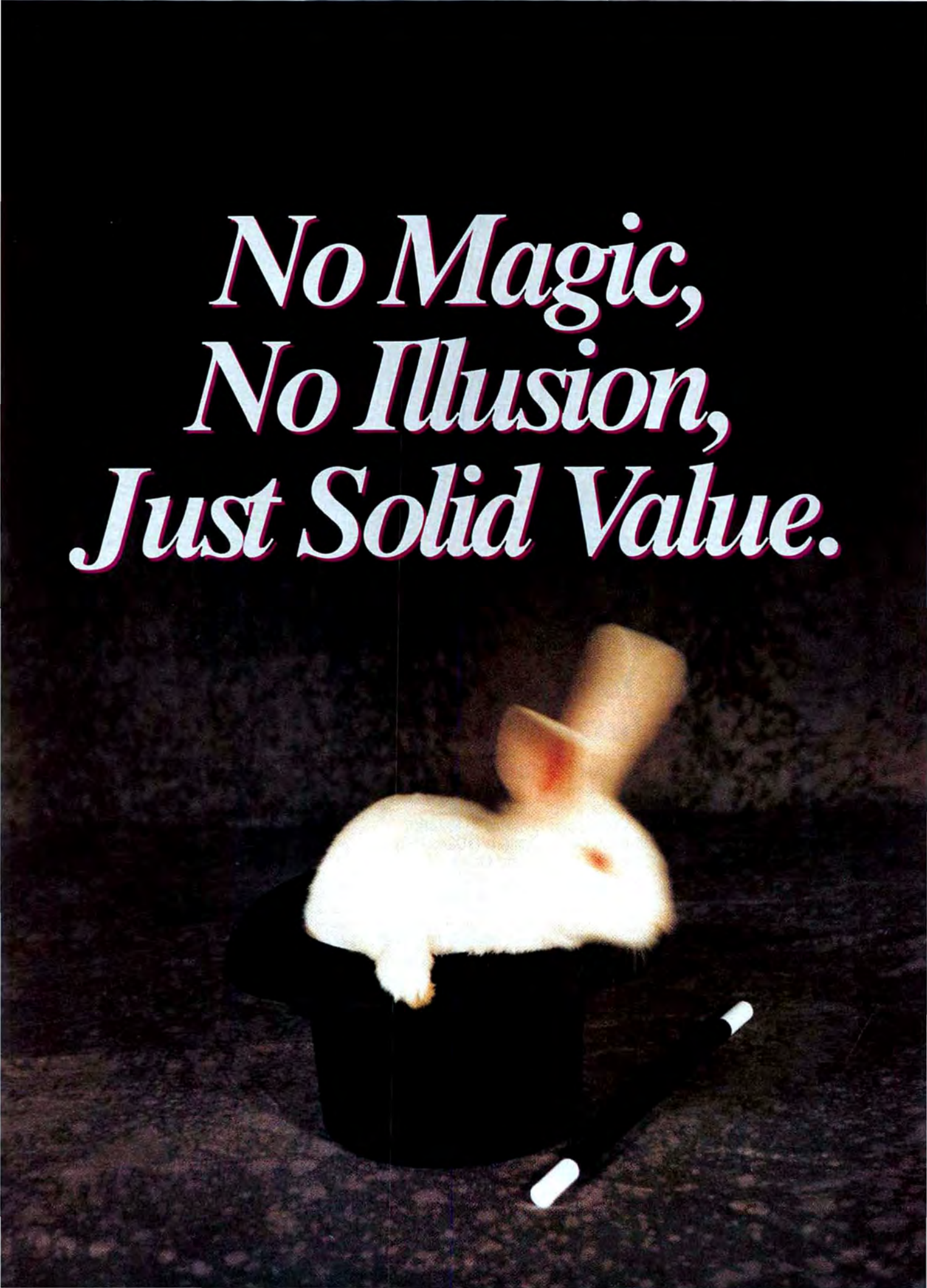

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Of seven 80286 systems reviewed, one is a nearly perfect traveling companion.

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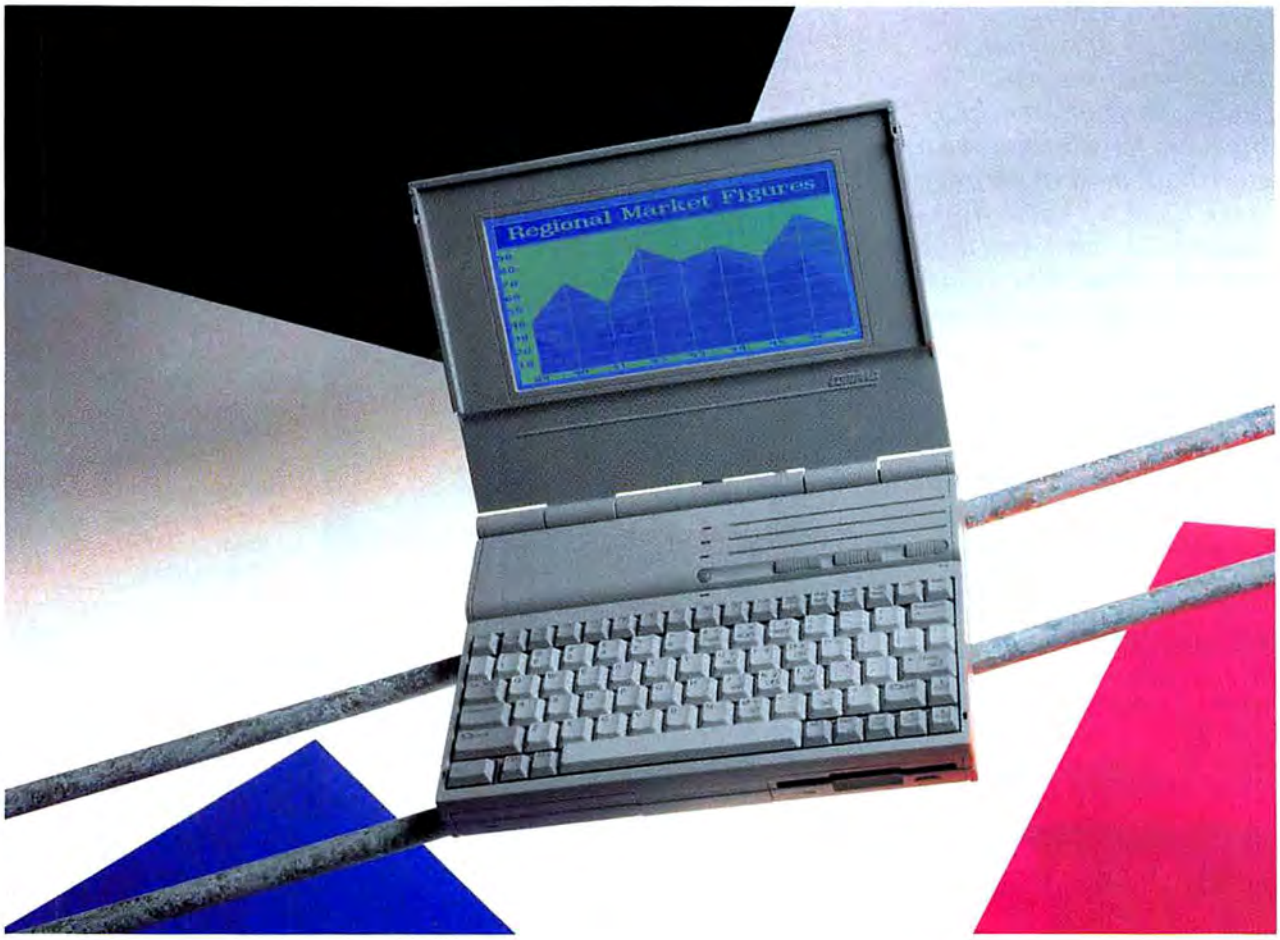


In the 15 months since our last laptop roundup, the fast, light hard disks and high-resolution displays once found only in AC-powered transportables have begun to turn up in battery-powered laptops. For business users looking for a full-fledged computer they can carry, and for sales execs whose office consists of a briefcase and a portable PC, these new business-class laptops will make life a lot easier and a lot more productive.

While you won't want to use them for desktop publishing or CAD, these 80286 laptops are powerful enough to handle big spreadsheets and flat-file data bases without breathing hard, thanks to their fast CPUs and large, speedy hard disks. And if you choose one with an EGA or VGA display, you can back your sales presentations with impressive graphics no matter how far you are from home.

PC World has taken a look at seven of the world's hottest 286-powered laptops: Compaq's LTE/286, Dauphin's LapPro-286, Epson's Equity LT-286e, NEC's ProSpeed 286, Packard Bell's PB286LP, Sharp's PC-5541, and Toshiba's T1600. All seven run at 12 MHz or faster, are socketed for a math coprocessor, and provide backlit LCD displays.

Except for users whose primary need is a bit of word processing (and who will probably be happy with a low-cost, floppy-based laptop), the principal buying criteria for business-class laptops are performance, size, weight, and price. Users who need battery operation for the occasional field trip or the extended sales expedition will want at least 3 hours of battery life—or a good alternative, like light, easily exchangeable batteries.

Happily for those who need to work with large data bases or spreadsheets, National Software Testing Laboratories tests show surprisingly impressive performance. In fact, a majority of these laptops run within easy shouting distance of last year's speed winner, the Compaq SLT/286. Two are even faster.

If you have to lug these laptops around, be aware that the manufacturer's advertised weight seldom includes batteries or other essentials. *PC World* calculates "traveling weight" and "traveling volume" to include everything you'll have to schlep down the airplane aisle: batteries, AC adapters, modems, and so on.

Veteran road warriors will appreciate some dramatic display improvements: Screens are larger, and they all boast sharp, bright, backlit images that are a pleasure to read. Moreover, two of the seven machines have built-in VGA graphics, and two have EGA. All have ports for external monitors.

When you get back to the office, you'll probably want to hook up with your familiar peripherals—and that may be a problem. Unlike AC-powered transportables (most of which include at least a few standard AT expansion slots), only one of these laptops accommodates a standard expansion board. Fortunately, three of the seven offer an optional expansion chassis with one or more standard slots.

To help you make price comparisons, we configured (and priced) all seven laptop systems as closely as possible to the following specifications: a minimum of 640K of RAM (most come with 1MB), a 1.44MB floppy drive, a 40MB hard disk, an internal 2400-bps modem, an AC adapter/charger, DOS 3.3 or a later version, and a carrying case.

Compaq LTE/286

Compaq's tiny 8.5-by-11-by-1.9-inch LTE/286, a *PC World* Best Buy, is the lightest, smallest laptop in the roundup and has the longest battery life. For $5657 (in the standard *PC World* configuration), you get the portability of a notebook with the power and convenience of a full-fledged hard disk laptop. Thanks to cutting-edge disk technology, the LTE/286 weighs in at a mere 10 pounds—with a fast 40MB hard disk and a 1.44MB floppy drive. In fact, the LTE/286 is so light and small that it renders two of last year's

Compaq's LTE/286 (far left) is the smallest, lightest laptop here, and it boasts a terrific battery life, but its screen is relatively cramped.

FRED STIMSON

FEATURES EVALUATION

LTE/286 Looks Like a Long-Running Hit

Compaq's reasonably priced 10-pound laptop sets a new standard for the category. Packard Bell's middleweight PB286LP offers good value at a rock-bottom price. If you want EGA graphics and an AT slot at a price you can afford, the Epson Equity LT-286e has what it takes, although it's heavy.

● Yes
○ No
◒ Deficient

	Compaq LTE/286	Dauphin LapPro-286	Epson Equity LT-286e	NEC ProSpeed 286	Packard Bell PB286LP	Sharp PC-5541	Toshiba T1600
Standard features							
List price[1]	$5657	$3753	$5397	$6526	$4827	$6143	$5706[2]
CPU	80C286	80C286	80C286	80C286	80C286	80C286	80C286
CPU speed (MHz)	12/8	12/8	12/8	16/8	12/6	12/8/6	12/6
Coprocessor support	80C287-12	80287	80C287	80287	80287	80287	80C287-12
Disk-caching software	●	○	○	●	○	○	●
CPU-speed RAM[3]							
Capacity	2.6MB	4MB	2MB	5MB	5MB	3.6MB	5MB
Expandability							
Standard 8/16-bit expansion slots/slots free	0	0	1/1	0	0	0	0
100MB hard disk available from manufacturer	○	●	○	●	○	○	○
Expansion chassis available	●	●	○	●	○	○	●
Portability							
Traveling weight[4]	10	19.5	24.5	22.4	18.7[5]	20.0	16.7
Volume (cubic inches)[6]	211	660	673	709	579	621	581
Battery life (minutes)							
With minimum hardware installed	425	120	190	150	270	150	180
With modem and full backlighting	290[7]	85	120[7]	115	200	100	140
Ergonomic design							
Display type	CGA	CGA or HGC	EGA	VGA	CGA	VGA	EGA
Switchless setup	●	●	●	●	●	●	●
Screen tilt (degrees)	45	55	55	65	90	45	50
Reset button	○	○	●	●	○	○	●
Complete documentation	●	○	●	●	○	●	●
Service and support							
Warranty period (months)	12	12	12	12	12	12	12
On-site service	◒[8]	○	○	○	○	○	○
Toll-free support number	◒[8]	●	●	○	●	●	●
Daily support (hours)	◒[8]	8	10	9	11	◒[8]	10
Weekend support	◒[8]	○	○	○	●	○	○
BBS	◒[8]	○	○	●	○	○	●

[1] Price is based on 640K or 1MB RAM, 1.44 floppy drive, 40MB hard disk, at least one parallel and one serial port, battery, AC power supply/charger, 2400-bps modem, carrying case, and DOS 3.3 or later version.
[2] Includes second battery.
[3] Includes motherboard memory and RAM installable in proprietary slots accessed at full CPU speed.
[4] Includes computer, AC adapter, lightest battery available, modem, and carrying case.
[5] Includes 2 pounds for a generic carrying case; Packard Bell doesn't sell one.
[6] Includes computer, AC adapter, and external battery if required.
[7] Modem not available for testing; actual figure will be lower.
[8] Available only via dealer.

diskless laptops (NEC's UltraLite and Zenith's MinisPort) virtually beside the point (see the sidebar "Notebook PCs: Early Entries Lack Drive to Succeed"). The only bad news is its small, old-fashioned CGA display.

The LTE's performance is a bit below average in this fast company; in fact, it came in dead last on the processing-intensive *1-2-3* benchmark. This test aside, however, it is virtually on a par with its older brother, the SLT—which was last year's laptop speed champ.

Given the LTE's minuscule weight, its battery life is astonishing. Even when its battery saving options aren't enabled, the machine runs an amazing 5 hours (the manual claims only 3.5 hours) before it needs a recharge. What's more, battery replacement is fast and easy, so if you pack a few extra batteries (they weigh only 1.5 pounds each), you can work for long periods away from the AC plug. (We were unable to get a modem in time for testing; with a modem installed, battery life will be somewhat shorter.)

The LTE's blue-on-silver CGA display is the smallest of the bunch—just under 7.75 by 3.75 inches. And although text is bright and easy to read, the screen squashes graphics, producing the most distorted images. The 80-key keyboard is fairly small, too. Its compactness is achieved in part by the unusual step of making the top and bottom rows (function keys, <Space> bar, and so on) smaller than usual. Its keys also depress only half as far as the other laptops', but since the alphanumeric keys are standard size, touch typists won't suffer unduly.

The LTE's tiny "cigar box" case accommodates 640K of motherboard RAM and has two proprietary slots. One slot lets you add up to 2MB of CPU-speed RAM (for a maximum of 2.6MB); the other holds a modem or an extra serial adapter. There's also a port for connecting an optional ($349) expansion chassis with room for either a 5¼-inch floppy drive or a 40MB tape drive; the chassis, however, has no slots.

Compaq handles service and support via individual dealers, so it's hard to generalize about it. We called dealers in eight major markets, and the results were fairly impressive. Seven of the eight offered on-site service at no extra cost, and six of the eight offered a fax machine, an in-house BBS, or both. Only three offered toll-free tech support, but presumably you won't need to call long distance; tech support was available an average of 10 hours a day (but only on weekdays). We were unable to evaluate the quality of tech support.

Despite its slightly sluggish performance and its CGA graphics, the LTE/286 has single-handedly reinvented the standards for hard disk laptops, thanks to its amazing combination of notebook size with a standard complement of hard and floppy drives—and its outstanding battery life. When you factor in the surprisingly reasonable price, you've got an irresistible buy.

EXECUTIVE SUMMARY

Compaq LTE/286

80286 hard disk laptop

BEST BUY

This lightweight laptop packs a standard 40MB hard disk and a standard floppy drive in a tiny 10-pound, notebook-size package. Battery life is outstanding, and considering what you get, the LTE's price is surprisingly reasonable. It's only drawback is a CGA display. Amazing!

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability			●	
Portability				●
Ergonomic design				●
Service and support				●
Performance				●
Overall value				●

Reader service no. 605

Dauphin LapPro-286

Dauphin's entry has the lowest price in the roundup ($3753 in the standard *PCW* configuration) *and* the best performance scores—but it achieves this unusual combination by pushing an inexpensive 10-MHz CPU well past its rated speed. Nor is that the only problem. The Dauphin's battery life is the

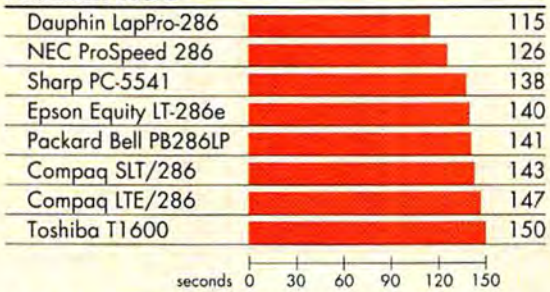
Given the LTE's minuscule weight, its battery life is astonishing.

NSTL TEST REPORT

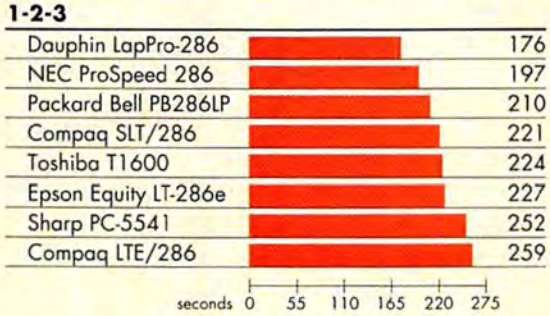
ProSpeed 286 Takes Safe-Speed Honors

Dauphin's LapPro-286 earned top performance scores, but only by pushing its 10-MHz CPU well beyond its rated speed. NEC's 16-MHz ProSpeed 286 turned in the second-fastest scores without questionable tactics.

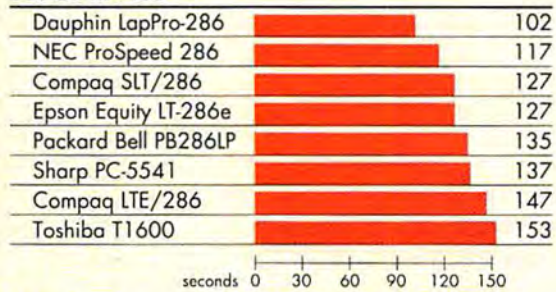
Microsoft Word



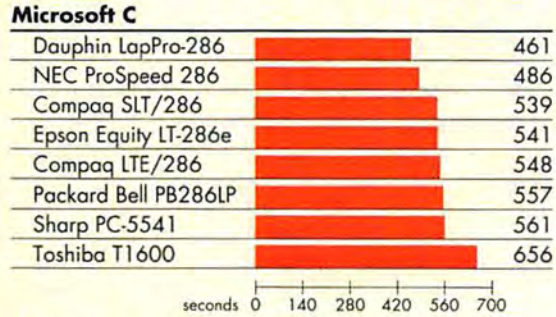
1-2-3



dBASE III Plus



Microsoft C



Methodology
All machines were tested with a coprocessor and a 256K extended memory disk cache (except in the *1-2-3* benchmark). Systems were tested with the following amounts of RAM: Epson Equity LT-286e, 2MB; Compaq LTE/286, 2.6MB; Sharp PC-5541, 3.6MB; Compaq SLT/286 and Dauphin LapPro-286, 4MB; NEC ProSpeed 286, Packard Bell PB286LP, and Toshiba T1600, 5MB. The Compaqs, the Packard Bell, and the Epson were equipped with 20MB hard disks; the rest of the machines had 40MB hard disks.

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.

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 processing and memory access speeds.

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.

Microsoft C 5.0
The *Microsoft C* benchmark measures the time required to compile and link *XLISP*. 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.

shortest in the roundup, its maximum resolution is low, there are no dedicated function keys, and at nearly 20 pounds, it's a heavy handful.

This 12-MHz machine took top place in every test, even beating the 16-MHz NEC ProSpeed 286. Unfortunately, it achieves its blazing performance via a highly questionable technique. The unit we received for evaluation used an AMD 80L286-10 CPU that's rated only for 10-MHz operation. Dauphin representatives assure us that new units are shipping with 12-MHz-rated CPUs, but unless you look under the hood, you

won't know what you're buying. Reliable 12-MHz operation requires a 12-MHz CPU; pushing a CPU above its rated speed can cause potentially dangerous overheating and data errors.

Eighty-five minutes of battery life is woefully inadequate—but that's all you get from the Dauphin. There's no way to turn off the hard disk, and backlighting must be turned down manually. The AC adapter won't power the computer and charge the battery at the same time, and Dauphin doesn't sell an external, off-line charger.

The Dauphin's blue-on-silver display is a good-size 8.75-by-5.5-inch unit whose crisp appearance reflects its Toshiba pedigree, but it supports only CGA graphics. (A Hercules-graphics–compatible model is also available.) Furthermore, the 75-key keyboard is annoying: A dedicated numeric keypad is included, but its layout is irregular—and there are no dedicated function keys. To simulate function-key operation, you have to press the <Func> key while striking one of the numeric keys.

The Dauphin's motherboard holds 4MB of RAM, but be sure to buy it equipped that way if you want that much RAM—if you upgrade later, you must discard the first set of RAM chips. There's a socket for an internal modem, but if you want a standard AT slot, you need the $295 expansion chassis.

Dauphin's service and support package is fairly minimal; its only outstanding feature is a toll-free technical support number (weekdays only). As we do for all systems, we placed three test calls to evaluate the quality of tech support. All three were answered immediately.

The LapPro-286's low price and amazing performance are impressive, but its drawbacks—which include inferior battery life and portability, a CGA display, an awkward keyboard, and a CPU pushed beyond its safe-rated speed—are distressing. This is a good machine to avoid.

Dauphin's LapPro-286 is heavy, with a short battery life. The test unit pushed a 10-MHz CPU to 12 MHz, giving good scores but making data errors likelier.

FRED STIMSON

EXECUTIVE SUMMARY

Dauphin LapPro-286

80286 hard disk laptop

Dauphin achieves the remarkable performance of its bargain-priced speedster with a risky technique: pushing its 10-MHz CPU to 12 MHz. More bad news: You get only 90 minutes of battery life, the machine is heavy, and the keyboard is hard to use. Not recommended.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability		●		
Portability	●			
Ergonomic design	●			
Service and support		●		
Performance				●
Overall value	●			

Reader service no. 606

Epson Equity LT-286e

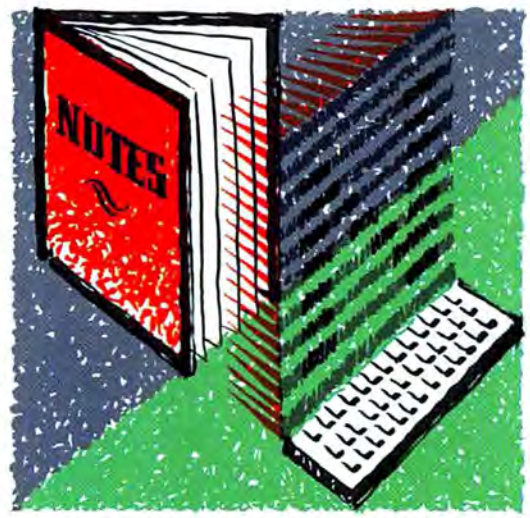
This reasonably priced system ($5397 in the standard configuration) features an EGA display, a removable hard disk, a great keyboard, decent battery life, average performance—and an AT-compatible expansion slot. However, at 24.5 pounds, it's the heaviest machine in the roundup, and its CPU-speed RAM ceiling is the lowest of any machine reviewed.

A heavy battery pack is one reason the

Equity weighs so much, but the battery provides only 2 hours of use. Fortunately, you can detach it if you're shuttling between home and office, lowering traveling weight by 4 pounds. Battery-saving time-out options are available, but they must be set via keyboard commands or batch files.

The LT-286e's most unusual component is

NOTEBOOK PCS: EARLY ENTRIES LACK DRIVE TO SUCCEED



TIM CARROLL

If your roadwork is limited to light word processing and small spreadsheets, notebook computers like NEC's $3128 UltraLite and Zenith's $2257 MinisPort seem to make a lot of sense. Light in weight, tiny in size, and short on battery life, these seductive little units fall halfway between full-powered business-class laptops and expensive executive toys.

Eliminate the laptop's hard disk and floppy drives in favor of a built-in RAM disk, and you get rid of a lot of weight and bulk. Retain a QWERTY keyboard, a real display, and a couple of megabytes of RAM, and you can still see what you're typing *and* run familiar software.

There's only one problem. Without drives, how do you get data in and out?

NEC's aptly named UltraLite (traveling weight 5.5 pounds) uses no drives at all—unless you count its optional, outboard 3½-inch floppy drive. It stores its operating system in ROM, along with an assortment of utilities like *LapLink*, and lets you create a battery-backed RAM disk up to 2MB in size. Then you import and export data and applications over a serial cable via *LapLink*, or with the optional external floppy, or on expensive, low-capacity, battery-backed RAM cards.

The UltraLite is a pleasure to use, but it has an Achilles' heel: It runs only 90 minutes on a full battery charge, a severe limitation for a system that's ostensibly designed primarily for portability. Worse yet, the battery is not removable, so forget about carrying spares. (At press time, NEC announced an upgraded version that features a removable battery.)

Like the NEC UltraLite, Zenith's MinisPort lets you set up a battery-backed RAM disk; with a memory upgrade, you can configure up to 1.4MB (640K less than the UltraLite) as a battery-backed drive. The MinisPort also includes a tiny, nonstandard 2-inch 720K floppy drive (primarily meant to back up the RAM disk), but it pays the price in weight: This notebook checks in at 9.75 pounds traveling weight—over 4 pounds heavier than the UltraLite. And since the only machine that will read the disks is another MinisPort, you still need to use the serial port to get data or applications in and out. Zenith puts DOS in ROM, along with a version of the serial port file-transfer utility *FastLynx LX*.

The MinisPort beats the UltraLite hands down for battery life: You get 2 hours of normal use, and swapping batteries is easy. With a couple of extras in your briefcase, you can compute from coast to coast on battery power.

But hold on before you make a decision. You're no longer stuck choosing between light weight and drives. The Compaq LTE/286 is a 10-pound 286 with a standard floppy, a standard 40MB hard disk, a built-in 2400-bps modem, and a phenomenal 5-hour battery life. It's smaller in the wide dimensions than the UltraLite *and* the MinisPort and barely half an inch thicker. And it's only a few ounces heavier than the Zenith. Of course you'll pay for the new technology: The LTE/286 costs $5657 in the *PCW* configuration.

There's nothing wrong with the idea of a featherweight notebook computer. But now that drive and battery technology is catching up with business needs, you'll never need to settle for a driveless wonder again. We have seen the future of the notebook, and it's the LTE/286. —*J. D.*

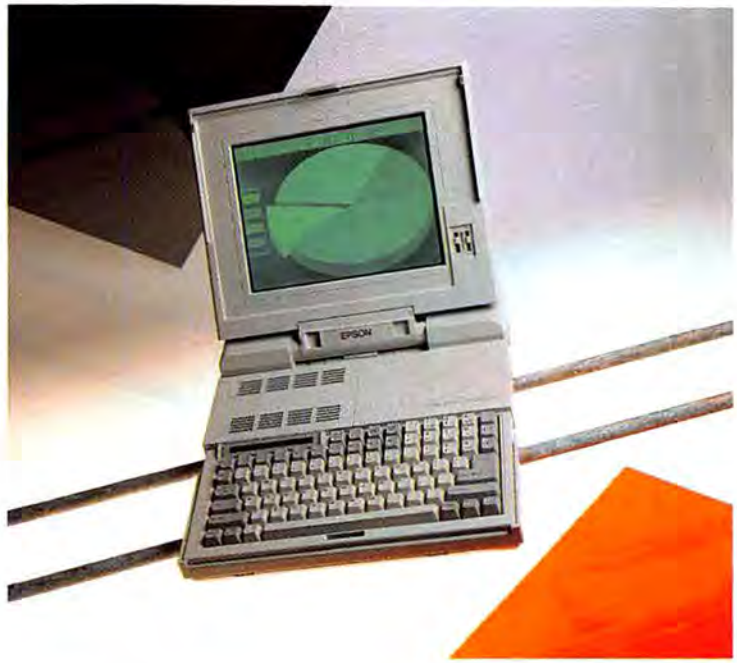
its snap-in/snap-out hard drive. This feature would be a lot more useful, of course, if you could snap the drive into a standard desktop. However, it does let you lock the drive in a safe for excellent data security (while you continue to use the laptop).

The big 8.25-by-6.25-inch paper-white EGA screen can display eight shades of gray and is the only one reviewed that does not distort graphics. The contoured, 84-key keyboard is unusual in that you *never* need to use a <Fn> key; all the keys are dedicated. However, the bottom row of the numeric/cursor pad is separated from the top by three rows of character keys. A small LCD display above the keyboard indicates CPU speed, disk, monitor, and power source.

There's a low 2MB limit on CPU-speed RAM. The motherboard holds up to 1MB; another 1MB can be placed on a user-installable memory board in a proprietary memory slot. The LT-286e also provides a proprietary slot for a modem and a two-thirds-length (9-inch) AT-compatible slot.

Epson's service and support package is pretty bare-bones. It offers a toll-free tech support number (weekdays only), but getting through to that line isn't easy. Two of our three calls met busy signals; the third was answered immediately.

The Equity LT-286e is reasonably priced and offers a nice package of features—EGA graphics, a fine keyboard, and an expansion slot—but the machine's too heavy and a bit too miserly with RAM capacity to be irresistible. If Epson ever provides a way to slide the pop-out hard drive into a desktop machine, it will be a different story.



Epson's Equity LT-286e comes with an EGA display and an AT-compatible expansion slot—at 24.5 pounds it's no lightweight, though.

FRED STIMSON

EXECUTIVE SUMMARY

Equity LT-286e

80286 hard disk laptop

Epson's EGA system delivers a great keyboard, decent battery life, and the only built-in AT-compatible expansion slot in the roundup—all at a reasonable price. Unfortunately, the LT-286e is very heavy—but if you need that slot, it's still a tempting choice.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability			●	
Portability			●	
Ergonomic design				●
Service and support			●	
Performance				●
Overall value				●

Reader service no. 607

NEC ProSpeed 286

The 16-MHz ProSpeed sports a big, beautiful VGA display, and performance scores second only to the CPU-pushed Dauphin's. Its capacity for CPU-speed RAM ties for best in the roundup, and an excellent expansion chassis is available. However, the ProSpeed is the largest machine in the roundup, at 22.4 pounds (traveling weight) the second heaviest, and the most expensive ($6526 in the *PCW* configuration). Furthermore, you get less than 2 hours of battery life before the low-power light starts blinking.

NEC lets you choose among three power options: an AC adapter; a small battery of identical size; and a big, heavy "battery slice." All three clip into the same compartment at the rear of the machine; the "slice" sticks out an extra inch-and-a-half and adds 2 pounds to the weight, but it boosts battery operation to only 3 hours total.

NEC's ProSpeed 286 is a 16-MHz speedster with great performance scores and a VGA display, but it's heavy, and its battery life is unimpressive.

The ProSpeed's paper-white VGA display measures 7.5 by 5.625 inches and can show eight discernible shades of gray. The keyboard has 83 full-size keys and a reasonably good feel. There are dedicated cursor- and page-control keys, but the numeric pad is embedded (that is, you must press and hold the <Fn> key to activate it).

The motherboard holds 1MB of RAM. You can add up to 4MB of CPU-speed RAM via a memory board that goes in a proprietary slot, for a generous 5MB total. Two other proprietary slots are built-in: one for a modem and one for an optional ($899) expansion module that provides four standard expansion slots (one 8-bit, three 8/16-bit) and two half-height storage bays.

NEC's service and support package is unimpressive. For one thing, you have to pay long-distance charges for tech support. That's bad enough when you get an immediate answer—which happened two times out of three. On the third call, however, we were stuck on hold for 5 minutes—with the meter running. On the bright side, NEC has an in-house BBS.

If you've got to have the fastest laptop on the block (and are put off by Dauphin's pushed CPU), the ProSpeed has your name on it; the attractive VGA display and generous capacity for CPU-speed RAM will be welcome fringe benefits. But for most business users, its large size, heavy weight, short battery life, poor support, and extremely high price are convincing reasons to look elsewhere.

EXECUTIVE SUMMARY

NEC ProSpeed 286

80286 hard disk laptop

The ProSpeed is one of the fastest laptops we tested, and it boasts excellent VGA graphics. However, its size and weight make it hard to carry, it runs out of juice in less than 2 hours, and it's extremely expensive. You can do better.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability			●	
Portability		●		
Ergonomic design				●
Service and support		●		
Performance				●
Overall value		●		

Reader service no. 608

Packard Bell PB286LP

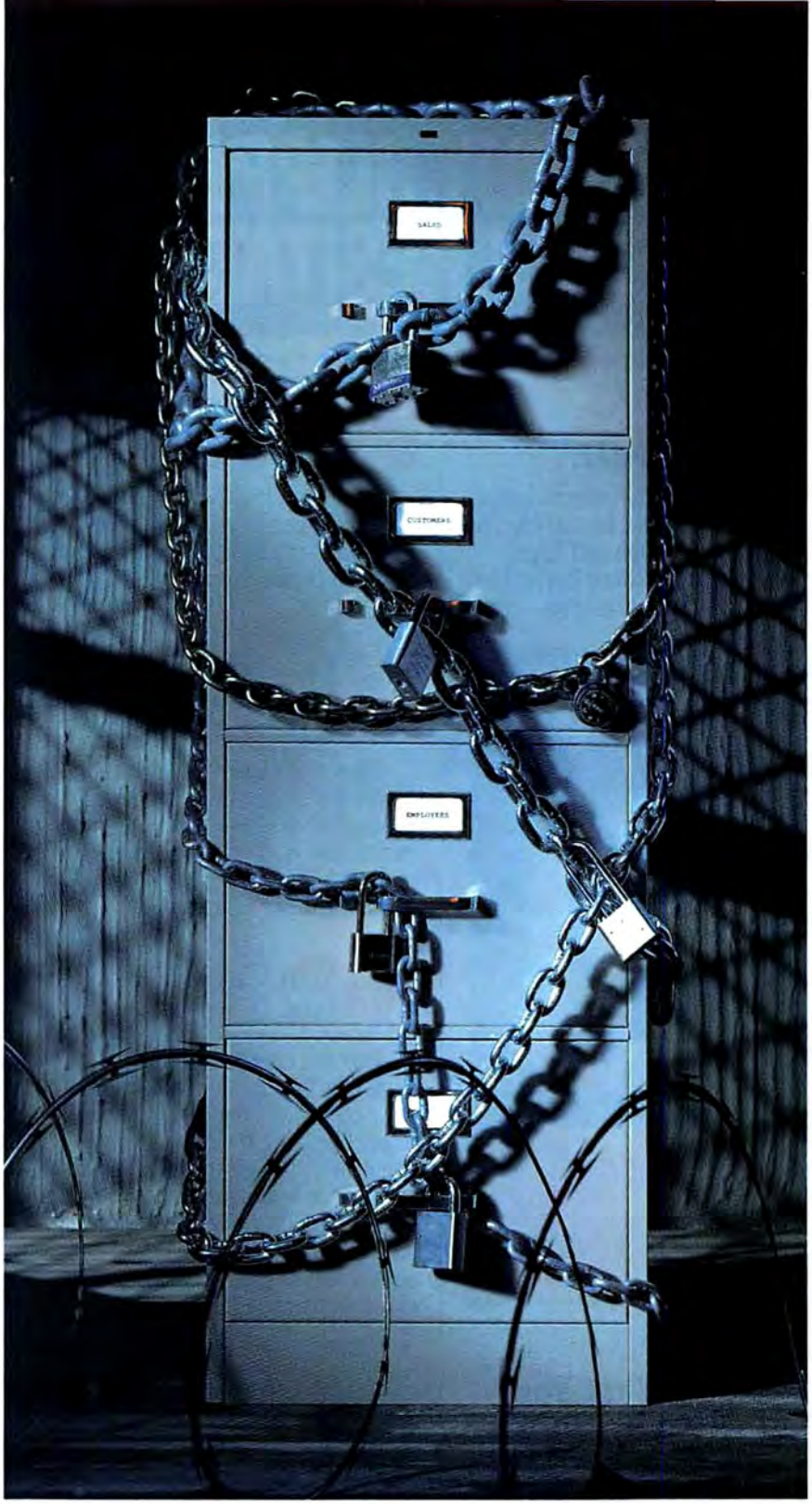
For a mere $4827 (in the standard configuration), Packard Bell will sell you a nice little generic laptop. You'll have to settle for CGA graphics and a hefty 20-pound traveling weight, but you'll get impressive battery life, OK performance, and a generous 5MB ceiling for CPU-speed RAM. Considering the price, it's an attractive package.

The good news about battery life is that you can expect to get at least 3 hours; with power-saving options enabled, you'll probably get close to 5. The bad news is that you'll need tools to replace the battery pack.

The Packard Bell's paper-white CGA display measures 8.25 by 5.25 inches, and it's the only one in the roundup that folds all the way back to a flat position, making it easier to use an external monitor. The 82-key keyboard has a good, solid feel and has dedicated <Page Up>, <Page Down>, and cursor keys. The numeric pad is embedded.

You can place up to 5MB of RAM on the PB286LP's motherboard, but you'll have to

FRED STIMSON



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go shopping for the SIMMs yourself because Packard Bell doesn't sell them. There's a proprietary slot for a modem, but no standard slots and no expansion chassis.

Packard Bell's service and support features include a toll-free tech support number that works 11 hours weekdays and 9 hours Saturdays. Unfortunately, we had a very hard time getting through. Two of our calls met a busy signal; the third time we spent 13 minutes on hold before we were given a choice between hanging on or leaving a message. When we chose the latter, a computer voice informed us that the mailbox was full, and we were disconnected.

The PB286LP is a no-nonsense machine at a fairly low price. It's not flashy, but if you don't need expansion slots or high-resolution graphics—and don't mind problematic tech support and lugging a 20-pound laptop—its good battery life and high RAM ceiling make it an appealing buy.

EXECUTIVE SUMMARY

Packard Bell PB286LP

80286 hard disk laptop

A very low price and 3 hours of battery life are good reasons for considering this no-nonsense laptop from Packard Bell. CGA graphics and a heavy traveling weight are reasons you may want to think twice.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability		●		
Portability			●	
Ergonomic design			●	
Service and support			●	
Performance				●
Overall value			●	

Reader service no. 609

Sharp PC-5541

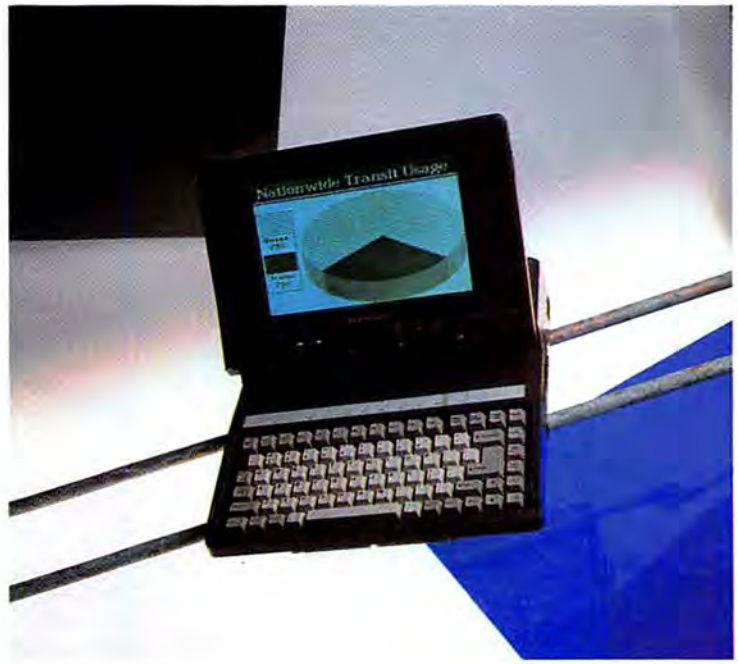
This premium-priced system ($6143 in the *PCW* configuration) boasts the best display in the roundup—a VGA with 16 shades of gray—and at 18.7 pounds it's a decent middleweight. However, it's still not a great deal: For one thing, battery life is well under 2 hours. And the PC-5541's performance is a bit of a disappointment as well; it was one of the slowest systems tested.

The Sharp's internal battery isn't meant for quick replacement, which is too bad since it provides only about 100 minutes of use. An optional screw-on "battery slice" adds another 2½ hours of battery life, but it also adds 4.6 pounds to the package. Battery-saving time-out options can be set using the ROM-based setup routine.

The PC-5541's crowning glory is its bright, easy-to-read 7.75-by-5.9-inch VGA display. With 16 distinguishable shades of gray, you can run most of your everyday software without reinstalling the color defaults. The 79-key keyboard has a light, positive feel, but <Page Up>, <Page Down>, and the numeric pad are embedded.

The PC-5541 holds 640K of RAM on the motherboard. To expand beyond that, you have to go in stages. First you slide a 1MB expansion board under a panel on the bottom of the Sharp, bringing total RAM to 1.6MB. Then you plug a 2MB module into the expansion board, raising total memory to 3.6MB.

Sharp offers minimal service and support. There's a toll-free tech support number, but that's about all. Worse yet, getting through on the tech support line is virtually impossi-



Packard Bell's PB286LP is a low-priced laptop with a good battery life. However, at 20 pounds it's a hefty handful, and the display is only CGA.

FRED STIMSON

The Sharp PC-5541 is quite light (18.7 pounds), including a fine VGA display. But its battery life is short, and performance is only so-so.

ble. Call number one met a busy signal. Call number two reached a recording that reported tech support was closed—at 3 p.m. on a weekday. Call number three got through, but only after 10 minutes on hold.

If you're looking for a great display, and 3.6MB is all the CPU-speed RAM you need, the Sharp PC-5541 may seem tempting. But for $6143 you have a right to expect lighter weight, better performance, and more impressive tech support and battery life.

EXECUTIVE SUMMARY

Sharp PC-5541

80286 hard disk laptop

It's slow, it's expensive, and the battery runs down before 2 hours elapse. About the only nice things you can say about this laptop are that it's not too heavy and it's got a great VGA display—but that's not enough to make it a smart buy.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability		●		
Portability			●	
Ergonomic design				●
Service and support		●		
Performance				●
Overall value			●	

Reader service no. 610

Toshiba T1600

Toshiba laptops have shown up extremely well in previous *PC World* reviews, and while the midpriced T1600 ($5706 in the standard configuration, with two batteries) is no speed demon, it's no disgrace to its line either. It's light (16.7 pounds) and reasonably small, boasts a sharp EGA display and an excellent (optional) expansion chassis, and provides dual battery bays so you can change batteries without shutting down. However, you'll have to do the battery shuffle more often than you'd like: Each 11-ounce battery lasts only a little over an hour; with both installed you get 140 minutes.

There's worse news in the performance department: The T1600 is the slowest laptop in the roundup. When you consider, however, that its overall performance is still within 10 percent of last year's paragon, the Compaq SLT, this doesn't seem so bad.

Toshiba has put a lot of work into the battery-related features of the T1600. In addition to the handy dual-battery design, Toshiba offers a unique "resume" feature that saves the program you're running *and your data* to battery-backed RAM just before an emergency low-power shutdown. Battery saving options include CPU-speed reduction and time-outs for backlighting, hard drive, and modem power, plus a "sleep" function that takes the CPU off line altogether when it's not needed. There's even a useful pop-up "fuel gauge" for the battery packs.

The T1600's good-looking, blue-on-silver, 8.75-by-5.5-inch EGA display shows eight shades of gray. The 86-key keyboard has dedicated cursor- and page-control keys—but you'll need the <Fn> key to activate the embedded numeric pad.

One megabyte of RAM goes on the motherboard; you can add two 2MB memory boards to reach a total of 5MB, but the dealer will have to install them. It's possible to configure up to 4MB as a battery-backed RAM disk. There are two dedicated expan-

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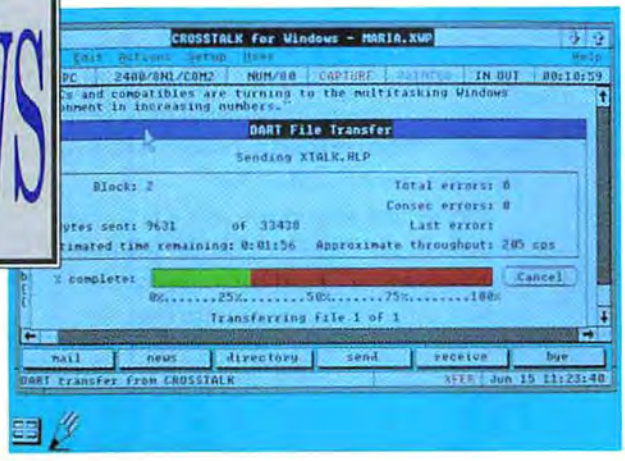

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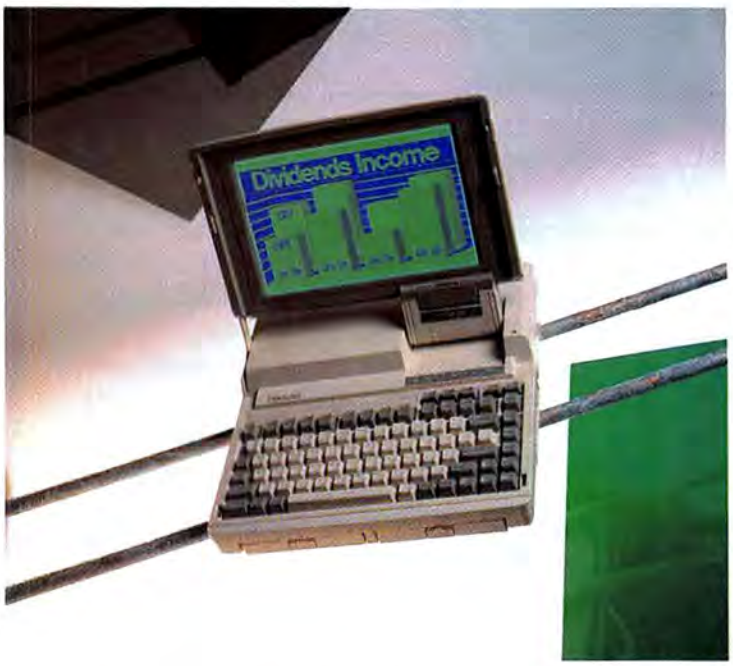

Toshiba's T1600 gets high scores for portability and boasts an EGA display. Its battery life could be better, though, and performance is poky.

sion slots: One holds a modem; the other can be used for a proprietary Ethernet board, a modem with an additional serial port, or the optional ($1198) expansion chassis, which contains five standard 8-bit slots.

Service and support are only a bit better than minimal: There's a BBS and toll-free tech support, but you'll have time for *two* cups of coffee while you wait for help. On three calls we spent an average of 7 minutes on hold before we got to leave a message.

If you do most of your computing on the road—especially in the stop-and-start world of airline travel—the T1600's excellent portability and thoughtful battery features are very useful. But if away-from-the-plug computing is not your highest priority, its poky performance reduces its appeal.

Laptops That Mean Business

Even the worst of these business-class laptops would have seemed extremely impressive just a few years ago, and the best of them—the Compaq LTE/286—would have been inconceivable. This 10-pound wonder offers 5 hours of battery operation with full backlighting *and* a fast hard disk—at a surprisingly reasonable price ($5657). Sure, it would be nice if it were faster and if its CGA display were VGA—but it's still a very hard deal to beat.

For low price ($4827) and solid value, Packard Bell's "generic" (and slightly overweight) PB286LP with CGA display is worth considering. If you want an EGA system with a built-in AT-compatible expansion slot, your only choice is the Epson Equity LT-286e—a reasonably inexpensive ($5397) laptop whose only serious drawbacks are its ponderous 24.5-pound weight and its short battery life. And for $5706 the Toshiba T1600, with a good-looking EGA display, is light and small—but it's also fairly slow.

The novelty of simply being able to use your computer away from the power plug wore off long ago. With the arrival of long-lived (and lightweight) battery systems that include low-power hard drives, displays, and CPUs, business users have begun to demand the same power from their laptops that they expect from their desktops. Now, with the best of these business-class laptops, they can get it. ●

John Diebold is a marine geophysicist specializing in computer analysis of seismic data.

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

(continues)

EXECUTIVE SUMMARY

Toshiba T1600

80286 hard disk laptop

This light, compact machine comes with an EGA display, a battery-backed RAM disk, and a collection of handy utilities. But it's the slowest system in the roundup, and its battery life is unimpressive.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability			●	
Portability				●
Ergonomic design				●
Service and support			●	
Performance				●
Overall value			●	

Reader service no. 611

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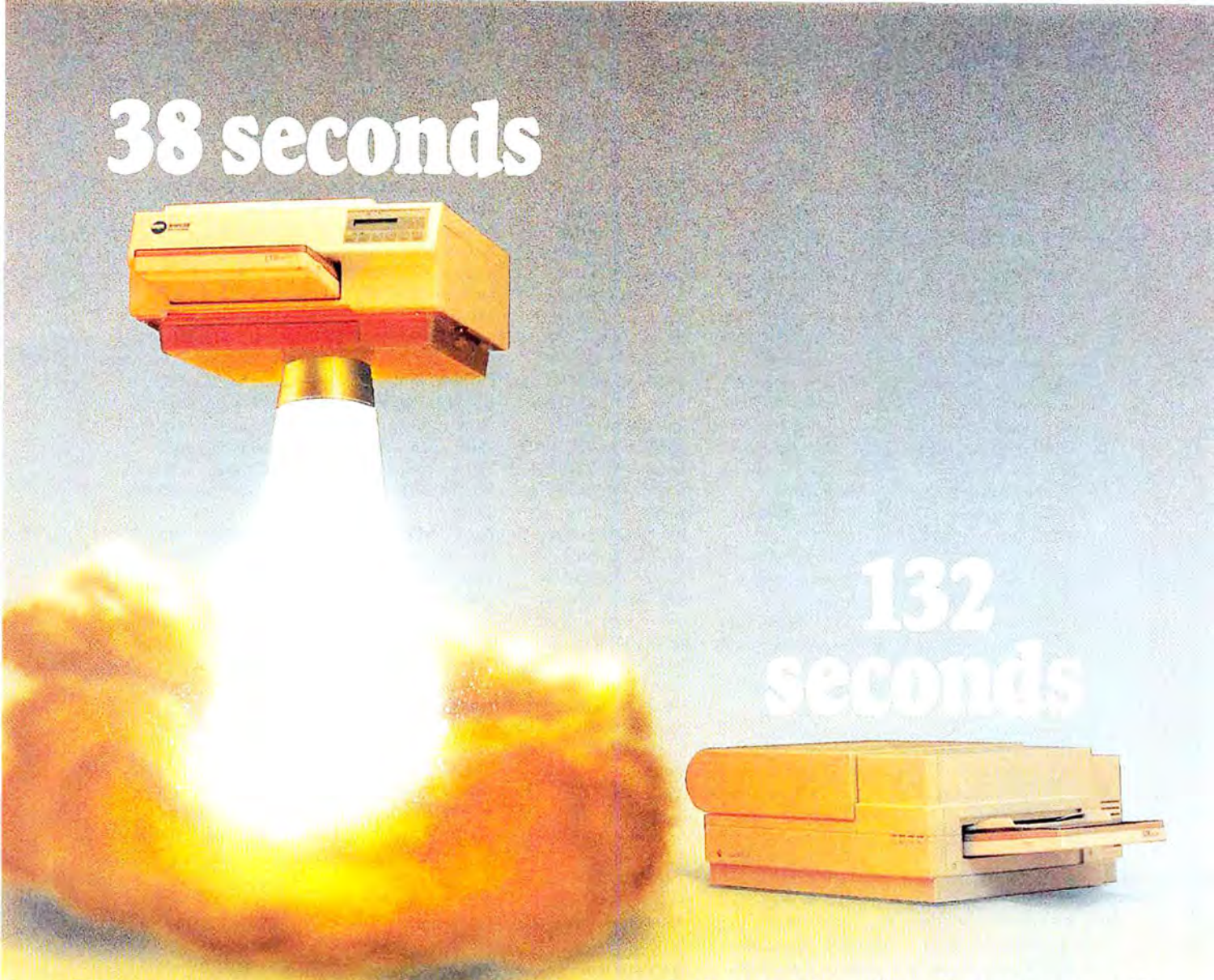

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Compaq LTE/286
Compaq Computer Corp.
20555 SH 149
Houston, TX 77070
800/231-0900
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ACCESSORIES: 1MB RAM $699, 2MB RAM $1299; external storage module $349; 2400-bps modem $449; numeric keypad $119; extra AC adapter/charger $199; extra battery pack $129; carrying case $89; DOS 3.31 $120, DOS 4.01 $150, OS/2 1.1 or 1.2 $340
WARRANTY: one year limited
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: via authorized dealers
OTHER SUPPORT: none
Reader service no. 605

Dauphin LapPro-286
Dauphin Technology, Inc.
1125 E. St. Charles Rd.
Lombard, IL 60148
800/782-7922, 312/627-4004, 708/627-7618 (fax)
LIST PRICE: 20MB system with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, one parallel and two serial ports, AC adapter/charger, DR-DOS 3.4 $3145, with carrying case and 2400-bps modem $3403; 40MB system (same as 20MB system but with 40MB hard disk) $3495, with case and modem $3753; 100MB system (same as 20MB system but with 100MB hard disk) $4050, with case and modem $4308
ACCESSORIES: 1MB expansion RAM $350, 4MB replacement RAM $595; expansion chassis $295; external 1.2MB floppy drive $299; 2400-bps modem $189, 4800-bps modem $499; 80287-10 coprocessor $310; battery pack $69; carrying case $69
WARRANTY: one year limited, carry- or mail-in to manufacturer
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: via dealer or toll-free number, M–F 9–5
OTHER SUPPORT: none
Reader service no. 606

Equity LT-286e
Epson America Inc.
23610 Telo Ave.
Torrance, CA 90505
800/922-8911, 213/539-9140
LIST PRICE: with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, one parallel and one serial port, AC adapter/charger, DOS 4.01, Turbo EMS $4599; with 40MB hard disk $4999
ACCESSORIES: 1MB RAM $499; 2400-bps modem $299; battery pack $349; extra AC adapter/charger $249; carrying case $99; external 1.2MB floppy drive $499
WARRANTY: one year mail- or carry-in to dealer or customer service center
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: via dealers or toll-free number, M–F 7–5
OTHER SUPPORT: none
Reader service no. 607

NEC ProSpeed 286
NEC Technologies, Inc.
Computer Products Division
1255 Michael Dr.
Wood Dale, IL 60191
708/860-9500
LIST PRICE: Model PC-21-01 with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, one parallel and one serial port, AC adapter/charger, DOS 3.3, Telcom 2.0 software $5099; Model PC-21-02 (same as PC-21-01 but with 40MB hard disk) $5599; Model PC-21-03 (same as PC-21-01 but with 100MB hard disk) $6999
ACCESSORIES: 1MB RAM $799, 4MB RAM $2499; 2400-bps modem $599; expansion chassis $899; internal battery $199, external battery $399; carrying case $129
WARRANTY: one year carry- or mail-in to service center
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll number, M–F 8:30–5:30
OTHER SUPPORT: 24-hour BBS (toll number)
Reader service no. 608

Packard Bell PB286LP
Packard Bell
9425 Canoga Ave.
Chatsworth, CA 91311
818/773-4400
LIST PRICE: basic system with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, one parallel and one serial port, AC adapter/charger, DOS 3.3, GW BASIC $3995; with 40MB hard disk $4495
ACCESSORIES: 2400-bps modem $269; carrying case $63
WARRANTY: one year mail- or carry-in to ATT-Paradyne or local service centers
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: toll-free number, M–F 7–6, Sat 8–5
OTHER SUPPORT: none
Reader service no. 609

Sharp PC-5541
Sharp Electronics Corp.
Systems Division
Sharp Plaza
Mahwah, NJ
07430-2135
800/237-4277 (for nearby dealers), 201/529-9500
LIST PRICE: with 640K RAM, 40MB hard disk, 1.44MB floppy drive, AC adapter/charger, DOS 3.3, GW BASIC 3.2 $5595
ACCESSORIES: EMS 4.0 extended memory board with 1MB RAM $845; 2MB RAM $1495; 2400-bps modem $449; add-on battery pack $399; serial I/O board $99; leather carrying case $199, nylon carrying case $99
WARRANTY: one year mail- or carry-in to one of five SABERS service centers (NJ, CA, TX, GA, IL)
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: via dealers or toll-free Technical Action Center, M–F 9–5
OTHER SUPPORT: none
Reader service no. 610

Toshiba T1600
Toshiba America Informations Systems, Inc.
Computer Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
800/334-3445, 800/457-7777 (dealer referral), 714/583-3000
LIST PRICE: with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, one parallel and two serial ports, AC adapter/charger, DOS 3.3, PC-Kwik $4999; with 40MB hard disk $5199
ACCESSORIES: 2MB RAM $1099; external 360K floppy drive $499; expansion chassis and interface board $1198; 2400-bps modem $349; battery pack $69; extra AC adapter/charger $388; numeric keypad $99; carrying case $89; OS/2 $325
WARRANTY: one year mail- or carry-in to Toshiba authorized service centers plus Exceptional Care, a program guaranteeing rapid turnaround
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 7–5
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Robert Luhn
Senior Editor

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2982 □WillMaker 3.0. . . . . $35.
Norton-Lambert ... NCP
4928 □Close-Up Customer 3.0 . . . . . 135.
4929 □Close-Up Support 3.0 . . . . . 165.
Paperback Software ... NCP
3142 □VP-Planner 3D 1.0 . . . . . 169.
PC Globe ... NCP
5902 □PC Globe 3.0. . . . . 39.
5900 □PC USA 1.0 . . . . . 39.
Personics ... NCP
3126 ▣SeeMORE 2.0 . . . . . 54.
4328 ▣Look & Link 1.1 . . . . . 59.
Peter Norton ... NCP
3152 ▣Norton Commander 3.0. . . . . 89.
3146 ▣Advanced Utilities 4.5 . . . . . 89.
6397 ▣The Norton Backup 1.0 . . . . . 89.
Quarterdeck ... NCP
3221 □Expanded Memory Mgr. 386 5.0 . 59.
3220 □DESQView 2.25. . . . . 79.
4586 □DESQView 386 1.0. . . . . 115.
6400 □Manifest 1.0. . . . . 39.
6422 □QRAM 1.0 . . . . . 49.

Quarterdeck ... NCP
□*Manifest 1.0*–Gives you a snapshot of your PC with detailed information about it's memory, hardware, DOS, and more. Included free with other listed Quarterdeck products through March 31, 1990 . . . . $39.

Reference Software ... NCP
4396 ▣Grammatik IV 1.0. . . . . 52.
Revolution Software ... NCP
4480 ▣VGA Dimmer 2.01 *(screen saver)* . 19.
RightSoft ... NCP
4155 ▣RightWriter 3.1. . . . . 54.
Samna ... NCP
5799 ▣Ami Professional 1.0 . . . . . 319.
Softlogic Solutions ... NCP
3546 □Disk Optimizer 4.05 . . . . . 45.
3542 □Software Carousel 3.01 . . . . . 55.
Softview ... NCP
3474 ▣MacInTax for Windows *(1989 taxes)* 65.

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MECA ... NCP
▣*Andrew Tobias' Tax Cut*–Manage your taxes this year with MECA's new Tax Cut for '89. Includes expert system which lets you consult with the tax experts while you prepare your return. Editor's Choice! . . . . . $45.

Software Publishing ... NCP
6289 ▣Draw Partner 1.0 . . . . . 59.
3499 □PFS:First Publisher 2.1 . . . . . 89.
3478 □PFS:First Choice 3.02 . . . . . 105.
3496 ▣Professional Write 2.11 . . . . . 149.
3493 ▣Professional File 2.01 . . . . . 199.
3482 □Harvard Graphics 2.13 . . . . . 339.
Symantec ... NCP
5383 ▣Budget Express 1.0. . . . . 99.
3427 ▣Q&A Write 1.01 . . . . . 139.
3425 □Q&A 3.0 . . . . . 229.
3431 □Timeline 3.0. . . . . 399.
Timeslips ... NCP
2987 □Timeslips III 3.4 . . . . . 169.
Timeworks ... NCP
6253 ▣Publish-It! 1.1 . . . . . 115.
TOPS ... NCP
3724 ▣NetPrint 2.0 *(share printers)* . . . . 125.
3726 ▣TOPS Network Bundle 3.0 . . . . . 159.
3720 *Flashcard 2.1 (AppleTalk network card; 1 year warranty)* . . . . . 179.

Microsoft ... NCP
▣*Excel for OS/2 1.0*–Spreadsheet which allows you to take full advantage of the power and flexibility of OS/2. Sophisticated analytical tools, easy-to-use Presentation Manager interface, and much more . . . . . $339.

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All new versions with all new features for your business or home. Let DacEasy provide your business accounting and tax solutions.

◉*Accounting 4.0* ..... $89.

☐*Rapid Tax 1.0 for 1989 Taxes* ..... 45.

Traveling Software ... NCP

4190 Battery Watch 2.0 *(3½" only)* ..... 35.
5179 ◉LapLink III 3.0 ..... 85.
3727 ◉DeskLink 2.2 ..... 99.

True BASIC ... NCP

3561 ◉True BASIC 2.1 ..... 52.

Vericomp ... NCP

3765 ◉SoftBytes 2.0 ..... 35.

WordPerfect Corp. ... NCP

3799 ◉WordPerfect Library 2.0 ..... 75.
3804 ☐WordPerfect 5.1 ..... 265.
3806 Additional Network Stations 5.1 ... 169.

WordStar USA ... NCP

2825 ☐WordStar Prof. Release 5.5 .... 229.
5000 ☐*Upgrade to Release 5.5* ..... 89.

Xerox ... NCP

3812 ☐Ventura Publisher 2.0 ..... call

XTREE ... NCP

6161 ◉XTREE Pro Gold 1.3 ..... 75.

XYQUEST ... NCP

4393 ☐XyWrite III Plus 3.55 ..... 229.

Symantec ... NCP

☐*Q&A 3.0*–The top-rated, best-selling integrated database and word processor offers simple mail merge, detailed reporting, versatile word processing, advanced network support, and more ..... $229.

RECREATIONAL/EDUCATIONAL

Broderbund ... CP

1417 ☐Where/Europe Carmen Sandiego? $29.
5701 ☐Where/Time Carmen Sandiego? ... 32.

Electronic Arts ... NCP

5798 ☐Ferrari Formula I ..... 29.
4659 ◉Chessmaster 2100 *(CP)* ..... 35.
5804 ◉Deluxe Paint II *(Enhanced)* ..... 89.

Microprose ... CP

4454 ☐F-19 Stealth Fighter ..... 39.
5823 ☐Red Storm Rising ..... 39.

Microsoft ... NCP

2858 ☐Flight Simulator 4.0 ..... 39.

Parlor Software ... CP

3159 ☐Bridge Parlor 2.3 ..... 49.

Sierra On-Line ... CP

6023 ◉Leisure Suit Larry III ..... 39.
5695 ◉Manhunter: San Francisco ..... 33.
4456 ◉Police Quest II ..... 39.
5106 ◉Space Quest III ..... 36.
6022 ◉Colonel's Bequest ..... 36.

Stone & Associates ... NCP

◉*1st Math*–Animated graphics teach addition, subtraction, & patterning. Ages 4-8 ... $22.

☐*2nd Math*–Interactive tutorial and 7 games "teach" then "test" beginning addition through pre-calculus. Ages 7-16 ..... $27.

Spectrum Holobyte ... NCP

5993 ◉Welltris *(Tetris sequel)* ..... 22.

Spinnaker ... CP

5580 ☐Sargon IV ..... 32.

Stone & Assoc. ... NCP

3435 ◉My Letters,Numbers,Words *(2 to 6)* 22.
3438 ◉1st Math *(ages 5 to 8)* ..... 22.
3439 ☐2nd Math *(ages 7 to 16)* ..... 27.

Sublogic ... NCP

6190 ☐Air Transport Pilot ..... 33.

True BASIC, Inc. ... NCP

◙Kemeny/Kurtz Math Series:
10 titles ..... *each* 45.

HARDWARE

Manufacturer's standard limited warranty period for items shown is listed after each company name. Some products in their line may have different warranty periods.

Timeworks ... NCP

◉*Publish-It! 1.1*–This complete desktop publishing program includes advanced page layout, graphics, word processing, and typesetting ..... $115.

AST Research ... 2 years

1299 SixPakPlus 384k C/S/P ..... 189.
4107 RAMpage Plus 286 512k ..... 419.

Brother International ... 1 year

5787 HL-8e Laser Printer ..... 1899.
5788 HL-8Ps PostScript Laser Printer ... call
5786 Toner/Drum Kit ..... 99.

Central Point ... 1 year

5042 Copy II PC Deluxe Option Board .. 115.

Compucable ... 2 years

1604 2-Position switch box ..... 25.
1605 3-Position switch box ..... 35.

Corvus ... 1 year

6184 ReadyNet Starter Kit ..... 319.
6183 ReadyNet Add-On Kit ..... 165.

Cuesta ... 1 year

1608 Datasaver 400 Watt *(power backup)* 429.

Curtis ... lifetime

1690 Diamond Plus SP-1 + ... 41.
1694 Emerald SP-2 ..... 36.
1707 Ruby SPF-2 *(6 outlets)* ..... 55.
1708 Ruby-Plus SPF-2 Plus ..... 65.
We carry the full line of Curtis products.

Diconix ... 1 year

5655 150 Plus Printer *(Parallel)* ..... 359.

Epson ... 1 year

We are an authorized Epson Service Center.
1906 FX-850 *(80 col., 264 cps, 9 pin)* ... 369.
1904 FX-1050 *(136 col., 264 cps, 9 pin)* . 479.
5183 LQ-510 *(80 col., 180 cps, 24 pin)* .. 349.
1930 LQ-850 *(80 col., 264 cps, 24 pin)* . 549.
4117 LQ-950 *(110 col., 220 cps, 24 pin)* . 569.
1917 LQ-1050 *(136 col., 264 cps, 24 pin)* 769.
4116 LQ-2550 *(136 col., 333 cps, 24 pin)* 989.
5184 LX-810 *(80 col., 180 cps, 9 pin)* ... 199.
1052 Printer-to-IBM cable *(6 feet)* ..... 15.

5th Generation ... 1 year

3952 Logical Connection 512k ..... 529.

Hayes ... 2 years

2304 Smartmodem 1200 ..... 289.
2307 Smartmodem 2400 ..... 429.
2308 Smartmodem 2400B *(w/Smartcom II)* 429.

Hercules ... 2 years

2318 Graphics Card Plus ..... 189.

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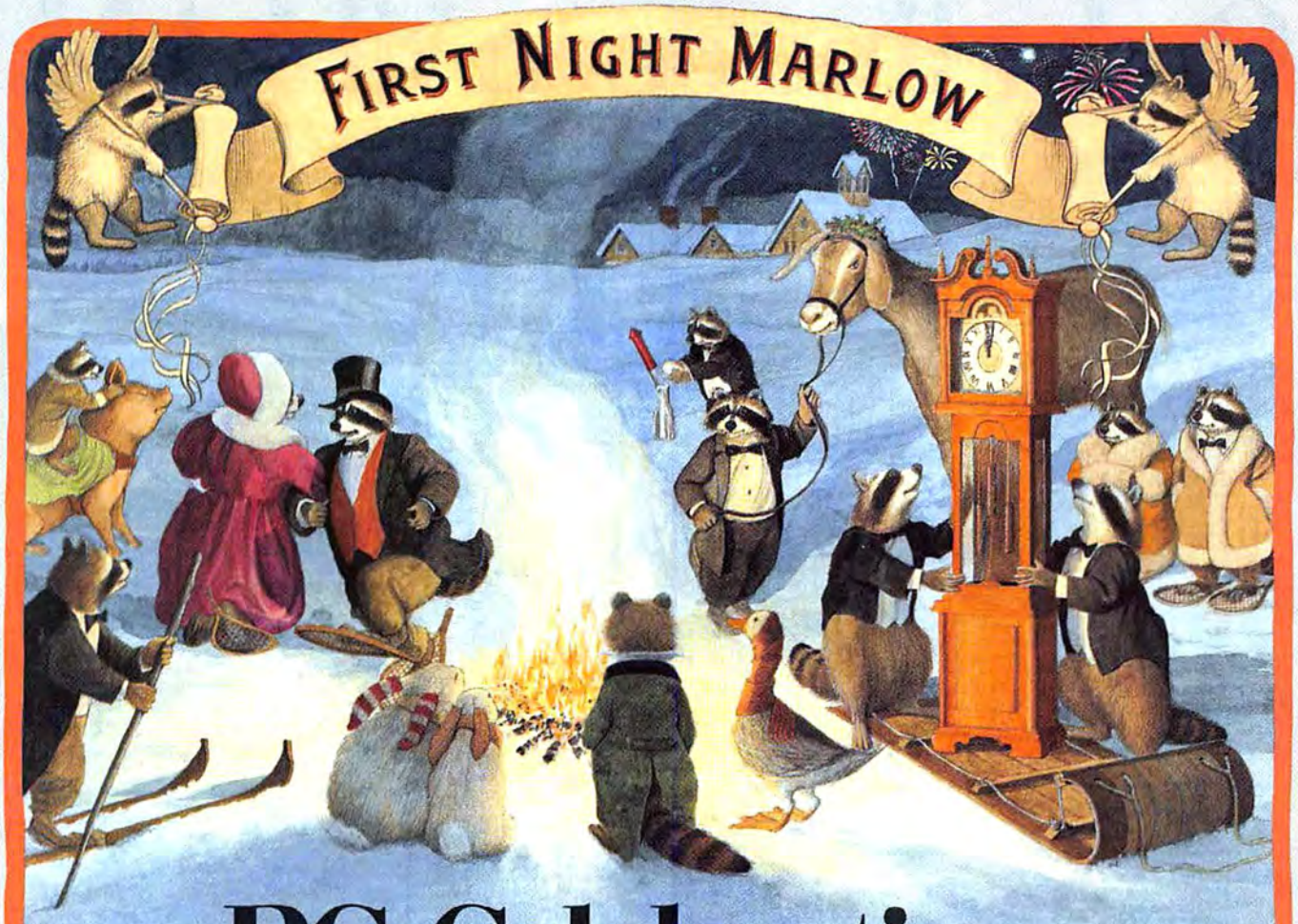

PC Celebration.

Furrier & Jive.
(Or, welcome back to the gay nineties.)

People are always asking if the celebrated rural outpost of Marlow, NH (pop. 561, Car. Rt. Sort 03456), is really ready for the '90s. Ready???! Why, if you give us a few minutes to hitch up the horses, light the oil lamps, pop open the parasols, and set a few bonfires, we'll make Currier and Ives look like Bert and Ernie. You see, even though our picture postcard town now has more printers than people, we still know the traditional way to ring out the old and ring in the new.

Oh sure, we've heard the talk about how technology is going to change everything. But, no matter how many megahertz you muscle into your micro, or how much resolution you ram into your rasters, or how many points per inch you output to print, you can still rely on us to deliver an irresistible combination of down-home prices and up-country personal service.

Better keep our sox on.

It's important that we all keep our tootsies toasty as we stroll down the old stage road into the last decade of the 20th Century. So we're giving a free pair of genuine 100% wool PC Connection Sox to everyone who places an order of $500 or more between now and March 31.

Enjoy safe sox all winter long with warm and toasty 100% wool PC Connection Sox. Offer not available to accounts on net terms. One per customer.

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Order line open 'til 1 AM.

Mountain Computer ... 1 year

2917	40-60 Meg Internal Tape Drive	$379.
2935	40-60 Meg Int. Tape Drive for PS/2	379.
5502	83-152M Ext. Tape Drive	759.
5500	83-152M Int. Tape Drive	629.
6153	DC2120 Cartridge *(5 pack)*	135.
5190	DC2000 Pre-formatted Cartridges *ea.*	35.

Pacific Rim ... 1 year

5010	1.2 Meg External	215.
5011	360k External 5¼" Drive	179.

Plus Development ... 2 years

3105	Hardcard 20 Meg *(49 ms)*	529.
3106	Hardcard 40 Meg *(28 ms)*	599.
6424	Hardcard II 80 Meg *(19 ms)*	699.

Seagate ... 1 year

FREE PCTV® Hard Drive Installation Tape with purchase of 20, 30 or 40 Meg Seagate drive for the IBM PC (not for AT). Beta or VHS.

2285	20 Meg Internal Hard Drive ST225 *(w/controller and cables, 65 ms)*	289.
2286	30 Meg Internal Hard Drive ST238 *(w/controller and cables, 65 ms)*	299.
4554	40 Meg Int. HD ST251-1 (28 ms)	359.
2287	40 Meg Int. HD for PC ST251-1 *(w/controller and cables, 28 ms)*	429.
4624	80 Meg Int. HD ST4096 (28 ms)	619.

XTREE ... NCP

▣ *XTREE Pro Gold 1.3*–A treasure of advanced disk management features–Directory Tree Display, Application Menus, Archive Management, Autoview & Enhanced View. Single keystroke commands for all operations . **$75.**

TEAC ... 1 year

4950	PC, XT 360k Drive *(5¼")*	79.
4951	720k Drive *(specify XT or AT, 3½")*	79.
4670	1.44 Meg Drive for XT *(3½")*	99.
4326	1.44 Meg Drive for AT *(includes Bastech software utilities, 3½" copy prot.)*	119.

MISCELLANEOUS

Checkfree

6360	CheckFree Xpress	25.

CompuServe

1676	CompuServe Information Service	24.

Cables ... lifetime

1019	Smartmodem-to-AT cable *(10 feet)*	15.
5511	Right Angle Printer cable *(6 feet)*	15.
1050	Parallel Printer cable *(15 feet)*	19.

DISKS

All disks have a lifetime warranty.

5¼" DS/DD Disks *(360k)*

3291	Sony *(10 disks per box)*	$12.
2789	Maxell MD2-D *(10 disks per box)*	13.
4192	Verbatim Datalife *(10 disks per box)*	13.

5¼" DS/HD Disks *(1.2 Meg)*

3770	Verbatim Datalife *(10 disks per box)*	19.
3292	Sony *(10 disks per box)*	19.

Intel ... 5 years Samna ... NCP

Inboard 386/PC with Free Samna Ami–The Inboard 386/PC gives you 80386 processing power, and a free Samna Ami Windows-based word processor (regularly at $129). Offer good through March 31, 1990 . **$579.**

Practical Peripherals ... 5 years

2400SA MNP–Fully supports error-free MNP Level 5 data transmission, giving you more confidence in your communications. Also supports Hayes compatible 2400 bps standard operation . . . . . **$209.**

2790	Maxell MD2-HD *(10 disks per box)*	19.

3½" DS/DD Diskettes *(720k)*

3297	Sony *(10 disks per box)*	14.
3772	Verbatim *(10 disks per box)*	15.
2792	Maxell *(10 disks per box)*	15.

3½" DS/HD Diskettes *(1.44 Meg)*

3298	Sony *(10 disks per box)*	29.
3773	Verbatim *(10 disks per box)*	29.
2793	Maxell *(10 disks per box)*	29.

MEMORY

3248	256k DRAMs *(120 nanosecond)*	call
4366	1 Meg x 9 SIMMs *(100 nanosecond)*	call
5510	1 Meg x 9 SIMMs *(80 nanosecond)*	call
5746	1 Meg Chips *(80 nanosecond)*	call

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- We accept VISA and MASTERCARD only.
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- All U.S. shipments insured; no additional charge.
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- 120 day limited warranty on all products.*
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Peter Norton ... NCP

▣ *The Norton Backup 1.0*–Save your data before you lose it with the all new Norton Backup. 3 user modes for ease of operation at any level plus many more advanced features make your backups easy . . . . . **$89.**

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For monitors, printers, Bernoulli Boxes, computers, hard drives, and power backups, pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoulli Boxes, computers, hard drives, and power backups, actual UPS Blue charge will be added. For all other items, add $3 per order.

Alaska and outside Continental US:

- Call 603/446-3383 for information.

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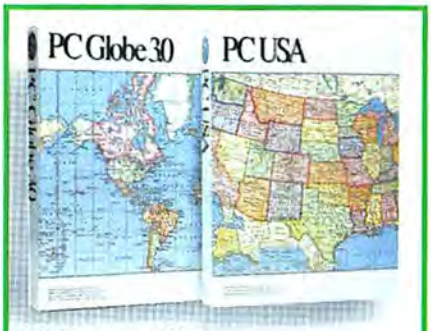

PC Globe ... NCP

☐*PC USA 1.0*–Instant profiles on all 50 states and Puerto Rico, including maps, graphics, and data ..... **$39.**

☐*PC Globe 3.0*–Provides profiles of 177 countries. Exports to many popular programs. **39.**

Intel ... 5 years

4696	2400B Internal Modem	159.
2352	2400B Internal Modem 2 *(for PS/2)*	249.
5119	2400 Baud External Modem	179.
6420	2400EX MNP Modem	229.
2346	Inboard 386/PC w/1 Meg *(w/free Ami)*	579.
2339	Inboard 386/AT *(req. inst. kit)*	859.
4266	Above Board Plus 512k	419.
4267	Above Board Plus I/O 512k	449.
5336	Above Board Plus 8 2 Meg	699.
5342	Above Board Plus 8 I/O 2 Meg	739.
4272	Above Board 2 Plus 512k	469.
5396	Above Board MC 32 0k	359.
4275	Connection Coprocessor	579.
4857	Visual Edge	449.
	MATH COPROCESSORS	
2370	80287-8 *(for 8 MHz 80286 CPU's)*	199.
2369	80287-10 *(for PS/2 Models 50 & 60)*	229.
4750	80387SX *(for 80386SX CPU's)*	309.
2371	80387 *(for 16 MHz 80386 CPU's)*	349.
2372	80387-20 *(for 20 MHz 80386 CPU's)*	399.

Kensington Microware ... 1 year

2582	Masterpiece Plus	109.
5697	Expert Mouse *(Trackball for PS/2)*	115.

Key tronic ... 3 years

4518	101 Plus Keyboard	99.

Kraft ... 5 years

5801	New Game Adapter *(2 game ports)*	27.
5800	3 button Thunder Joystick	29.
5802	Trackball	69.

Logitech ... limited lifetime

5464	Series 2 Mouse *(C9 for PS/2's)*	69.
5151	HiREZ Mouse *(C9)*	85.
6029	Trackman *(Trackball) serial 85. bus*	89.
4297	ScanMan Plus *(hand scanner)*	185.

Micron Technology ... 2 years

5818	Beyond 640 EMS Board 1 MB	369.
5821	Beyond EX Extended Mem. Brd. 2 MB	599.

Microsoft ... lifetime

2897	Mouse with Paintbrush	109.
2898	Mouse with Windows 286 2.1	139.

MicroSpeed ... 1 year

6007	PC-TRAC Trackball *serial 75. bus*	85.
6010	FastTRAP 3D Trackball *serial 99 bus*	109.

Mouse Systems ... lifetime

5845	White Mouse *(bus or serial)*	$69.
5997	Trackball *(1 yr. wrnty.) serial 75. bus*	85.
4306	PC Mouse II w/PC Paint+	89.

NEC ... 2 years

4799	Multisync 2A *(VGA Monitor)*	499.
5085	Multisync 3D Monitor	689.

Orchid Technologies ... 4 years

4690	ProDesigner VGA *(800 x 600)*	249.

PC Power & Cooling Sys. ... 1 yr

REPLACEMENT POWER SUPPLIES

3202	Turbo Cool 150 *(25° - 40° cooler)*	129.
3200	Silencer 150 *(84% noise reduction)*	115.

Practical Peripherals ... 5 years

3101	1200 Baud Internal Modem	69.
3100	1200 Baud External Modem *(mini)*	77.
3103	2400 Baud Internal Modem	139.
3102	2400 Baud External Modem	179.
5286	2400 Baud Int. MNP Modem *(Lev. 5)*	175.
5285	2400 Baud Ext. MNP Modem *(Lev. 5)*	209.
4542	2400 Baud Internal Modem for PS/2	229.

Intel ... 5 years

2400EX MNP Modem–MNP support allows error-free transmission as well as data compression providing 2400 bps throughput up to 4800 bps. Also supports Hayes compatible operation ..... **$229.**

Safe Power Systems ... 2 years

4561	Safe 250W *(standby power bkup)*	249.
4562	Safe 425W *(standby power bkup)*	369.

SOTA Technology ... 2 years

5107	Floppy Drive Controller *(SS/p)*	99.
5111	SOTA 286i-12 *(12 MHz accelerator)*	269.
5402	SOTA 386i-16 *(16 MHz accelerator)*	389.

Targus ... lifetime

4899	Nylon Laptop carrying case	55.
6037	Premier leather carrying case	199.

TheComplete PC ... 2 years

5598	TheComplete Half Pg. Scanner 400	189.
4887	TheComplete FAX 9600	429.
5140	TheComplete Page Scanner	549.
5828	TheComplete Communicator	559.

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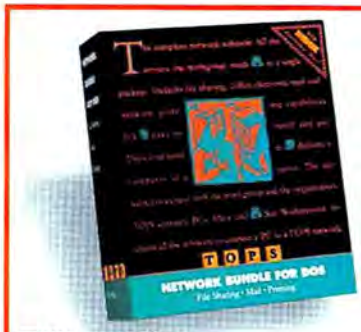

TOPS ... NCP

☐*Network Bundle for DOS 3.0*–Allows you to quickly and easily share files, electronic mail and printers between your Apple Macintosh, IBM PC and/or Sun Workstation. Now includes Inbox EMail software ..... **$159.**

Toshiba ... 1 year

3684	T1000 Laptop *(80C88, 6.4 lbs.)*	669.
4958	T1600 Laptop *(12 MHz, 20 Meg)*	3249.

Tripp Lite ... 2 years

6201	Isobar 8 *(8 outlets, 12 ft. cord)*	69.
6019	LS 600 Line Stabilizer	85.
6018	LC 1200 Line Conditioner	159.

Video 7 ... 7 years

5883	1024i VGA *(includes 512k)*	289.
4931	VRAM VGA 512k	449.

DRIVES

DTC ... 1 year

6248	AT Floppy/Hard Drive Controller	129.

IOMEGA ... 1 year

5116	Bernoulli II Single 44 Meg Internal	995.
5117	Bernoulli II Dual 44 Meg External	1969.
5113	44 Meg Cartridge Tripak *(5¼")*	249.
2499	PC2 Card *(controller required)*	169.
2500	PC2B Card *(bootable card)*	229.

Microlytics ... NCP

☐*GOfer 2.0*–The original, affordable, simple, painless, quick, easy, and fast text-retrieval software package for IBM PC and compatible computers. ..... **$45.**

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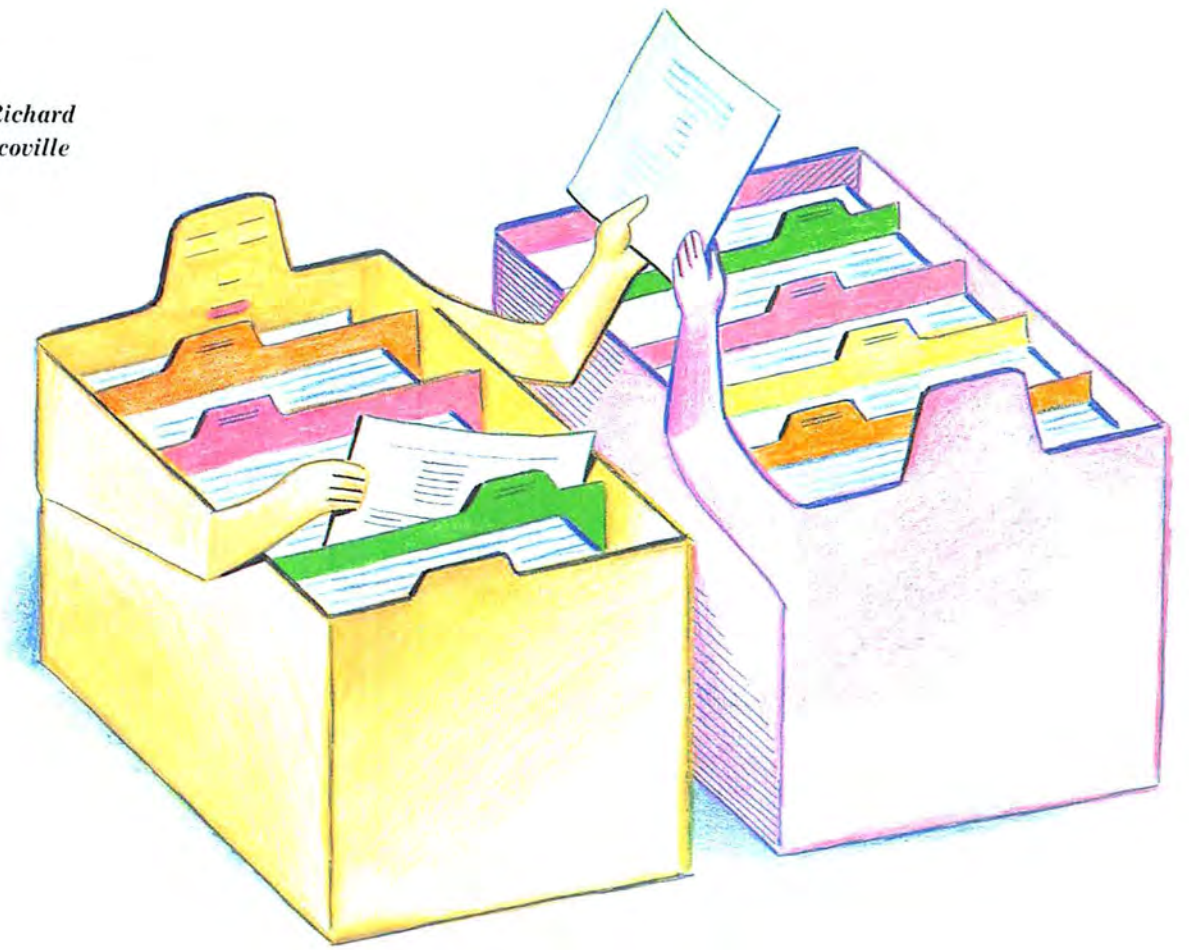
New Dimensions for Flat Files

Simple, nonprogrammable data managers aren't just for mailing lists anymore.

Our Best Buy proves that these basic business tools can learn relational tricks and still put on a friendly face.

Richard Scoville



Glance around your office, and you'll probably notice people using the wrong software for the job. This is especially true in data management—some users struggle to apply *1-2-3* to complex data juggling, while others sledgehammer simple tasks with a difficult (and expensive) programmable data base management system (DBMS).

Sometimes the best solution is a "flat-file" data manager, which fleshes out the spreadsheet's two-dimensional design with DBMS-style data entry and reporting functions. Flat-file programs have always been fine for maintaining mailing lists, but most business applications aren't so simple—they involve relationships between different kinds of data.

Only one of the seven nonprogrammable data managers reviewed here is limited to a flat-file approach. The other six offer varying degrees of relational skills, plus reporting, querying, and forms design features that often rival those of the heavyweights. They *don't* offer procedural languages or application generators, a fact that limits customization options. But despite the increasing ease of use of programmable DBMS's such as *Paradox* and *dBASE IV*, nonprogrammable file managers are friendlier—and markedly less expensive.

You can divide the programs into three basic groups, according to their relational talents. Despite other charms, Borland's *Reflex* is strictly a flat-filer, limited to examining one table at a time. ButtonWare's *PC-File:dB*, Software Publishing's *Professional File*, and Symantec's *Q&A* are all semirelational, providing lookup tables to simulate many-to-one relations. The final group approaches full relationality: Alpha Software's *Alpha Four*, WordPerfect Corporation's *DataPerfect*, and *Xerox FormBase*. Except for *FormBase*, they don't let you edit more than one table at a time. However, they're legitimate relational engines, providing dynamic one-to-many and (with the exception of *FormBase*) many-to-many links. (For more on relational concepts, see the sidebar "Links and Lookups—How Data Managers Juggle Relationships.")

DAVID SUTER

Facts In, Information Out

What are the key features to look for in a nonprogrammable DBMS? Relational features usually take top billing—you may not need complex querying and reports from multiple tables today, but chances are you will in the future. On the other hand, there's more to a data manager than relational prowess. A thorny interface can hamstring a highly relational program, and a top-notch report writer can elevate a flat-file simpleton. Once you determine how much relational power you need, consider the following features.

Ease of Use User friendliness varies according to a task's complexity. For example, *Q&A* is a whiz at simple applications, but it's daunting when you try complex jobs. And though not as intuitive as *Q&A* at simple tasks, *Alpha Four* is adroit at tackling knottier problems that require relational tricks. If you expect your modest application to grow more complex over time, *Alpha Four* is probably your best bet.

Design and Data Entry All the programs let you design custom data entry forms by freely "painting" the screen with fields. The programs vary, however, in formatting, validation, and field-type options. Among other tricks, you should be able to screen out invalid data and speed data entry by copying data from the previous record. *Alpha Four* is the best designer overall, but if you crave advanced formatting, *FormBase* is the answer—it even doubles as a forms design package.

Querying Broadly defined, all the reviewed programs offer some kind of query by example (QBE): To select records, you enter examples, values, and expressions in a blank entry form. Querying tools don't match *Paradox*'s QBE, but you can choose fields and conditions from lists rather than having to type them in yourself. Implementation

FEATURES EVALUATION

Data Basics, Relational Extras

Relational capabilities are crucial for all but the simplest applications. Alpha Four wins a Best Buy by combining top relational skills with good design tools, querying talents, and reporting features.

● Yes
○ No
◒ Deficient
▼ Limited only by available disk space

	Alpha Four 1.0	DataPerfect 2.0	PC-file:dB 1.1	Professional File 2.01	Q&A 3.0	Reflex 2.0	Xerox FormBase 1.0
Standard features							
List price	$549	$495	$89.95	$299	$349	$249.95	$495
RAM required	512K	256K	416K	380K	512K	512K	640K
Relational skills							
Many-to-one links	●	●	●	●	●	○	●
One-to-many links	●	●	○	○	○	○	●
Many-to-many links	●	●	○	○	○	○	○
Edit multiple tables at once	○	○	○	○	○	○	●
Lookup-table validations	●	●	○	●	●	○	●
Displays lookup values from related file	●	○	○	○	○	○	○
Design and data entry							
Memo fields	●	●	●	◒[1]	○	●	●
Variable-length fields	○	●	○	●	●	●	●
Can require unique field entry	●	●	◒[2]	●	●	○	○
Keystroke macros	●	○	●	●	●	○	●
Custom menus	●	○	○	●	○	○	○
Password protection	●	●	●	●	●	○	●
Reads/writes DBF	●	○	●	●	●	●	●
Reads/writes WK1	●	○	○	●	●	●	●
Search, sort, and query							
Save queries for reuse	●	◒[3]	○	●	○	●	●
Wild-card substring search	●	●	●	●	●	●	●
Boolean searches	●	●	●	○	○	●	●
Locates characters in string	●	●	●	●	●	●	●
Displays virtual field	●	○	○	○	○	●	●
Reporting							
Band-oriented system	●	●	●	○	○	●	○
Charting module	○	○	●	○	○	●	○
Cross-tabulated reports	○	○	○	●	○	●	○
Mail merge	●	◒[4]	●	○	●	●	●
Includes lookup values	●	●	●	●	●	○	●
Interrecord calculations	●	●	○	○	○	●	●
Percent-of-total calculations	●	○	○	●[5]	○	●	●
Capacity							
Maximum file size	4GB	2GB	4GB	8MB	256MB	32MB	▼
Maximum records per file	2 billion	16 million	1 billion	59,000	16 million	65,000	▼
Maximum fields per record	128	80	70	3200	2182	250	▼
Maximum record size	4K	2.6MB	4K	56K	16.7K	8K[6]	▼
EMS support	○	○	○	●	●	●	●

[1] No true memo field, but you can attach text to fields via attachment page.
[2] Can generate unique record numbers only in a calculated, noneditable field.
[3] Saved only for current session.
[4] Function did not work in test version.
[5] With cross-tabs report.
[6] Plus 8K for each memo field.

varies, however. Some programs force you to create a report before you can view more than one record at a time; others make it tough to create and view calculated fields, and some won't save queries.

Reports Most of the programs provide a band-oriented report generator, which makes it easy to lay out headers, footers, titles, and detail sections. You should also be able to embed calculated variables and lookup fields. Several of these report writers, such as *Reflex*'s, rival those of full-fledged DBMS's.

Extras such as mail merge, label generation, and business graphics are also part of the report category. A mail merge module for generating form letters is an essential element. All but *DataPerfect* and *Professional File* include one, and these two programs save data in the mail merge formats of companion word processors *WordPerfect* and *Professional Write*, respectively. *Q&A* provides the easiest mail merge (and the most advanced word processor); other programs let you add conditional statements that automatically insert different boilerplate depending on such variables as the recipient's income or sex. *Reflex* and *PC-File:dB* offer the convenience of built-in charting, and *Reflex* and *Professional File* provide cross-tabulation reports, which are handy for statistical analysis.

Performance Speed is critical in data management, especially when dealing with large data bases. As National Software Testing Laboratories' (NSTL) benchmarks show, there are considerable time differences between the programs in reporting, searching, and updating tasks. *Reflex* and *Q&A* are the fastest overall, and *Professional File* is close behind. The results tend to indicate a trade-off between speed and relational skills, with highly relational programs such as *DataPerfect* and *FormBase* running slowest.

Customization Because these programs lack procedural languages and application generators, you can't customize them extensively. However, all except *Reflex* and *DataPerfect* can record and play back keystrokes. Better yet, *Alpha Four* and *Professional File* let you design custom menus that prompt users through simple data entry and reporting tasks. The lack of conditional functions, however, limits design possibilities.

Network Features One indicator of progress in this category is that four of the programs now provide LAN versions. However, multiuser support is uneven. Only *Q&A* meets the security standards of programmable DBMS's, providing both file and record locking. *Professional File* lacks record locking, which would prevent multiple users from updating the same record file at the same time, and *PC File:dB* lacks file locking. *DataPerfect* notifies users if a record is in use, but it lacks both file and record locking. According to NSTL benchmarks (not reproduced here), the programs' multiuser performance tended to duplicate their rankings in single-user tests.

Alpha Four 1.0

The relational powerhouse of the roundup, Alpha Software's *Alpha Four*, is remarkably easy to use. And because DBF is *Alpha Four*'s native format, you can easily swap data with *dBASE* programs. The $549 price is high, and performance is only average, but with its relational skills, custom menus, and top-notch screen and report generators, *Alpha Four* wins a Best Buy.

EXECUTIVE SUMMARY

Alpha Four 1.0

Nonprogrammable data manager

Combining an approachable interface with a rich array of features, *dBASE* file compatibility, and excellent relational skills, *Alpha Four* is a system you can grow with.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills			●	
Design and data entry				●
Search, sort, and query			●	
Reporting				●
Performance		●		
Overall value				●

Reader service no. 645

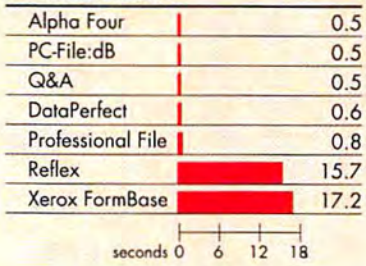
Reflex and PC-File:dB offer the convenience of built-in charting.

NSTL TEST REPORT

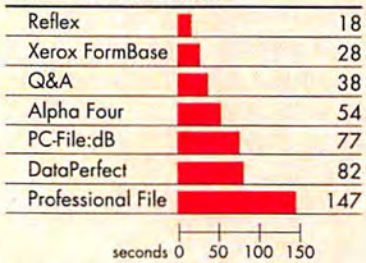
Simpler Data Managers Run Faster

The flat-file Reflex and the semirelational Q&A take top speed honors, while more relational programs like FormBase and DataPerfect bring up the rear.

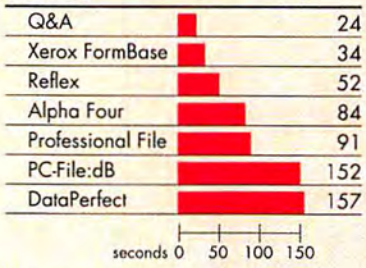
Indexed search



Nonindexed search

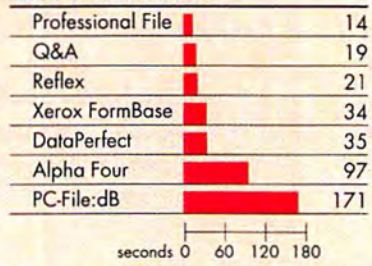


Browse

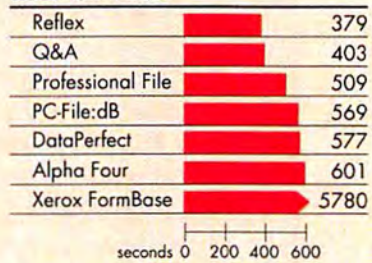


[1] FormBase was unable to complete the Complex report generation.

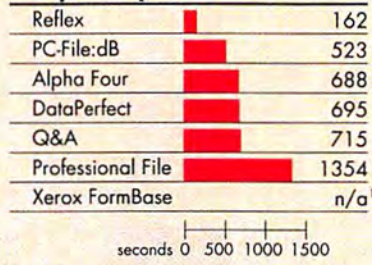
Report generation using a dual-index search



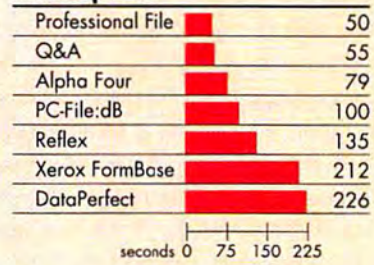
Report generation using a dual-level sort



Complex report



Mass update



Print three-across mailing labels

Methodology
All tests were conducted using a 12-MHz Compaq DeskPro 286 configured with a 256K extended-memory disk cache and a 20MB hard disk. The test data base consisted of 5000 records of 19 fields each, with field types divided between numeric, alphanumeric, date, and logical.

Indexed search
The data base is searched on an indexed field for a single, nonexistent record.

Nonindexed search
The data base is searched on a nonindexed field for a single, nonexistent record.

Browse
The data base is searched on an indexed field for two separate records, which are then displayed on screen in read-only mode.

Report generation using a dual-index search
The data base is searched on primary and secondary indexed fields, and a report is output to the screen.

Report generation using a dual-level sort
The data base is sorted on primary and secondary indexed fields, and a report is output to the printer.

Complex report
About 40 percent of the records are selected on the criterion of one field less than another, and a dual-level sort is performed. A virtual calculated field is created, and subtotals and a grand total are calculated. Finally, the report is formatted and output to the printer.

Mass update
A global update is instituted, resulting in the change of one field per record in about 5 percent of the data base.

Print three-across mailing labels
Three-line labels using a total of six fields are printed three across.

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

Alpha Four's smooth interface is built around full-screen menus, function keys, and pop-up lists. Many tasks, such as creating a data base, are similar to procedures in *dBASE III Plus*, but *Alpha Four* makes them far easier.

Alpha Four follows a bottom-up approach to relational design: You build tables indexed on unique key fields, then link them with a screen that portrays relationships graphically. You can link a single file to several others, which makes establishing many-to-many relations easy. *Alpha Four* is the roundup's only program that lets you post values automatically from a transaction file, just as you can with *dBASE*'s UPDATE. Using this feature in combination with group subtotals, you can post expenses to budget categories in an expense report.

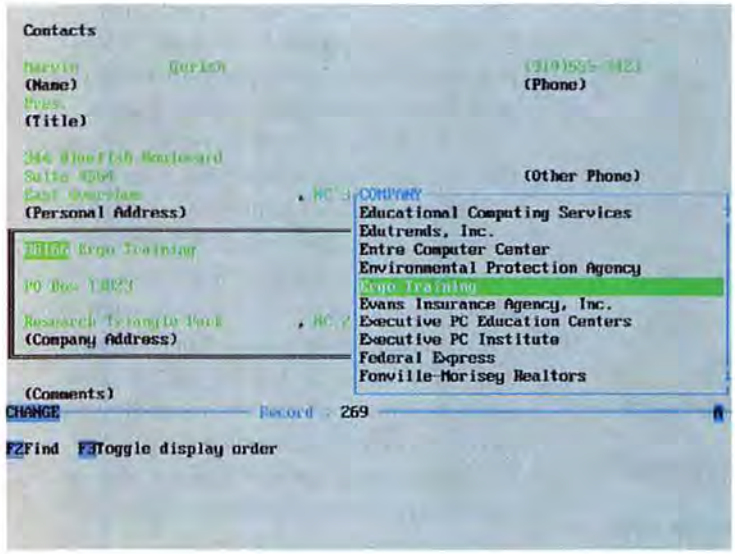
Data entry controls are exceptional: You set up masks and templates to structure the data, then apply validation rules. Entry screens and table views display calculated values, including fields from related files. In a many-to-one relationship, you can view a lookup table in a pop-up window, quickly locate a record, and plug its key value into a form. If there's no match, you can zoom to the lookup table, add a record, and quickly return.

Alpha Four offers an easy-to-use querying system that lets you choose fields from a menu and save queries for reuse. For more intricate queries, you can build expressions using a substantial subset of *dBASE* functions.

Alpha Four's band-oriented report generator is second only to *Reflex*'s in overall value. Formatting controls are extensive, and you can define calculated values, including fields in a related data base. The mail merge module is versatile, featuring blank-line suppression, calculated variables, and conditional statements.

A custom-menu builder coupled with macros lets you create simple applications, such as an invoicing system for a small business. But since the macros lack conditionals, you can only replicate rote procedures.

With its superb design and reporting features and strong relational talents, *Alpha Four* comes close to the power of a programmable DBMS. It's the Best Buy if you want a near *dBASE* compatible without programming.



Alpha Four's specialty is relational links. In this view, a dynamic link is established between two related files (Contacts and Company). To retrieve a company ID from the Company data base, you select the company name from a handy lookup list.

DataPerfect 2.0

Like *Alpha Four*, *DataPerfect* is highly relational, but design flaws hamper its potential. *WordPerfect* users won't mind *DataPerfect*'s lack of menus, but the function-key interface is inconsistent. To update records globally, you must create a report that places calculated values into fields. Worse, changing a table's structure involves a tortuous procedure reminiscent of *dBASE II*, and the program

EXECUTIVE SUMMARY

DataPerfect 2.0

Nonprogrammable data manager

DataPerfect scores high on relational capability, but it suffers from a confusing interface and poor performance.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills				●
Design and data entry				●
Search, sort, and query			●	
Reporting			●	
Performance		●		
Overall value			●	

Reader service no. 646

lacks file conversions. A slow performer, *DataPerfect* is only for *WordPerfect* offices that want to integrate other WordPerfect applications using cross-application macros.

Unlike *Alpha Four*, *DataPerfect* requires that you first define a data base, then link it to related tables and fields chosen from lists. Relational capabilities match *Alpha Four*'s. To perform a one-to-many link, you place the cursor in a "doorway" field, step through into a related table, grab a value from a lookup list, and then plug it into the original table. Every field can have its own lookup list, complete with index. Unfortunately, *DataPerfect*'s formulas for lookups, queries, and validations are arcane and refer to fields by code numbers instead of names.

The QBE procedure is straightforward, but it's crippled by a major flaw—unless you create a report, you're limited to viewing selected records one at a time. The band-oriented report writer takes advantage of *DataPerfect*'s relational talents, and it provides conditional page breaks and multicolumn lists to make reports visually appealing. But a quirky interface gets in the way—for example, the procedure to insert fields varies depending on field type.

DataPerfect's mail merge is extremely primitive, but you can export data directly into *WordPerfect* secondary merge files. And with the $129 *WordPerfect Library*, you get macros that can integrate *DataPerfect*, *WordPerfect*, and other WordPerfect family applications.

If you're an all-*WordPerfect* office, *DataPerfect* might make sense. But most users should look elsewhere.

PC-File:dB 1.1

For only $89.95, ButtonWare's semirelational *PC-File:dB* delivers a bundle. Performance is mediocre, but this shareware program's native *dBASE* file format and superb mail merge and graphics modules make it a solid bargain.

PC-File:dB's friendly full-screen, first-letter menus are always one step ahead. Sometimes they guess wrong, but they're usually quite prescient. Creating a data entry screen is easy enough, but options are limited. You can define calculated fields that tap values from a static lookup table, but you can't validate entries against a lookup, and there are no functions for field and report calculations.

On the surface, *PC-File:dB*'s querying skills seem primitive—its QBE feature displays only one record at a time. However, you can also use a more challenging filtering method that lets you quickly select records by building a special sort index and permits you to browse multiple selected records.

The band-oriented report writer is second-rate, and you're limited to one level of subtotals. But the program's extras redeem it. The graphics module includes horizontal bar charts, scatter plots, regression lines, and more. A superb mail merge offers conditional statements, calculated variables, table lookups, and advanced formatting. The label generator is another nice touch—set up a label format as a macro, and you can print a label at the touch of a key.

If you don't need top relational skills, but mail merge, graphics, *dBASE* file compatibility, and a slim price tag are on your wish list, *PC-File:dB* could be the answer. By the time you read this, *PC-File:dB* will be replaced with a new version called *PC-File 5.0*. Similar in relational skills, it will add mouse support, multiple input screens, and user-defined indexes with multifield *dBASE* expres-

PC-File:dB's superb mail merge offers conditional statements, calculated variables, table lookups, and advanced formatting.

EXECUTIVE SUMMARY

PC-File:dB 1.1

Nonprogrammable data manager

A bargain hunter's delight, *PC-File:dB*'s low price, *dBASE* compatibility, and graphics and mail merge modules compensate for modest relational capabilities and limited data base design skills.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills			●	
Design and data entry			●	
Search, sort, and query				●
Reporting				●
Performance			●	
Overall value				●

Reader service no. 647

sions. The price rises to $129.95, but that's still far less than any of its rivals in this field.

Professional File 2.01

A near-twin of *Q&A*, Software Publishing's semirelational *Professional File* offers similar menus and lookup functions. The $299 program bests *Q&A* with its cross-tab reports and menu customization, but it lacks *Q&A*'s mail merge, and it's somewhat slower. Like *Q&A*, its approach to building searches, report layouts, and field attributes is awkward. All told, it's only a fair value.

Professional File's amiable interface has overlapping pop-up menus; help is succinct and context sensitive. As with *Alpha Four*, you can build custom menus that prompt users through a rote series of predefined tasks. Performance is inconsistent—reporting is usually quick, but searching and browsing drag.

Data entry screens can include many-to-one links via lookups, validation formulas,

LINKS AND LOOKUPS—HOW DATA MANAGERS JUGGLE RELATIONSHIPS

It's not the facts but the relationships between facts that create useful information. Making those connections has traditionally been the job of heavyweight programmable DBMS's like *dBASE*. Flat-file data managers—so called because they store data in a two-dimensional table not unlike a spreadsheet—have typically been relegated to managing mailing lists, card files, and other simple tasks.

But the line between flat-file and relational programs is blurring. Semirelational DBMS's such as *PC-File:dB*, *Professional File*, and *Q&A* use lookup tables to simulate many-to-one relationships. For example, a sales manager could maintain a data base of sales reps, names, and territories in one table and a history of client contacts in another. With a lookup function, the contacts data base could pop the salesperson's name into one field when you entered the territory in another.

However, these programs are still essentially flat-file data managers because the lookups aren't dynamic—entries aren't updated on the fly, and duplicate data must be stored in all related tables. Thus, as your applications get more complex, modifications become increasingly tedious and confusing, and you run the risk of data redundancy or even inaccuracy. Fortunately, these programs avoid redundancy when they generate a report—because lookups are created on the fly with the report, data is stored in one place only.

Lookup programs have been around for several years, but *Alpha Four*, *DataPerfect*, and *Xerox FormBase* break new ground. Despite their lack of procedural languages, they're able to handle relational chores previously the dominion of programmable DBMS's.

The relational litmus test here is the one-to-many link. *FormBase* handles this with subtables. In a data base of clients, for example, a subtable could show the history of sales calls. Better yet, *Alpha Four* and *DataPerfect* use dynamic links, temporary pointers that let you view and edit data from related tables in the same application. Data isn't duplicated, and flexibility improves because you can forge new links without modifying the data base structure.

In addition, *Alpha Four* and *DataPerfect* let you model many-to-many relationships. For instance, you can track a situation in which service personnel visit different clients, and the same client is visited by different service people. This application requires three linked tables: clients, personnel, and visits.

None of these programs can match the relational muscle of *Paradox*, *R:base*, or *dBASE IV*. Only *FormBase* lets you edit data in several tables at once. Even *FormBase* can't create an outer join, an inclusive link that can retrieve all records in one table even if they don't meet the conditions of a related table.

If you need such power—or extensive customization—you're probably better off with a programmable DBMS. But for many bread-and-butter business applications—sales tracking, personnel management, and mail merge—*Alpha Four* and its peers may be all you need. —*R. S.*

EXECUTIVE SUMMARY

Professional File 2.01

Nonprogrammable data manager

Professional File offers such extras as cross-tabs and custom menus. But awkward querying and reporting get in the way.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills			●	
Design and data entry			●	
Search, sort, and query			●	
Reporting			●	
Performance				●
Overall value			●	

Reader service no. 648

Q&A's text editor has flowered into a true word processor.

and a variety of field types. However, averaging and other basic statistical functions are lacking. Ad hoc queries are limited—to peruse a calculated value, you must either modify the file structure and recalculate the field or prepare and run a report.

The report generator is impoverished. It lacks a band system, you're limited to three calculated fields per report, and producing subtotaled fields is complex. There's no mail merge, but you can send files directly to *Professional Write* for merging. One nice touch is the superb cross-tabulation function, which could, for example, report on visits by a particular salesperson broken down by company size. You can also show subtotals only and percent-of-total calculations.

Professional File's cross-tabulated reports and custom menus are tempting. But if those features aren't crucial, keep looking.

Q&A 3.0

Recognizing that the quintessential data base application is an automated address book used for mail merge, Symantec has combined a DBMS with a word processor to create the highly popular *Q&A*. For simple tasks, the $349 *Q&A* is the easiest program in the roundup. The addition of many-to-one lookups makes more complex applications possible, but the tougher the job, the more frustrated you'll get. Still, *Q&A*'s fast performance, easy mail merge, and built-in word processor make it a solid deal.

Like *Professional File*, *Q&A* uses pop-up menus; its superb context-sensitive help is a perfect match for novices. When you open a data base, a QBE form invites you to enter search parameters. Unfortunately, you can't save queries or use Boolean and case-sensitive searches.

Q&A offers a rich function set for calculating and validating field entries and reports. *Q&A*'s unique system for interrelating fields automatically skips the spouse's-name field if the marital status field reads 'single'. Yet design limitations abound—you can't change column widths in table view, and you must base calculations on field numbers instead of names, which makes changing complex applications a pain. The report writer lacks a band orientation and forces you to embed formatting codes.

If mail merge is important, however, you'll probably forgive *Q&A*'s flaws. Its text editor has flowered into a true word processor, replete with headers and footers, block edits, search and replace, and font control. Preparing a form letter is a matter of typing the text, linking to a data base, and entering the field names. However, you can't insert calculated variables or conditionals.

EXECUTIVE SUMMARY

Q&A 3.0

Nonprogrammable data manager

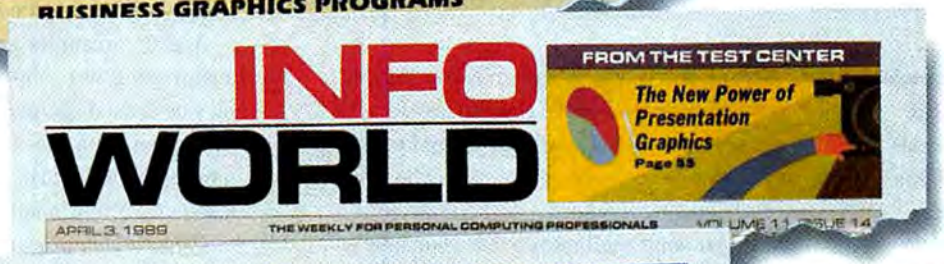
The ultimate mail merge machine, Q&A combines data management and word processing to come up with a useful tool. Good performance, rich calculation features, and an easy interface compensate for Q&A's design glitches.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills			●	
Design and data entry			●	
Search and query			●	
Reporting				●
Performance				●
Overall value				●

Reader service no. 649

When buying business graphics software, look out for number one.

Freelance Plus
#1 Rated Graphics Program
August, 1989



Freelance Plus
Best Rated Presentation Graphics Program
April 3, 1989

Freelance Plus
Top Ranked Desktop Presentation Package
July 10, 1989

Freelance Plus
Best Buy Graphics Program
November, 1989

The industry experts have put their stamp of approval on the new Lotus® Freelance® Plus. In fact, their rave reviews call it the best business graphics software on the market.

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And it works better with Lotus 1-2-3® than any other presentation graphics package.

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And you'll see that the best way to look out for number one, is to buy #1.

Lotus Freelance Plus

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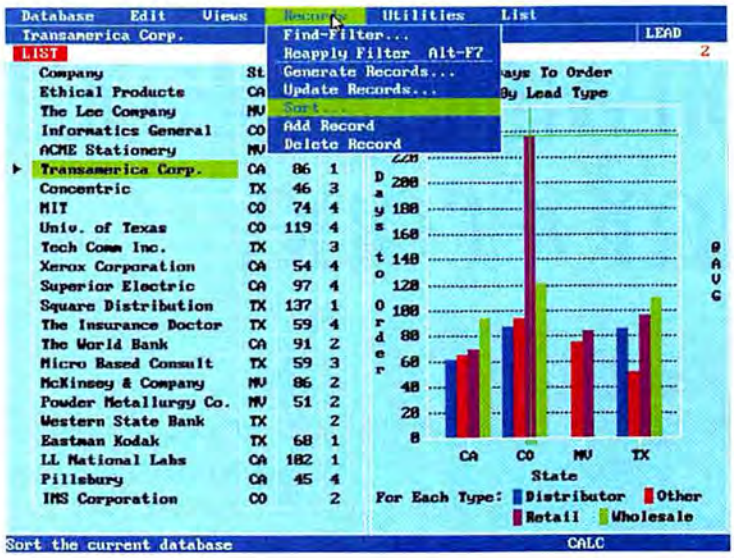

Reflex's graphical interface offers flexible views of data that can be saved and reused with other data bases. Its graphics function is the best in the roundup.

Q&A is the only program reviewed that provides acceptable LAN features. It delivers both file and record locking and offers extras such as identifying the user who is currently editing a record.

If you want mail merge and your needs are simple, *Q&A* may be the ticket. And with its top speed and solid security on LANs, *Q&A* is a perfect home for your department's shared address data base.

Reflex 2.0

Unabashedly flat-file, Borland's *Reflex* lacks indexing, macros, and even the simplest relational talents. Its range is severely restricted—an application as simple as tracking sales calls would tax it. Yet *Reflex*'s graphical interface and reporting tools are superb, and it's one of the the fastest programs in the roundup. *Reflex* is not for everyone, but for quick analysis and presentations, it can't be beat.

Reflex's consistent interface is easy to learn. Using pulldown menus, you can display multiple views of a data base simultaneously, each view consisting of a form, a table, or a report layout. Unlike most data managers, which handcuff views to their home data base, *Reflex* lets you transfer views between data bases.

Each application is limited to a single table. Extensive *1-2-3*–style @ functions permit workarounds for data entry and list validation, and you even get unique interrecord functions such as @PREV(), which accesses a value in a previous record. However, the @ functions are difficult to master, and the lack of lookups severely narrows design vistas.

Reflex's QBE is straightforward, and, as with *FormBase*, you can create virtual fields that calculate and display values on the fly. You can even use them to sort data, thus broadening ad hoc queries.

The band-oriented report generator is the best in the roundup. Its outstanding layout controls cover variables, groups, subtotals, and more, and you can call on variance and standard deviation formulas. Like *Alpha Four*, *Reflex* allows you to design multipass reports that scan a file for totals and figure percent-of-total values or weighted averages.

A glitzy graphics module supports numerous graph types. You can display graphs side by side with data, graph calculated values on the fly, and run cross-tab graphics. The mail merge facility is also tops and supports variables and conditionals.

Reflex's lack of relational features renders it unfit for most applications. Yet it's a good vehicle for developing presentations, and it's great for market researchers, financial folk, scientists—anyone who needs quick, explor-

EXECUTIVE SUMMARY

Reflex 2.0

Nonprogrammable data manager

Strictly a "flat-file" data manager, *Reflex*'s range of applications is limited. But it's the fastest program in the roundup, and it features a superb report writer, cross-tabs, graphs, and mail merge. It's perfect for temporary analysis, but don't count on it for mission-critical applications.

	POOR	FAIR	GOOD	EXCELLENT
Relational skills	●			
Design and data entry			●	
Search, sort, and query			●	
Reporting				●
Performance				●
Overall value			●	

Reader service no. 650

If Time is Money, Better Employee Scheduling Saves a Fortune!

WHO WORKS WHEN

- **Calculates employee schedules in seconds**
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— **Fulfill complex scheduling needs.** Use the Work Patterns feature to create elaborate rotating shift/station and on/off pattern schedules. These patterns can be up to 16-weeks in length and can be assigned to individuals or groups.

— **Better organized and better informed.** View or print your schedules by shift or employee. Produce individual assignment sheets. Calculate staffing shortages. List employee information. Who Works When generates these and other valuable reports to help you make effective scheduling decisions.

— **Easy to use.** Just because it's powerful doesn't mean it's complicated. Move between easy-to-use screens with just one keystroke. On-line help too. No complicated formulas to remember. You'll feel like a pro in hours.

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Over a thousand hospitals, universities, manufacturers, retail outlets, and government agencies are taking advantage of the power and flexibility of Who Works When. Some of their comments:

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— A.L. DeWitt, Dir. Resp Care Services, St. Charles Hospital, Ohio
ADVANCE for Respiratory Therapists

"Anyone who's faced the nightmare of manually scheduling and rescheduling employee shifts knows the meaning of frustration. A small change in one variable can ripple through them all and pull your entire schedule down around your ears. It's for chores like this that computers were invented, and Newport Systems has just the electronic manager for the job."
— PC World

$479 Who Works When will help you become a more effective scheduling manager, and it's only $479. Compare our solution with those costing two to five times more. You'll find that Who Works When gives you the most power for the least money. Let Who Works When help you better manage your most valuable resource - your employees.

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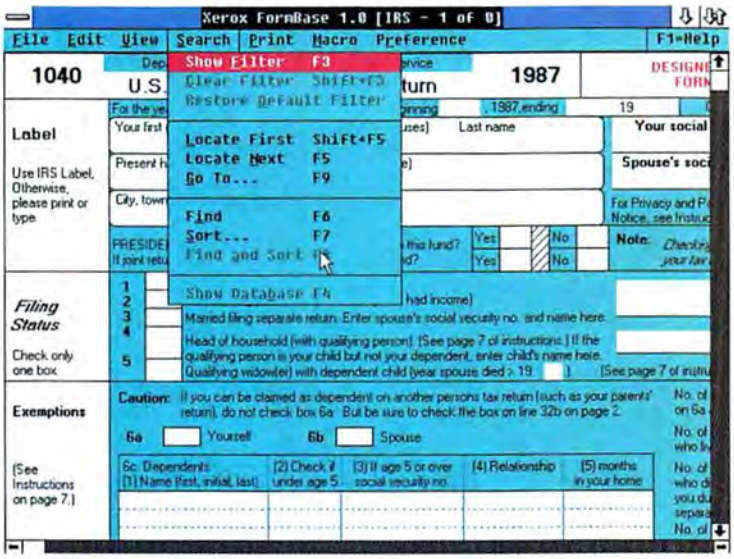

Xerox FormBase provides a stunning Windows-based interface that lets you view a realistic page display as you design the form on screen. Formatting options are so advanced that FormBase doubles as a forms package for creating printed forms.

atory analysis of data. Because *Reflex* stores its data in the same format as Borland's *Paradox*, *Reflex* also makes good sense for *Paradox* sites.

Xerox FormBase 1.0

Comparing *Xerox FormBase* with its rivals is like justifying the penguin as a bird: It has all the right parts, but its behavior is singular. For starters, this highly relational *Windows*-based DBMS is an accomplished forms designer with desktop publishing skills. More important, in *FormBase* every form is a potential data base, and a data base is simply a form. It's a difficult metaphor to grasp, and some traditional data management tools are missing. Still, *FormBase* is a good choice if you need to generate polished paper forms that match on-screen data entry forms.

FormBase's interface is all *Windows*, complete with pulldown menus and function-key alternatives to mouse commands. But unlike the *Windows*-based *Superbase 4*, *FormBase* lacks DDE hooks. The program is also quite sluggish. Reporting is notably torpid—*FormBase* took almost ten times longer thans its rivals to generate one report.

In the relational domain, *FormBase* takes a major step beyond lookups. You can define a subform or subtable to handle one-to-many links, such as salesperson to sales calls; when you specify a salesperson, his or her calls appear in a scrollable window on the form. *FormBase* lacks many-to-many links, but it's the only program reviewed that lets you edit two related tables at once.

FormBase makes data base design a snap—enter a field name, then move and size the field with the mouse. Double-click on a field, and you can pick calculation and format controls from a dialog box. *FormBase*'s formatting and validation options are impressive, and printer and font support is tops. Image fields (unique in this roundup) let you incorporate logos, signatures, and scanned photos, making the program a good match for personnel and other image-management applications.

Most users will struggle to adapt to *FormBase*'s unique approach. Everything on a form is considered a field or a variable; to add text to a form, you create a field with a name (but no value), or you define a field with a default value. You can design multiple views of forms, and a catalog view tracks fields, data types, and locations.

With most data managers, a form is for data entry, a report is for printing, and never the twain shall meet. But in *FormBase*, a data entry form *is* a report, and vice versa. And such reports! For example, you could

EXECUTIVE SUMMARY

Xerox FormBase 1.0

Nonprogrammable data manager

The only Windows product in the roundup, the highly relational Xerox FormBase stands apart. Offering top-notch desktop publishing skills, it's as much a forms designer as it is a DBMS. However, reporting is glacially slow, and it lacks some traditional DBMS accoutrements.

	POOR	FAIR	GOOD	EXCELLENT	
Relational skills				●	
Design and data entry					●
Search, sort, and query				●	
Reporting				●	
Performance		●			
Overall value				●	

Reader service no. 651

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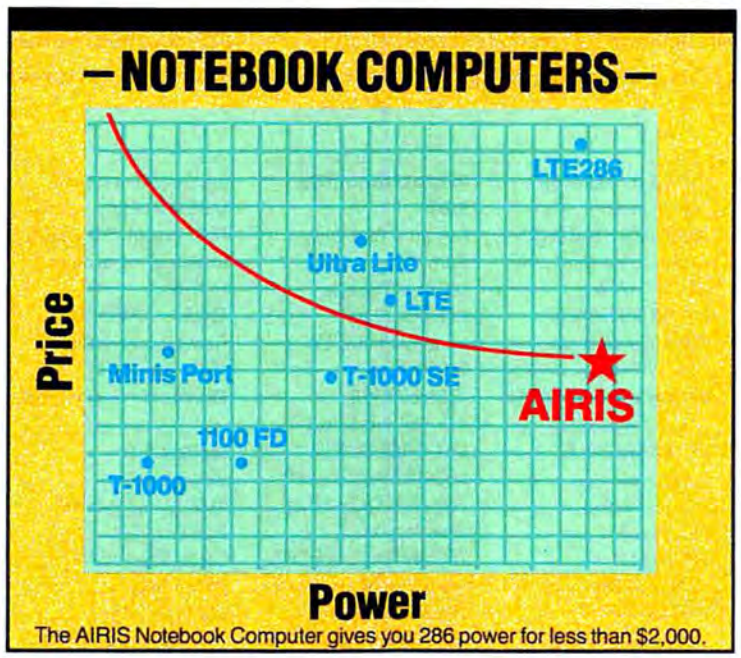

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create an impeccable reproduction of a tax form complete with fonts, shades, and rounded boxes and print it out or use it for on-screen data entry. However, because the program isn't band oriented, setting up a complex report with headers and footers is a page-at-a-time task.

FormBase's sluggish performance and lack of a traditional report writer limit its audience. But if you're a *Windows* user or need sharp forms, it's the program of choice. *FormBase* blows a refreshing breeze into the dusty halls of data management, but it's not quite perfected.

Relations Without Programming

When all is said and done, *Alpha Four* takes the Best Buy honors. You can't beat its mix of top-notch relational skills, *dBASE* file compatibility, and a forgiving interface. But if the price is too high and your needs are simpler, alternatives abound. *Reflex* is the choice for analytical reporting, *Q&A* is still the mail merge champ, *FormBase* is primed for forms design, and *PC-File:dB* is the best bargain.

The entire concept of flat-file data management may soon be obsolete. Programs like *Alpha Four* can now tackle applications that once required programming. Until object-oriented programming arrives, this is the most you can expect without programming, debugging, programming, debugging, and programming yet some more. ●

Richard Scoville is vice president of Ergo Training in Research Triangle Park, North Carolina, and a contributing editor for PC World.

For more information about all products in this article, circle reader service no. 904.

WHERE TO BUY

Alpha Four 1.0
Alpha Software Corp.
1 North Ave.
Burlington, MA 01803
800/451-1018,
800/462-2016 (Massachusetts), 617/229-2924,
617/272-4876 (fax)
LIST PRICE: $549
REQUIREMENTS: 512K, hard disk, DOS 2.0 or later version
TECHNICAL SUPPORT: 60 days free, toll number, M–F 9–6
OTHER SUPPORT: BBS; additional support $49 to $99 per year
Reader service no. 645

DataPerfect 2.0
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
800/321-4566
LIST PRICE: $495; $195 per additional LAN workstation
REQUIREMENTS: 256K, two floppy drives (hard disk recommended), DOS 2.1 or later version (DOS 3.0 or later for LAN version)
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 7–6
OTHER SUPPORT: CompuServe forum (GO WPSGB)
Reader service no. 646

PC-File:dB 1.1
ButtonWare Inc.
P.O. Box 96058
Bellevue, WA
98009-4469
800/528-8866,
206/454-0479
LIST PRICE: $89.95
REQUIREMENTS: 416K, hard disk or two 720K floppy drives, DOS 2.0 or later version (DOS 3.1 or later for LAN version)
TECHNICAL SUPPORT: one year, toll number, M–F 8–4
OTHER SUPPORT: additional year $45
Reader service no. 647

Professional File 2.01
Software Publishing Corp.
1901 Landings Dr.
P.O. Box 7210
Mountain View, CA
94039-7210
415/962-8910,
415/969-8466 (fax)
LIST PRICE: $299
REQUIREMENTS: 380K, hard disk, DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 7–4
OTHER SUPPORT: CompuServe forum (GO SPC)
Reader service no. 648

Q&A 3.0
Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014
800/441-7234,
800/626-8847 (California)
LIST PRICE: $349
REQUIREMENTS: 512K, two floppy drives (hard disk recommended), DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 6–5
OTHER SUPPORT: CompuServe forum (GO SYMANTEC), BBS
Reader service no. 649

Reflex 2.0
Borland Int'l
1800 Green Hills Rd.
P.O. Box 0001
Scotts Valley, CA
95066-0001
408/438-5300
LIST PRICE: $249.95
REQUIREMENTS: 512K, hard disk, graphics display, DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: CompuServe forum (GO BORAPP); BEST $2500 per Borland product (Borland Enhanced Support and Training Program provides a dedicated support person, remote communications link [Close-Up], newsletter, demo tapes)
Reader service no. 650

Xerox FormBase 1.0
Xerox Desktop Software
P.O. Box 660512
Dallas, TX 75266-0512
800/822-8221
LIST PRICE: $495
REQUIREMENTS: 640K, hard disk, graphics display, Windows 2.1 or later version (run-time included); mouse recommended
TECHNICAL SUPPORT: 60 days, toll number, M–F 8–6
OTHER SUPPORT: Priority Plan $100 a year (toll-free access, newsletter, discount on upgrades and training); Priority Plus Plan $1000 a year (covers 4 MIS users, bigger discounts on training and upgrades); CompuServe forum (GO FORMBASE); company BBS
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	XTree Pro Gold $129	Norton Commander 3.0 $149	Lotus Magellan $195	PC Tools $129
Application menu	✓	✓	Macro	✓
Auto view (browse)	✓		✓	
Find files	✓		✓	✓
Copy/move file contents	✓		✓	
View files	✓	✓	✓	✓
Open/associate application	✓	✓	✓	✓
Split windows	✓	✓		✓
Prune/graft	✓		✓	✓
Global file views	✓			
Collapse directories	✓			
Hide/unhide directories	✓			
Format disks	✓			✓
Toggle/merge tagged files	✓			
Reverse file specs	✓			
Copy original directory structure	✓		✓	
Date/time stamp files	✓			
Print directory tree	✓			✓
Change file attributes	✓	✓		✓
Rename a volume	✓			
Archive manager	✓		✓	
EGA/VGA support	✓	✓		✓
Mouse support	✓		✓	✓

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Paint Programs Pass the Screen Test

For editing bit-mapped images and producing simple on-screen slide shows, a low-cost paint program deserves star billing.

Our casting call discovers one bit player with real talent.

Jesse Berst and Scott Dunn

Ever since top-notch PC drawing programs began to appear, users have been tempted to give paint programs the brush-off. After all, paint packages can't offer the high-resolution output of *Micrografx Designer* or *Corel Draw*, and most can't match the grouping, layering, Bezier curves, and other sophisticated features of their vector-driven cousins.

But paint programs are ideal tools for desktop publishers who need to edit bit-mapped images before importing them into documents. If you need to clean up screen captures, retouch scanned input, or modify bit-mapped clip art, a good paint package is essential.

Each of the programs reviewed here—RIX SoftWorks' *Colorix 1.2*, Mouse Systems' *PC Paint 3.1*, Z-Soft's *PC Paintbrush IV*, and Spinnaker Software's *Splash*—gives you the tools to edit bit-mapped images or create your own masterpieces in up to 256 on-screen colors. But they also have their specialties: *PC Paint* and *Splash* let you produce simple desktop slide shows; *Colorix* adds to this capability a variety of dissolves and wipes. And while all four packages can handle relatively simple gray-scale images (digital reproductions of continuous-tone images such as photographs), only *PC Paintbrush IV* packs true gray-scale editing power in an inexpensive paint program.

Drawing Distinctions

It's easy to understand why draw programs get star treatment. Draw packages use mathematical formulas to generate shapes that can be easily resized, combined with other on-screen objects, and printed at the highest resolution your output device can produce. Paint programs, by contrast, create pictures by laying down patterns of pixels. The resolution of the image depends on its source: Send a 300-dpi paint image to a 1270-dpi typesetter, and you'll get back a 300-dpi printout.

Paint packages show their true colors when dealing with bit-mapped clip art and scanned images. When you scan an illustration, you get a pattern of pixels called a bit map. A draw program can resize the bit map, but to manipulate the image the program must convert the bit map to vectors by tracing it. Unfortunately, most auto-tracers can't interpret sophisticated details like shadow lines or solid areas, so they often turn complex images into simplistic line drawings.

MICK WIGGINS ILLUSTRATION CREATED WITH COREL DRAW

A paint program handles a bit-mapped image like putty. You can copy, flip, or rotate the image and edit it pixel by pixel—to delete unwanted specks from a scanned logo, for instance. Another plus: Paint packages are generally much cheaper and easier to use than draw programs.

Key Features

What should you look for in a paint package? Whether you're creating images, assembling desktop presentations, or editing bit maps, a paint program should be easy to use and intuitive. Three of the packages offer icon-based, point-and-click interfaces; only *Color-ix*, with its densely nested pop-up menus, forces you into an arduous apprenticeship.

And when you're stuck, all but *PC Paint* offer on-line help. However, none of the packages reviewed here supports *Windows*, which means you can't cut an image from your paint program and paste it directly into *PageMaker*, for example. (At press time, only Z-Soft offered a separate *Windows* version of its product.)

Obviously, each package should also provide basic image-creation tools—lines, boxes, circles, ellipses, an airbrush, an eraser—plus a variety of special effects. All the packages include the essentials, and each allows you to copy, cut and paste, flip, and rotate images; edit the color palette; and use any object as a brush. But with its sophisticated curve controls and a choice of 40 brush sizes, *PC Paintbrush*'s tool selection is clearly superior.

FEATURES EVALUATION

PC Paintbrush Has Distinct Edge in Gray Area

While no PC paint program offers the sophisticated gray-scale editing power of an electronic darkroom package, Z-Soft's PC Paintbrush IV comes close.

● Yes
○ No
◒ Deficient

	Colorix 1.2	PC Paint 3.1	PC Paintbrush IV	Splash
General				
List price	$199	$69.95	$99.95	$99.95
Number of files open	1	1	1	1
On-line help	●	○	●	●
Supports Windows	○	○	○	○
Uses expanded memory	○	○	○	○
Image creation tools				
Number of brush sizes	9	5	40	16
Number of brush shapes	6	6	7	16
Levels of gray	64	64	256	64
Line/curve/box/circle	●	●	●	●
Polygon	○	●	●	○
Freehand draw	●	●	●	●
Gray percentage spec'ing	○	○	●	○
Edit palette	●	●	●	●
Pattern fills	●	●	◒[1]	●
Graduated fills	●	●	●	●
Image manipulation/editing				
Levels of undo	1	1	2	1
Levels of zoom	2	2	8	1
Blur/sharpen	○	○	○	○
Brightness/contrast	◒[2]	○	●	○
Global inversion	●	○	●	○
Flip/resize image	●	●	●	●
Degrees of rotation	1	90	90	90
Skew/tilt image	●	○	●	○
Smooth (anti-alias)	●	○	●	○
Smudge/blend	●	○	●	○

	Colorix 1.2	PC Paint 3.1	PC Paintbrush IV	Splash
File import/export				
File import				
EPS	○	○	○	○
GEM	●	○	○	○
IMG	●	○	○	○
PCC	●	○	○	○
PCX	●	●	●	○
TARGA	●	○	○	○
TIFF	●	○	●	○
Windows Metafile	○	○	○	○
ASCII text	●	○	○	●
File export				
EPS	○	○	○	○
GEM	●	○	○	○
IMG	●	●	○	○
PCC	●	○	○	●
PCX	●	●	●	○
TARGA	●	○	○	○
TIFF	●	○	●	●
Windows Metafile	○	○	○	○
Output				
Color separations	○	○	○	○
Reverse/negative	●	●	●	○
PostScript	●	●	●	○
LaserJet	○	●	●	●
Color printer	●	●	●	◒[3]
Slide recorder	●	○	○	○

[1] Lacks preset patterns; user-created tiles do not do fills.
[2] Global but not local.
[3] Prints only black-and-white on color dot matrix printers.

Business presenters looking for quick-and-dirty desktop slide shows will find *Colorix* the best of the lot, if they can get past its ornery interface. This powerful program offers multiple dissolves, primitive animation features, and a choice of 30 bit-mapped fonts.

For pixel editing, you'll want to be able to load brush colors directly from the screen for easy retouching. Although all four packages can match the colors in an image being edited, only *PC Paint* and *Splash* make it a one-step operation. Flexible zoom controls and user-definable selection tools are also important. *PC Paintbrush*'s eight levels of zoom and unique scissors tool, which lets you cut around the border of unusual shapes, give it the edge.

At a minimum, each package should read and write PCX and TIFF files, especially if you plan to export the image to *Ventura Publisher* or *PageMaker*. While *Colorix* offers

generous file support, the rest are spotty—and *Splash* forces you to capture PCX and TIFF images before editing them.

Also be aware of hidden hardware costs. For example, *Colorix* and *Splash* require MCGA or VGA setups. And though all four programs can output to a color ink jet printer like the Hewlett-Packard PaintJet, none supports color PostScript, and only *Colorix 1.2* supports a film recorder to allow direct slide output.

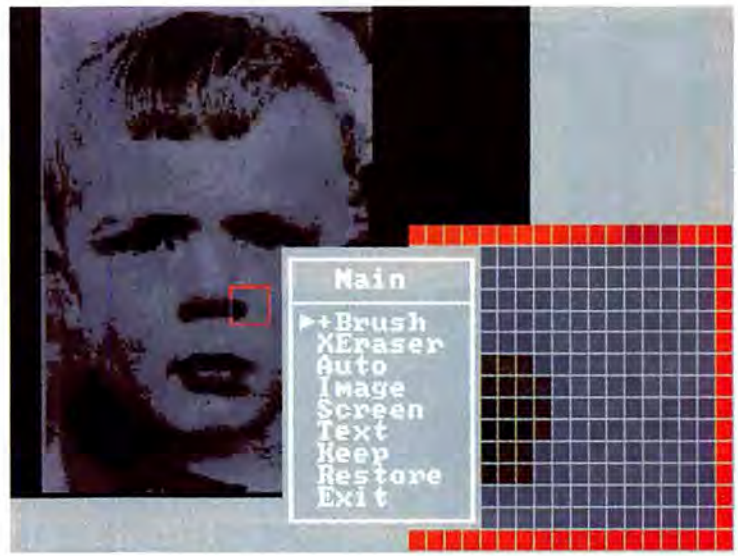
A Finer Shade of Gray

The ability to edit gray-scale images is especially important to desktop publishers who use scanned photos in their documents. But not all paint packages live up to gray expectations.

In simple line art, each pixel is either on (black) or off (white). In a gray-scale image, a pixel can also be some shade of gray in between. While all the packages treat gray shades as different colors, only *Paintbrush* offers a full 256 levels, allowing you to match shades more closely when working with images captured by the top 8-bit scanners.

And only *PC Paintbrush* and *Colorix* offer the smudge/blend and smoothing features essential for seamless retouching. *Colorix* lets you adjust brightness for the entire image, but only *Paintbrush* lets you adjust brightness and contrast for any selected area.

However, graphics pros who work extensively with scanned photos should invest in programs like Xerox Imaging Systems' *Gray F/X* or Astral Development's *Picture Publisher.* Those powerful image editors offer total image manipulation, from sharpen and blur functions to posterization—features not found in even the best paint packages.



Colorix's two-level zoom mode aids in editing bit maps, but navigating the program's pop-up menus can be a chore.

Colorix 1.2

A powerful image creation and editing package, the $199 *Colorix 1.2* is hampered by a convoluted interface and a high price. This VGA-only program is best suited to technically adept graphic artists who have time to explore its many facets.

Unlike its icon-driven peers, *Colorix* employs a series of cascading pop-up menus. Thus, a simple process like changing brush types means selecting an option from the main menu, picking another option to display the shadow menu, and clicking on the desired brush. Then you must return to the main menu and select color, width, shape, and other options. Since *Colorix* displays only one menu at a time, you're almost guaranteed to get lost along the way.

Colorix's powerful editing tools include anti-aliasing (smoothing), smudging, and air brushing, and it's the only program that can rotate images in 1-degree increments. You can adjust brightness globally, but unlike *PC Paintbrush, Colorix* doesn't let you alter selected portions of a picture, which limits its value as a gray-scale editor.

EXECUTIVE SUMMARY

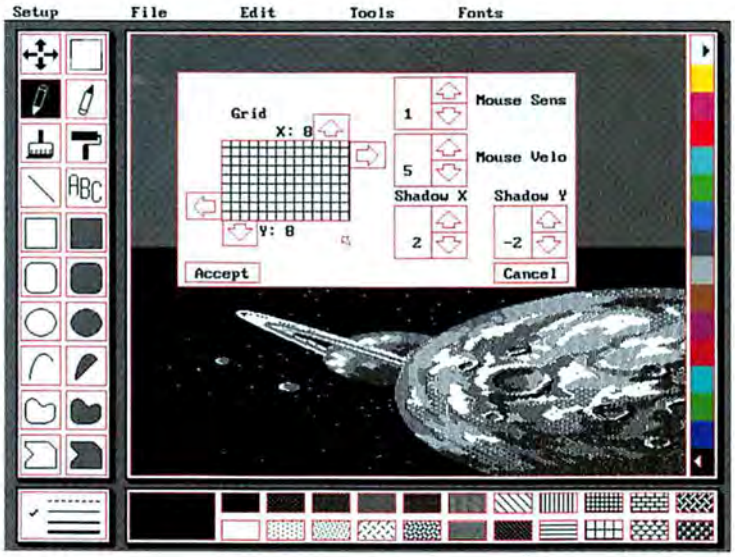
Colorix 1.2

Paint program

A technical overachiever, RIX SoftWorks' Colorix 1.2 packs a lot of power but is held back by its awkward interface and high price.

	POOR	FAIR	GOOD	EXCELLENT
Image creation				●
Image editing			●	
Import/output				●
Overall value			●	

Reader service no. 615



PC Paint's Control Box lets you fine-tune the speed and sensitivity of the mouse.

Colorix 1.2 wins points with its file support. It can import and export PCX, PCC, IMG, TARGA, and WordPerfect graphics, plus gray-scale and color TIFF files, which means you can use *Colorix* with almost all desktop publishing programs, scanners, and video digitizing boards. *Colorix* comes with a powerful screen capture function, and business presenters will appreciate its slide-show facility, which features a programmable automatic timer and 13 kinds of dissolves and wipes. Getting slide output, however, means shelling out $499 for a Polarix film recorder interface.

Despite the program's power, it's hard to recommend *Colorix 1.2* to anyone but graphics professionals with lots of time and patience. It's a capable piece of work but not an easy program to learn, let alone master.

PC Paint 3.1

At $69.95, Mouse Systems' *PC Paint 3.1* is the cheapest package in the roundup and supports the widest range of adapters (from CGA to enhanced VGA). However, the program's minimal editing tools and rudimentary slide show capability limit its appeal for desktop publishers or business presenters.

PC Paint offers the usual painting tools, plus open and filled polygons and rounded rectangles. Artists will appreciate the ability to adjust the cursor's speed and sensitivity—an option useful for altering individual pixels in zoom mode.

But if you're looking to do gray-scale editing, look elsewhere. Like *Splash*, *PC Paint 3.1* lacks contrast and brightness controls. It also falls short in smoothing and smudging tools, and it can't import TIFF files—a deadly omission.

Slide-show options are also limited. *PC Paint* comes with 18 fonts, but you can't skew, shade, or slant them. You can set an automatic timer, but you can't change the settings for each slide, and there are no fancy transitional effects.

PC Paint 3.1's easy-to-use image creation tools should appeal greatly to the faint of art. But desktop users who need sophisticated image editing capabilities should turn to *Colorix* or *PC Paintbrush IV.*

EXECUTIVE SUMMARY

PC Paint 3.1

Paint program

Ease of use and low cost distinguish Mouse Systems' *PC Paint 3.1*. However, the bargain price is offset by a lack of gray-scale editing tools and the inability to import TIFF files.

	POOR	FAIR	GOOD	EXCELLENT
Image creation				●
Image editing			●	
Import/output			●	
Overall value			●	

Reader service no. 616

PC Paintbrush IV

Z-Soft's *PC Paintbrush IV* packs a lot of gray-scale editing power into a $99 paint package. In fact, *Paintbrush IV* would easily rate a Best Buy except for one thing: It consumes so much memory, there's only about 100K left over for loading a picture—not enough for large or complex gray-scale images. (Z-Soft's *PC Paintbrush IV Plus*, which offers support for expanded memory, was released too late to include in this review.) And it offers virtually no presentation capabilities. Still, *PC Paintbrush IV* is easily

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the best of the bunch for creating and editing bit maps.

PC Paintbrush's icon-rich interface is the standard by which other paint packages should be judged, offering detailed information like cursor coordinates, the amount of available RAM, and context-sensitive help. Unlike the other programs, *Paintbrush* also lets you customize your work space, choosing which menus, tools, and palettes to display.

Z-Soft offers plenty of image creation tools. Artists will drool over *Paintbrush*'s curve controls, which provide four control points (twice as many as *Colorix* does). And Z-Soft's flexible zoom mode makes pixel editing a breeze, with eight levels of magnification and the ability to pan around a picture—truly a zoom with a view.

EXECUTIVE SUMMARY

PC Paintbrush IV

Paint program

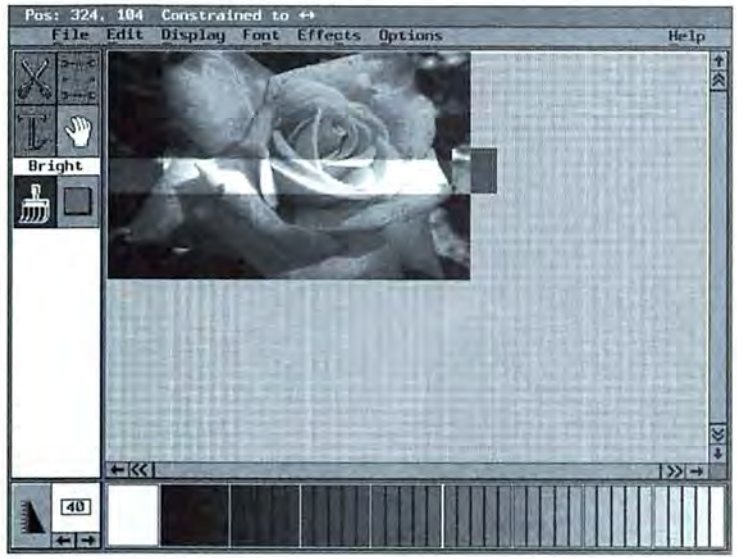
Z-Soft's *PC Paintbrush IV* combines excellent paint tools and an industry-standard interface with a plentiful selection of gray-scale editing functions. Despite limits on image size, it's an excellent value.

	POOR	FAIR	GOOD	EXCELLENT
Image creation				●
Image editing				●
Import/output			●	
Overall value				●

Reader service no. 617

More important are *Paintbrush*'s surprisingly powerful gray-scale tools. To alter brightness for part of an image, simply select the brightness option from a pulldown menu, set the desired intensity, and rub your brush over the area—a procedure similar to the burning and dodging techniques used in darkrooms. The blend tool lets you soften harsh edges in a selected area by averaging the colors or shades, making it invaluable for retouching scanned photos.

PC Paintbrush is the only package reviewed that could not load large images. Nonetheless, it's a powerful program at an appealing price. But desktop publishers who work with large TIFF files should wait for the $199 *PC Paintbrush IV Plus*.



PC Paintbrush IV lets you adjust brightness for selected areas of gray-scale images but limits the size of the pictures you can edit.

Splash

Splash is a visually stunning program that should appeal to managers who want to create simple desktop slide shows on a VGA setup. But without any real gray-scale editing tools, the $99.95 *Splash* is not for serious desktop publishers.

Splash's strength is ease of use. To flip an image horizontally, for example, simply click

EXECUTIVE SUMMARY

Splash

Paint program

A friendly program that's fine for on-screen video shows, Spinnaker Software's *Splash* comes up short in support for essential file formats and gray-scale editing tools.

	POOR	FAIR	GOOD	EXCELLENT
Image creation				●
Image editing			●	
Import/output			●	
Overall value			●	

Reader service no. 618

This video image was imported into Splash via a digitizing board; the monkey's head (left) was duplicated and edited using the program's Stamp tool, producing the mutant species on the right.

on the "reverse" icon in the toolbox. Click on another icon to flip the image vertically, another to rotate it 90 degrees, and so on. *Splash*'s unique Brush Mirrors tool automatically reflects brush strokes in two or four locations, instantly producing symmetrical patterns—a useful feature for designing logos.

However, *Splash* lacks such essential image creation features as a convenient tool for generating curved lines, and its zoom function is severely limited. *Splash* also lacks basic gray-scale editing functions like smudge, blend, and smooth. The program includes no contrast controls, nor can it alter brightness for selected portions of an image.

And while *Splash* can save images in TIFF and PCC formats, importing files is another matter. You have only two real choices: using a supplied screen capture utility, or digitizing video images. The latter method requires ComputerEyes, a $400 digitizing board from Digital Vision.

Presentation-minded executives will appreciate *Splash*'s slide-show utility, with its ability to fade automatically from picture to picture. But desktop publishers won't be impressed by the program's minimal editing tools and limited import options.

The Last Pixel Show

While *Splash* and *PC Paint 3.1* may appeal to slide-show presenters, the programs would be miscast as power tools for desktop publishers. *Colorix 1.2* has a lot of raw power, excellent presentation capabilities, and adequate gray-scale editing tools—if you can cope with its ungainly interface.

But as a combination image creator/gray-scale editor, *PC Paintbrush IV* clearly beats the paints off the other contenders. And Z-Soft's high-budget sequel, *PC Paintbrush IV Plus*, seems certain to garner raves—even from desktop publishers with the most discerning palettes. ●

Jesse Berst is coauthor of Inside Xerox Ventura Publisher *and other computer books. Scott Dunn is a Seattle-based technical editor and desktop publisher.*

For more information about all products in this article, circle reader service no. 902.

WHERE TO BUY

Colorix 1.2
RIX SoftWorks, Inc.
18552 MacArthur Blvd.
#200
Irvine, CA 92715
800/345-9059,
800/233-5983 California, 714/476-8266
LIST PRICE: $199
REQUIREMENTS: 640K, VGA adapter, DOS 2.0 or later version
TECHNICAL SUPPORT: 90 days, toll number, M–F 8–5
OTHER SUPPORT: extended support, toll-free number $50 per year; BBS on BIX
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PC Paint 3.1
Mouse Systems Corp.
47505 Seabridge Dr.
Fremont, CA 94538
415/656-1117
LIST PRICE: $69.95
REQUIREMENTS: 384K; CGA, Hercules, EGA, VGA, or Super VGA adapter; DOS 2.1 or later version
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: company BBS
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PC Paintbrush IV
Z-Soft Corp.
450 Franklin Rd. #100
Marietta, GA 30067
404/428-0008
LIST PRICE: $99.95
REQUIREMENTS: 640K; CGA, Hercules, EGA, MCGA, or VGA adapter; DOS 3.0 or later version; hard disk recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 10–6
OTHER SUPPORT: company BBS
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Splash
Spinnaker Software
1 Kendall Sq.
Cambridge, MA 02139
617/494-1220
LIST PRICE: $99.95
REQUIREMENTS: 640K; analog RGB monitor with MCGA or VGA adapter; DOS 2.1 or later version
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Corel Draw! 1.01 (Corel Systems Corp.)	82	2.4/1.0	89	86	84	83	82	83	78	82	79	83	73	81
Arts & Letters Graphics Editor 1.02 (Computer Support Corp.)	80	3.0/1.0	87	80	84	79	78	79	76	82	74	78	90	76
Micrografx Designer 2.0 (Micrografx Inc.)	78	6.3/1.0	84	80	80	77	73	78	78	81	74	74	78	77
Kinetic Art 1.20G (Kinetic Presentations Inc.)	76	11.6/2.0	92	83	80	67	76	64	58	76	87	83	63	78
Artline 1.0 (Digital Research Inc.)	72	3.7/1.0	87	77	81	70	71	69	61	78	66	74	57	67
Adobe Illustrator 88 1.8 (Adobe Systems Inc.)	71	5.6/2.0	83	68	78	73	61	76	70	74	70	62	63	67

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PC WEEK CORPORATE TOP RATED SATISFACTION POLL 1989

REPORT CARD — INFO WORLD

PC Illustration Software

	(InfoWorld weighting)	Adobe Illustrator Windows Version 1.0	Arts & Letters Graphic Editor 1.02	Corel Draw 1.01	GEM Artline 1.0	Micrografx Designer 2.0
List price		$695	$695	$495*	$495	$695
Performance						
Speed	(125)	Poor	Satisfactory	Very Good	Very Good	Very Good
Input/output	(125)	Good	Good	Very Good	Good	Excellent
Drawing/editing	(200)	Good	Good	Very Good	Satisfactory	Very Good
Documentation	(100)	Excellent	Good	Excellent	Satisfactory	Very Good
Ease of learning	(100)	Very Good	Good	Excellent	Good	Very Good
Ease of use	(100)	Satisfactory	Satisfactory	Very Good	Satisfactory	Good
Error handling	(75)	Good	Satisfactory	Good	Satisfactory	Good
Support						
Support policies	(50)	Satisfactory	Satisfactory	Good	Poor	Poor
Technical support	(50)	Good	Very Good	Very Good	Good	Good
Value	(75)	Poor	Satisfactory	Excellent	Good	Very Good
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Highest Ranking Score!

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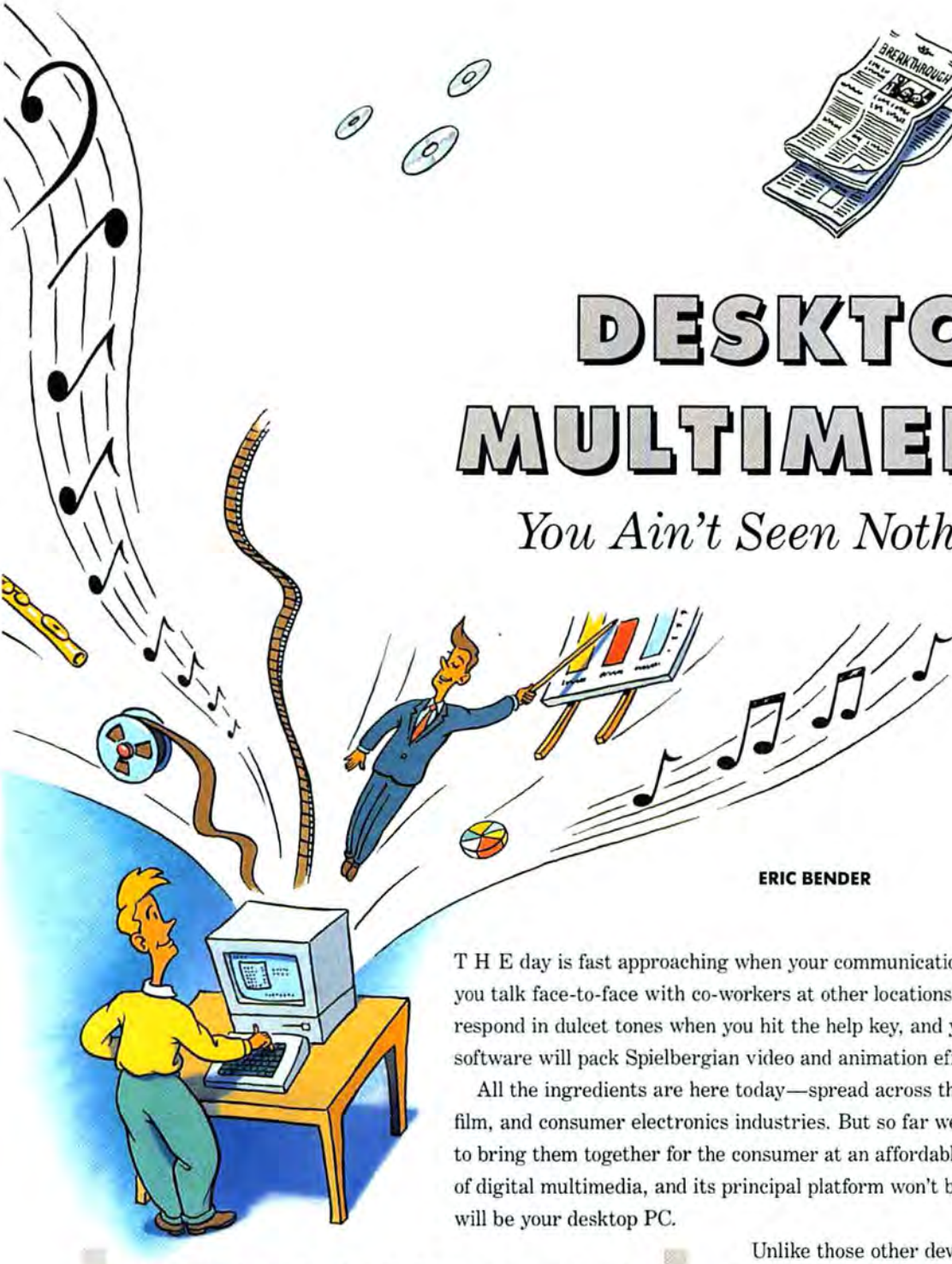


DESKTOP MULTIMEDIA:

You Ain't Seen Nothing Yet

ERIC BENDER

THE day is fast approaching when your communications software will let you talk face-to-face with co-workers at other locations, your spreadsheet will respond in dulcet tones when you hit the help key, and your children's game software will pack Spielbergian video and animation effects.

All the ingredients are here today—spread across the computer, television, film, and consumer electronics industries. But so far we've lacked the means to bring them together for the consumer at an affordable price. That's the goal of digital multimedia, and its principal platform won't be your TV or VCR—it will be your desktop PC.

Get ready to be dazzled by a new mix of hardware. Full-motion interactive video and superb CD sound will add extra layers of depth—and entertainment—to all sorts of desktop presentations.

ROBERT KOPECKY

Unlike those other devices, the PC provides the framework to weave together and control all the media threads, giving application developers handy new tools to manipulate all this great stuff. Developers, in turn, will provide more flexible and individualized ways for you to harness the technology both to get your work done and to enhance your leisure time. Interactive multimedia promises dramatic changes in business computing and may just be the catalyst that turns PCs into genuine home appliances.

Before any of this happens, suppliers must solve formidable technical, standardization, and marketing problems, a challenge that is likely to take years. But we can glimpse some consequences today.

Lotus's MultiMedia release 3 demo employs screen shots, audio, graphics, and video stills to demonstrate 1-2-3 release 3. In coming years, application developers will incorporate those features plus motion video into tutorials and on-line help.

tures of existing PC applications. A Lotus prototype demonstration for *1-2-3* uses audio and still-video images stored on a CD ROM disk to provide interactive training scenarios.

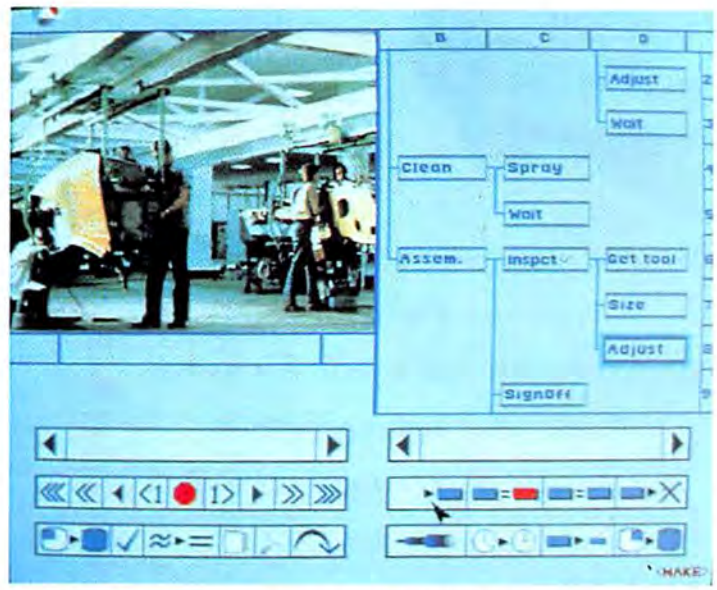
Other multimedia applications go a step further. VideoLogic in Cambridge, Massachusetts, offers a $2495 board that can digitize any standard TV signal and place it wherever and however you want on a standard VGA monitor while other PC software runs. One VideoLogic prospect, a financial services executive, was facing a major upgrade in order to deliver a hodgepodge of information to hundreds of securities traders. He was preparing to buy an assortment of incompatible hardware—workstations, TV monitors, and custom data terminals, all requiring their own expensive communications installations. "Instead, he found he could run a Cable Network News feed, market data, and *Excel* on each workstation," says Kirke Curtis, vice president for

CONCRETE APPLICATION BENEFITS

Interactive multimedia isn't a product; it's a broad march of allied technologies that spans the range of computer tasks. "I can't see any area of the computer industry that won't be touched by desktop video and multimedia," remarks Joseph Haaf, director of sales and marketing for Truevision in Indianapolis.

During the past decade, interactive videodisk systems have assumed an important role in corporate training. Full-motion video shows employees how to accomplish tasks. Audio can add important information—in a car-repair application, "you can hear the difference between a well-tuned engine and one that's off kilter," says Rob Glaser, head of Microsoft's multimedia systems group. These systems also can absorb and structure mountains of textual and graphic material, and they can deliver training to multiple employees at the work site. But the bottom line is that interactivity boosts the user's retention of the material.

Given these pluses, multimedia techniques are a natural for spicing up the tutorial and help fea-



Andersen Consulting's prototypes exploit the Intel/IBM Digital Video Interactive technology to aid training efforts and assist in manufacturing. Here, a video camera films production and instantly feeds it into a package that helps consultants analyze procedures.

sales and marketing. "He suddenly realized we could save him $100 million."

Another application, Wang's *Freestyle* communications package, gives an elegant example of the advantages of multimedia "compound documents" within a networked office. *Freestyle* works with an "electronic pencil" and corresponding tablet, plus a telephone handset. It lets you turn any information on your PC screen (such as memos, worksheets, or images of scanned-in forms) into electronic "pages." You can annotate the pages with written or voice comments and instantly mail them to other workers. The setup brings impressive speed (and clarity) to group tasks like assembling budgets, and the intuitive interface makes *Freestyle* quick and simple to use. In time, Wang and other vendors will extend such network applications with worker-to-worker video communications.

The Intel/IBM Digital Video Interactive (DVI) technology, which provides an all-digital environment replete with full-motion video, is being incorporated into a broad range of training applications. In this role, it provides educational benefits much like those of traditional videodisk systems, but its applications will be easier to create and will offer added attractions like animated graphics. DVI technology also allows new twists such as Videodisc Publishing's *Design and Decorate*, a point-of-sale package that lets consumers design a living room. You can specify the room's size and shape; select furniture (with a choice of fabrics), paint or other wall covering, and accessories; and

Developers Wait for PC HyperCard

"*HyperCard* raised people's consciousness about multimedia authoring," remarks David Backer, engineering vice president at Fluent Machines in Framingham, Massachusetts. The authoring package that ships with every Macintosh has limits—like monochrome graphics with less-than-full-screen action. But it has encouraged hordes of users to begin dabbling in multimedia. Other Mac packages—particularly *MacroMind Director* from MacroMind in San Francisco—bring impressive ease and flexibility to multimedia presentations.

MacroMind Director lets Macintosh users build multimedia presentations. The top window lets you create animated charts and other effects. In the bottom window, you assemble productions by stringing components together.

The PC lacks a *HyperCard* equivalent. It has attracted dozens of authoring packages, but they generally sacrifice ease of use for power. For those who want to create DVI packages, for instance, the first offering is *Authology: MultiMedia*. Created by CEIT Systems in San Jose, California, the software is sold by Intel for $4500. It provides a windowed environment to create business presentations, on-demand training, and point-of-sale applications, and "developers don't have to be C programmers or computer hotshots," Intel's Bob Brannon maintains. But the package is intimidating compared with *MacroMind*.

This spring should bring the debut of *Windows 3* and OS/2 packages that could break this logjam, led by *ToolBook* from Asymetrix in Bellevue, Washington. But other programming-for-nonprogrammer entries, like *Plus* from Spinnaker Software in Cambridge, Massachusetts, only creep toward full-blown multimedia. Given the lack of standard ways to manipulate video and audio, "it's just too hard for the moment," says Spinnaker president C. David Seuss.

Even when capable packages arrive, multimedia development poses other questions. If you want to incorporate video, where will it come from? You can shoot your own material, but while cameras and production equipment have grown dramatically cheaper and more accessible, you still need expertise. If you'd like to incorporate existing material, you run into major problems in licensing the material from the copyright owners. (All this helps to explain the tremendous push toward computer-generated animation.) Finally, writing interactive software is an immature but intricate art that demands experience.

—*E. B.*

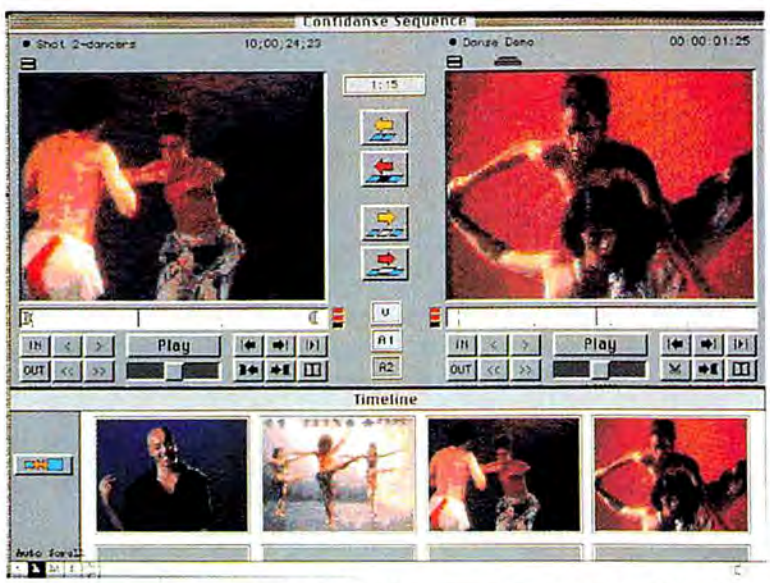
then view the result from various angles.

In desktop video production, Avid Technology in Burlington, Massachusetts, has built a dazzling system for broadcast editors. Avid's friendly Macintosh-based system digitizes analog tape, stores the data on large banks of hard drives, and allows editors to manipulate clips and assemble production tapes quickly. The system saves editors a startling amount of time and the company a great deal of money in production costs.

Packages that combine graphical information with CD music already rouse consumer lust. A case in point: Warner New Media in Burbank, California, offers a $66 Macintosh package of Mozart's *Magic Flute*. You not only hear a first-class performance of the opera, you can follow a guided tour through detailed background information.

Even a deeply serious magazine like *PC World* should mention multimedia's entertainment potential. For a program that runs even on a vanilla PC, plunk down $49.95 for Activision's *Manhole*. The interactive journey doesn't supply motion video but comes with (somewhat garbled) digitized speech and more than 600 cleverly connected fantasy scenes for children to explore.

VideoLogic's Digital Video Architecture products let you display and manipulate full-motion video on a standard VGA monitor. One option uses Windows or OS/2 to run video alongside other applications.



A Macintosh-based system, the Avid/1 Media Composer allows production editors to work interactively with taped material and see the results instantly.

IBM SEARCHES FOR FOCUS

Every major personal computer supplier has begun touting multimedia, but the lead players see the prospects quite differently.

IBM, whose customers and interests are almost endlessly diverse, is slowly pulling together a coherent strategy. "There are many people at IBM who each think they're responsible for multimedia," comments one outsider. However, William Spaller, planning director for Entry Systems Division, recently was dubbed desktop multimedia czar, and part of his job is to bring today's incompatible offerings into line. "The notion is to take all these technologies and integrate them in the PS/2 line," Spaller says, "and maybe they won't be add-in cards anymore."

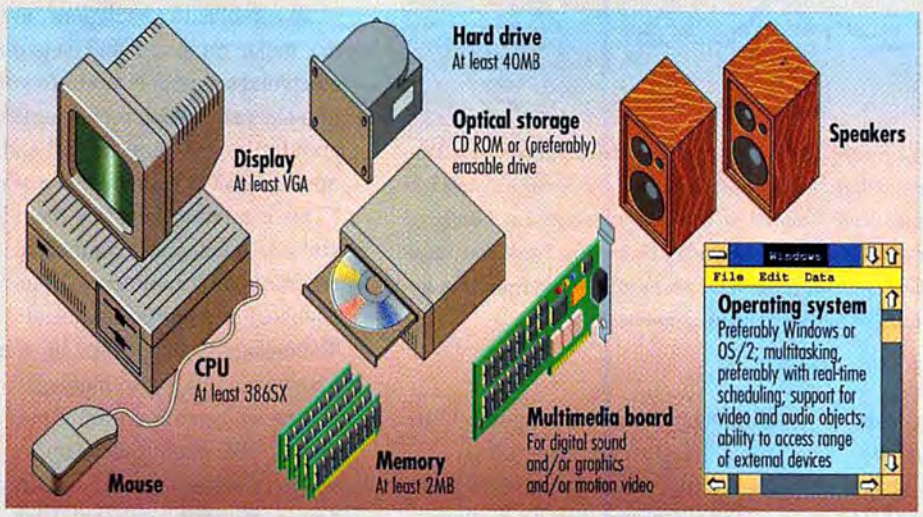
IBM's two major pushes: the joint project with Intel for all-digital DVI, and an upcoming home system (which IBM executives won't discuss) priced under $3000.

The powerful DVI technology

doesn't come cheap. The first DVI delivery boards will appear this quarter for around $3000 by themselves. Costs will drop steadily, however, and early in 1991 next-generation silicon will bring "a big breakthrough," says Bob Brannon, head of Intel's Princeton Operation in Princeton, New Jersey. A board could then conceivably retail for $1000 or less. And as processor power climbs and image manipulation improves, "the perceived picture quality will be much better," says Brannon. He sees DVI riding one of Intel's formidable ten-year price/performance curves.

While DVI and earlier offerings target business primarily, by mid-1991 IBM is expected to launch 386SX-based interactive home machines. With built-in CD ROM and impressive audio capabilities, the systems should arrive with jazzy consumer software. And Microsoft, IBM's ally on the project, sounds gung ho about its

The High Price of Multimedia



MATT NIELSEN

IBM and other suppliers are quietly working on multimedia PCs for the home; the first systems are expected to bundle in a CD ROM player and high-quality audio support. If you assembled a similar delivery system today, the bare-bones hardware cost would exceed $4000; adding DVI full-motion video would boost that price by at least $2000.

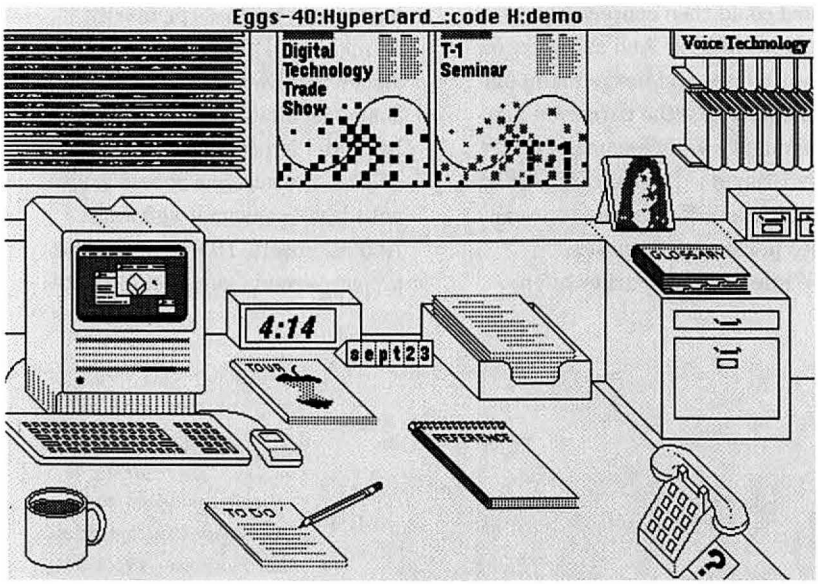
Any reasonably powerful PC can present graphics, animation, and minimal audio. But full-motion video requires not just a VCR or a videodisk player but also a second monitor, because the PC can't accept analog video without an expensive converter board. What you really want instead is an all-digital system that keeps everything fully controllable and ready for display on a single screen.

The first step is typically a CD ROM drive, and as manufacturing costs drop to a few hundred dollars, PC vendors are starting to build in CD ROM drives. Such systems can play regular CD audio but can't interleave the sound with other operations; the required hardware should arrive early this year. Next year should see widespread moves toward digital signal processors like the one in the Next machine (whose Lip Service feature lets you record your voice, edit the recording, and attach it to electronic mail).

But the big jump in hardware comes with full-motion digital video, a truly intimidating technical challenge requiring high resolution, a palette of millions of colors, and the ability to throw images onto the screen 30 times a second. None of that presents any problem for a VGA monitor, but the background digital video/graphics processing is a different story. When you put in enough color information for realistic images, you're dealing with multiple megabytes of data each second. The goal of compressing and decompressing all that data for storage raises the ante further. To shoehorn an hour of full-motion video onto a CD ROM disk using existing CD ROM controllers, DVI compresses images to less than 1 percent of their original size.

And now you want to do that yourself, on your desk? DVI and other desktop-media tools will give you the power, but the quality will lag for a few years. Furthermore, while CD ROM drives are suitable vehicles for publishing applications in volume, everyone really wants erasable-optical drives. Those will cost $3000 and up for years to come, and today's 1GB storage level won't cut it.

For everything to play together smoothly, you also need a multitasking graphical environment like *Windows* or OS/2, with hooks added to synchronize motion video and audio for multimedia. Finally you'll want friendly, capable authoring software that isn't restricted to dedicated crews of programmers and video jocks. —*E. B.*



Basics of Digital Voice Technology, a self-paced training package developed by Codex Educational Services in collaboration with Butler, Raila & Company, is a prime example of a highly interactive HyperCard application. Everything in this office is active and designed to help you progress through the course—click on the Digital Technology Trade Show poster, and you go to booths in an exhibit hall; click on the phone, and hear advice from a "mentor" tailored to your current assignment.

potential. "There's a prospect for multimedia really opening up the home market," Microsoft's Glaser says. But, he adds, "you'll need a system that puts everything together, and if it's harder to program than a VCR, it won't get off the ground."

Big Blue is a bit more cautious about mass acceptance. "The home market will not necessarily mushroom in the next five years," says Ronald Palmich, director of multimedia solutions for IBM's U.S. marketing and services group. "We can reach the low price points, but can we produce the number of applications that will get the consumer to pursue that opportunity?"

DESKTOP MEDIA MAKERS

Apple's advertising cleverly promotes the concept of desktop media as a new category, and Apple has captured the hearts and minds of many multimedia pioneers. "Apple is doing an excellent job of marketing," notes Intel's Brannon.

Apple's initial targets are businesses rather than consumers. And unlike both IBM and Microsoft, Apple emphasizes the here and now, pushing *HyperCard* and other accessible authoring packages that can exploit a well-defined delivery environment. Not only can Mac developers assume high-quality graphics and reasonable-quality audio; by the time you read this, Apple should have finished the first specification for Media Control Architecture, "a framework for all applications to access information from videodisk players, CD audio players, videotape recorders, and other media devices."

Still, Macs are no better than PCs at presenting motion video, and so the hottest *HyperCard* multimedia packages generally lack video. Apple lacks a DVI equivalent due to its reluctance to provide anything less than complete tool kits on the Mac. "We don't want to provide just the player function; we want the maker functions," explains Tyler Peppel, manager of multimedia products. "But with video today, it's as if you had books but no pencil or paper." Apple won't move to digital video until the paper (cheap erasable-optical storage) appears; that leaves DVI a window of opportunity.

To complicate predictions, every major computer and consumer electronics supplier wants to get into the act. Which technologies, standards, and vendors will end up winners? It's anybody's guess. "This is a transformation from a static to a cinematic computing environment," comments Mike Liebhold of Apple's Advanced Technology Group. "How do you know what's going to happen?"

Are we getting ahead of user needs? "We need to develop a whole new spectrum of user interface paradigms," remarks Liebhold. Andrew Lippmann of the Massachusetts Institute of Technology Media Laboratory adds, "We don't know how to interact with things that are moving. It's time to see if it's really the technology or our imagination that has held us back."

No new technology brings unalloyed joy—think of the friction caused by fax machines and voice mail. But multimedia's components are highly appealing; as Truevision's Haaf remarks, "video and audio are things with which we entertain ourselves." And like desktop publishing, desktop multimedia will spread far beyond its original entry points. ●

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

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PRINTER SHARING MADE SIMPLE

HIGH-POWERED, HIGH-PRICED PRINTERS ARE MADE FOR SHARING—BUT THAT DOESN'T MEAN YOU HAVE TO INSTALL A NETWORK. WITH THESE INEXPENSIVE ALTERNATIVES, ANY OFFICE CAN FIND A SHORTCUT TO HARD-COPY HEAVEN.

MATT LAKE AND SUSAN LUSTY

A printer that produces crisp graphics and a fistful of fonts isn't the cure for all hard-copy headaches. Everyone in the office wants to use it, and nobody wants to wait in line at a dedicated print station. The best way to share a printer is to hook it up to everyone's PC either in a star configuration with the printer at the center or in a chain connecting the printer and the PCs. But you don't necessarily have to install a network. In fact, at a minimum of around $200 per PC, a LAN may not be a cost-effective solution unless you need file sharing and electronic mail. This guide examines other printer-sharing options—multiport boards for the printer and stand-alone connectivity boxes—costing $150 or less per PC.

These boards typically slip into the optional I/O slot on printers like the LaserJet Series II and usually accept data through standard telephone cables and connectors. The stand-alone sharing devices listed here either are buffered—carrying their own memory for dealing with

ILLUSTRATIONS BY MARC ROSENTHAL

simultaneous print jobs—or come with spooling software. Some, like Black Box's Multiport Spoolers, are boxes with LED indicators and switches on the front panel. Others, including Fifth Generation's Logical Connection, look a little like power strips with I/O ports and can be stored out of sight.

Beyond basic configuration issues and ease of use, buyers should consider the potential pitfalls of sharing a printer. Printer sharing should take place in the background, but graphics or heavy font use will slow printing to a crawl and can hold up PCs in the print queue. That's when a printer-sharing device's print buffers, print-spooling program, and data transfer rate are important.

MEMORY, SPEED, AND PORTS

Buffer memory in a sharing device takes print-job processing away from your PC, freeing it sooner. Heavy print traffic and graphics printing call for large buffers. The speed at which data leaves the PC, measured in bits per second (bps), depends on ports, cabling, and hardware—PCs, printers, and sharing devices.

Parallel ports deliver data more quickly than serial ports; 576,000 bps or higher isn't unusual for parallel transfer, but data integrity degrades at distances beyond 20 feet. Although signal boosters can improve performance, longer distances demand serial transfer, using either regular cabling or telephone wire. The sharing device's transfer rates are also important, and the printer's limitations have the last word: If your printer can't handle more than 13,000 bps, nothing can make it print any faster.

Some sharing devices free up your PC by storing outgoing print jobs with spooling software such as *PrintCache*—formerly called *LaserTorq*—which ships with the LaserTools' Local Union board. Typically, such programs return PC control to users much more quickly.

CONTROL AND MONITORING

Once the print command is issued, monitoring and controlling the process is important. Some devices use memory-resident programs to control print queues; others have LED monitors and switches on the front panel. Some users prefer the convenience of software control, while others find that TSRs conflict with their applications and prefer manu-

(continues)

PRINTER BOARDS: THE SLOT-IN SOLUTION TO PRINTER SHARING

II = LaserJet Series II
IID = LaserJet Series IID
IIP = LaserJet Series IIP
LBP-8II = Canon LBP-8II
LBP-8III = Canon LBP-8III
200SII = Canon 200SII
HL8e = Brother HL8e

S = serial
P = parallel
FP = uses front-panel controls/indicators
SW = uses TSR software
Y = yes
N = no

COMPANY / Product	Printers supported	CONFIGURATION: Numbers of PC ports	Type of ports	Buffering: standard (maximum)	Data transfer rate (bps)	INDICATORS AND CONTROLS: Time-out range (seconds)	Delete print job	Set priority job	CONSUMER INFORMATION: FCC rating	List price with standard buffer	Reader service no.
ASP COMPUTER PRODUCTS											
SimpLAN ServerJet	II, IID	6	6S	256K (1MB)	1200–115,200	10–300	N	N	N	$495	670
		7	6S, 1P	256K (1MB)	1200–115,200	10–300	N	N	N	$645	670
		10	10S	256K (1MB)	1200–115,200	10–300	N	N	N	$795	670
ServerJet 622	II, IID	6[1]	6S, 1P	256K (1MB)	1200–115,200	10–300	N	N	N	$695	673
BAY TECHNICAL ASSOCIATES											
LaserShare 4C	II, IID, LBP-8II/III, HL8e	4	4S	256K	19,200	1–200	SW	N	A	$495	674
BELKIN COMPONENTS											
LaserLink F1Y205	II, IID	5	4S, 1P	256K (1.2MB)	1200–57,600	10–255	N	N	A	$495	675
LaserLink F1Y208	II, IID	8	8S	256K (1.2MB)	1200–57,600	10–255	N	N	A	$595	676
BLACK BOX											
Laser Spooler Board	II	3	3S	256K	9600	20–200	SW	N	A	$595	677
DIGITAL PRODUCTS											
LaserBoard	II, IID	4	4S	250K	9600	1–15,000	SW	N	A	$495	678
ImageMaker	II, IID	4	4S	250K	9600	1–15,000	SW	N	A	$695	679
EXTENDED SYSTEMS											
ShareSpool 2040A	IIP	4	4S	64K	9600–19,200	1–240	N	SW	A	$395	680
ShareSpool 2041B	II, IID	4	4S	256K (1MB)	9600–19,200	1–240	N	SW	A	$495	681
ShareSpool 2043A	LBP-8II, 200SII	4	4S	256K	9600–19,200	1–240	N	SW	A	$495	682
ShareSpool 2045A	LBP-8III	4	4S	256K	9600–19,200	1–240	N	SW	A	$495	683
GILTRONIX											
EZQ Laser	II	5	4S, 1P	256K (1.25MB)	1200–57,600	10–100	N	N	A	$495	684
LASER CONNECTION											
JetConnect/PC	II, IID, LBP-8II	4	3S, 1P	256K	19,200	1–999	N	N	A	$545	685
LASERTOOLS											
Local Union 61i	II	6	6S	spooled	9600–115,000	10–300	SW	SW	A	$995	686
Local Union 62i	II	6	7S (1 output)	spooled	9600–115,000	10–300	SW	SW	A	$1295	687
Local Union 101i	II	10	10S	spooled	9600–115,000	10–300	SW	SW	A	$1495	688
ROSE ELECTRONICS											
Laser Share	II, IID, LBP-8II	5	5[2]	256K (1.25MB)	1200–115,200	1–255	FP	N	A	$495	689
	II, IID, LBP-8II	10	10[2]	256K (1.25MB)	1200–115,200	1–255	FP	N	A	$795	689

[1] Plus an additional parallel output port for daisy chaining to another printer.
[2] Manufacturer supplies any combination of serial and parallel ports.

For more information about all products in this table, circle reader service no. 907.

al controls. Controlling time-outs—the period of time the device waits before abandoning a print job—can be especially important with graphics printing, where output can pause while the application generates the image.

THE UPGRADE PATH

You can upgrade sharing devices in two ways: by increasing the number of users, and by increasing the amount of buffering. Adding extra users often takes the form of *daisy chaining*—hooking an extra sharing device to your original one. You can increase buffers by slotting in extra memory, but each device has an upper memory limit worth noting when you buy.

BONUS POINTS

The most important piece of connectivity hardware is cabling—and this can add hundreds of dollars to the invoice. Some companies, such as IMC/Data Manager, include cabling in the price of their units, but don't assume that every manufacturer does.

You should also bear in mind the FCC tests for the radio frequency interference emitted by printer-sharing devices. A unit rated A is acceptable for business use, but a unit rated B—one that emits fewer radio frequencies—is better. ●

Matt Lake and Susan Lusty are editorial assistants for PC World.

SHARING WITHOUT BUFFERS: SPOOLING SPEEDS THE PRINTING PROCESS

S = serial
P = parallel
FP = uses front panel controls/indicators
SW = uses TSR software

Y = yes
N = no

COMPANY / Product	CONFIGURATION: PC-to-printer ratio	Type of ports	Supports daisy chaining	Spooling software	INDICATORS AND CONTROLS: Job-in-progress indicator	Set priority jobs	Delete print job	Time-out range (seconds)	CONSUMER INFORMATION: FCC rating	Software cost	List price	Reader service no.
BRAVO COMMUNICATIONS												
CPS/1021	2:1	3P	Y	PrintQ Share[1]	SW, FP	SW	SW	2+	B	$299[2]	$199	691
CPS/1042	4:2	6P	Y	PrintQ Share[1]	SW, FP	SW	SW	2+	B	$299[2]	$399	692
CPS/1082	8:2	10P	Y	PrintQ Share[1]	SW, FP	SW	SW	2+	B	$299[2]	$599	693
DRESSELHAUS COMPUTER PRODUCTS												
SmartPrint	2:1	3P	Y	Dspool	SW	SW	SW	15–60	A	n/a	$129	694
	4:1	5[3]	Y	Dspool	SW	SW	SW	15–60	A	n/a	$199	694
	6:1	7[3]	Y	Dspool	SW	SW	SW	15–60	A	n/a	$229	694
IMC/DATA MANAGER												
Auto-T Series	3:1	4[3]	Y	Duet	SW	SW	SW	1+	A	$59.95	$149	697
	6:1	7[3]	Y	Duet	SW	SW	SW	1+	A	$59.95	$195	697
LASERTOOLS												
Local Union	4:1	5P	Y	PrintCache	SW	SW	SW	0.7–80	A	n/a	$595	699
	8:1	9P	Y	PrintCache	SW	SW	SW	0.7–80	A	n/a	$795	699

[1]Licensed from Software Directions.
[2]Includes license for up to 8 users.
[3]Manufacturer supplies ports in different serial/parallel configurations.

For more information about all products in this table, circle reader service no. 908.

WHERE TO BUY

ASP Computer Products
1026 W. Maude Ave.
#305
Sunnyvale, CA 94086
408/746-2965,
408/746-2803 (fax)

Bay Technical Associates
200 N. Second St.
P.O. Box 387
Bay St. Louis, MS 39520
800/523-2702,
601/467-8231,
601/467-4551 (fax)

Belkin Components
14550 S. Main St.
Gardena, CA 90248
800/223-5546,
213/515-7585,
213/329-3236 (fax)

Black Box Corp.
Mayview Rd. at Park Dr.
P.O. Box 12800
Pittsburgh, PA 15241
412/746-5500,
412/746-0746 (fax)

Bravo Communications
1310 Tully Rd. #107
San Jose, CA 95122
408/297-8700,
408/297-8701 (fax)

Buffalo Products
2805 19th St. SE
Salem, OR 97302
800/345-8356,
503/585-3414,
503/585-4505 (fax)

Computer Friends
14250 N.W. Science Park Dr.
Portland, OR 97229
800/547-3303,
503/626-2291,
503/643-5379 (fax)

Comspec Communications
74 Wingold Ave.
Toronto, Ontario
M6B 1P5 Canada
416/785-3553,
416/785-3668 (fax)

Digital Products
108 Water St.
Watertown, MA 02172
800/243-2333,
617/924-1680,
617/924-7814 (fax)

Dresselhaus Computer Products
8560 Vineyard Ave.
#405
Rancho Cucamonga, CA 91730
800/368-7737,
714/945-5600,
714/989-2436 (fax)

Extended Systems
P.O. Box 4937
Boise, ID 83711
208/322-7163,
208/377-1906 (fax)

Fifth Generation
10049 N. Reiger Rd.
Baton Rouge, LA 70809
800/873-4384,
504/291-7221,
504/295-3268 (fax)

Giltronix
1430 O'Brien Dr.
Bldg. D
Menlo Park, CA 94025
415/853-1800,
415/853-1009 (fax)

IMC/Data Manager
1031-H E. Duane Ave.
Sunnyvale, CA 94086
800/537-5999,
408/730-1112,
408/730-1452 (fax)

Intellicom
9259 Eton Ave.
Chatsworth, CA 91311
818/882-8877,
818/882-2404 (fax)

Kansai Int'l
20917 S. Western Ave.
Torrance, CA 90501
800/733-3374,
213/782-8073,
213/782-8559 (fax)

Laser Connection
P.O. Box 850296
Mobile, AL 36685-0296
800/523-2696,
205/633-7223,
205/633-4866 (fax)

LaserTools
5900 Hollis St., Ste. G
Emeryville, CA 94608
800/346-1353,
415/420-8777,
415/420-1150 (fax)

National Semiconductor
Quadram Products Group
219 Perimeter Center Pkwy.
Atlanta, GA 30346
404/551-1000,
404/551-1027 (fax)
(continues)

BUFFERED BOXES FOR SHARING PRINTERS

S = serial
P = parallel
FP = uses front panel controls/indicators
SW = uses TSR software

Y = yes
N = no

COMPANY / Product	CONFIGURATION: PC-to-printer ratio	Type of port	Buffering: standard (maximum)	Data transfer rate (bps)	INDICATORS AND CONTROLS: Supports daisy chaining	Job-in-progress indicator	Set priority jobs	Cancel print jobs	Time-out range (seconds)	CONSUMER INFORMATION: FCC rating	List price with standard buffering	Reader service no.
ASP COMPUTER PRODUCTS												
Intelligent Buffer	3:1	4S	256K (512K)	300–19,200	Y	N	N	SW	5–40	n/a	$425	701
Printer Connection	4:2	6P	256K (1MB)	3000–56,000	Y	N	N	SW	1–255	n/a	$595	702
Printer Server	6:4	10P	256K (512K)	3000–56,000	Y	N	N	SW	40	n/a	$695	703
BAY TECHNICAL ASSOCIATES												
Model 24	3:1[1]	4[2]	512K (4MB)	38,400	N[1]	FP	N	SW	1–200	A	$895	704
Print Master	5:1	6[2]	512K (2MB)	19,200	Y	FP	N	SW	1–200	A	$739	705
Print Master	9:1	10[2]	512K (2MB)	19,200	Y	FP	N	SW	1–200	A	$895	705
Print Master II	3:1	4[2]	512K (1.2MB)	9600	N	FP	N	SW	1–200	A	$395	707
Print Master II	9:1	10[2]	512K (1.2MB)	9600	N	FP	N	SW	1–200	A	$695	707
BLACK BOX												
Multiport Spooler II	5:1[3]	6S	256K (2MB)	110–38,400	Y	FP	N	N	20–200	A	$949	709
Multiport Spooler IV	5:1[3]	6S	256K (1MB)	110–19,200	Y	FP	N	N	20–200	A	$795	710
Multiport Spooler VI	5:1[3]	4S, 2P	256K (1MB)	110–19,200	Y	SW	SW	SW	20–200	A	$795	711
Multiport Spooler VI	5:1[3]	6P	256K (1MB)	110–19,200	Y	SW	SW	SW	20–200	A	$795	711
Multiport Spooler VI	9:1[3]	6S,4P	256K (1MB)	110–19,200	Y	SW	SW	SW	20–200	A	$1095	711
Multiport Spooler VI	9:1[3]	10S	256K (2MB)	110–19,200	Y	SW	SW	SW	20–200	A	$1095	711
BUFFALO PRODUCTS												
SL	9:1[3]	6S, 4P	256K (4MB)	300–115,200	Y	FP	SW	FP	2+	A	$600	715
XE	2:2	4P	256K (2MB)	300–57,600	Y	FP	FP	FP	1–60	A	$400	716
COMPUTER FRIENDS												
Keydex UG-501P	4:2	2S, 4P	256K (3MB)	300–38,400	Y	FP	N	FP	30	n/a	$375	717
Keydex UG-501S	4:2	4S, 2P	256K (3MB)	300–38,400	Y	FP	N	FP	30	n/a	$375	718
COMSPEC COMMUNICATIONS												
Microshare MCS 8000	7:1[3]	8P	256K (256K)	300–57,600	Y	FP	N	FP	10–50	n/a	$399	719
DIGITAL PRODUCTS												
PrintDirector	6:1[3]	7[2]	256K (4MB)	300–38,400	Y	N	N	SW	1–15,240	A	$695	720
EXTENDED SYSTEMS												
MultiSpool ESI-2248A	4:2	5S, 1P	256K (1MB)	9600–19,200	Y	N	SW	N	1–240	A	$695	721
MultiSpool ESI-2278A	7:2	8S, 1P	256K (1MB)	9600–19,200	Y	N	SW	N	1–240	A	$1095	722
ShareSpool ESI-2048A	4:1	4S, 1P	256K (1MB)	9600–19,200	Y	N	SW	N	1–240	A	$595	723
ShareSpool ESI-2078B	7:1	7S, 1P	256K (2MB)	9600–19,200	Y	N	SW	N	1–240	A	$995	724
FIFTH GENERATION												
Logical Connection	6:2[3]	4S, 4P	256K (1MB)	300–9600	Y	N	N	SW	1–255	B	$695	725
GILTRONIX												
EZQ 1000	6:2	6S, 2P	256K (256K)	75–19,200	Y	FP	FP	N	1–999	A	$585	726
EZQ 1100	9:1[3]	6S, 2P	256K (2MB)	75–19,200	Y	FP	FP	N	1–999	B	$850	727
IMC/DATA MANAGER												
Data Manager	3:1[3]	4[2]	256K (1MB)	300–38,400	Y	SW	SW	SW	1+	A	$495	728
Data Manager	7:1[3]	8[2]	256K (1MB)	300–38,400	Y	SW	SW	SW	1+	A	$695	728
INTELLICOM												
Mega-Link	3:1[4]	2S, 2P	256K (1MB)	300–19,200	N	FP	N	FP	12	A	$499	730
Quick-Net 1000	4:1[4]	4S, 1P	256K (4MB)	1200–38,400	N	SW	SW	SW	1–999	A	$799	731
Quick-Net 1000	9:1[4]	8S, 2P	512K (4MB)	1200–38,400	N	SW	SW	SW	1–999	A	$899	731
KANSAI INT'L												
DSS-32	3:2	5P	1MB (2MB)	90,000	Y	FP	N	FP	5–60	A	$438	733
DSS-41	4:1	5P	1MB (2MB)	90,000	Y	FP	N	FP	5–60	A	$468	734
DSS-42	4:2	3S, 3P	1MB (2MB)	90,000	Y	FP	N	FP	5–60	A	$498	735
NATIONAL SEMICONDUCTOR, QUADRAM PRODUCTS GROUP												
Microfazer VI	5:1[3]	4S, 2P	256K (1MB)	110–19,200	Y	SW	N	SW	20–200	B	$690	736
PCPI												
ImageNet 1000	8:2	10S	1MB (2MB)	150–19,200	Y	FP	N	FP	1–300	B	$1495	737
ImageNet 500	4:2	6S	512K (2MB)	150–19,200	Y	FP	N	FP	1–300	B	$995	738

[1]Designed for modular increase of ports to a total of 24.
[2]Manufacturer supplies various configurations of serial/parallel ports.
[3]All ports can be designated for PCs or printers.
[4]Serial ports can be designated for PCs or printers.
[5]Manufacturer supplies either all serial or all parallel ports.

For more information about all products in this table, circle reader service no. 909.

BUFFERED BOXES FOR SHARING PRINTERS *(continued)*

S = serial
P = parallel
FP = uses front panel controls/indicators
SW = uses TSR software

Y = yes
N = no

COMPANY / Product	CONFIGURATION: PC-to-printer ratio	CONFIGURATION: Type of port	CONFIGURATION: Buffering: standard (maximum)	CONFIGURATION: Data transfer rate (bps)	INDICATORS AND CONTROLS: Supports daisy chaining	INDICATORS AND CONTROLS: Job-in-progress indicator	INDICATORS AND CONTROLS: Set priority jobs	INDICATORS AND CONTROLS: Cancel print jobs	INDICATORS AND CONTROLS: Time-out range (seconds)	CONSUMER INFORMATION: FCC rating	CONSUMER INFORMATION: List price with standard buffering	CONSUMER INFORMATION: Reader service no.
PROTEC												
ByteLink	11:1[3]	12[2]	256K (2MB)	300–38,400	Y	FP	N	SW	1–999	B	$1095	739
Byteway 1000	3:1[3]	4[2]	256K (1MB)	300–38,400	Y	FP	N	SW	1–999	B	$545	740
Byteway 1000 Plus	7:1[3]	8[2]	256K (1MB)	300–38,400	Y	FP	N	SW	1–999	B	$685	741
Q4 INSTRUMENTS												
Data Shuttle 8400	11:1[3]	8S, 4P	256K (8MB)	300–76,800	Y	SW	N	SW	1–256	n/a	$899	742
MISE 28	8:2	10P	256K (512K)	4500	Y	SW	N	SW	1–256	n/a	$775	743
RELIABLE COMMUNICATIONS												
Sierra Exchange	5:1[3]	6[2]	256K (2MB)	150–38,400	Y	FP	N	N	0–255	A	$649	744
Super Buffer	11:1[3]	12[2]	256K (4MB)	150–38,400	Y	FP	N	N	0–255	A	$1395	745
ROSE ELECTRONICS												
Caretaker Plus	4:1	5[5]	256K	19,200	Y	FP	N	N	1–255	A	$635	746
Caretaker Plus	8:1	9[5]	256K	19,200	Y	FP	N	N	1–255	A	$735	746
MasterSwitch Series	5:1	6[2]	256K (4MB)	50–115,200	Y	SW	SW	SW	0–256	A	$789	748
MasterSwitch Series	9:1	10[2]	256K (4MB)	50–115,200	Y	SW	SW	SW	0–256	A	$989	748
Super Switch	8:1	9[2]	256K (4MB)	50–19,200	Y	SW	SW	SW	1–255	A	$635	750
SEQUENTIAL SYSTEMS												
Q-System PC	4:1	4P, 1[2]	256K (2MB)	10–20	N	FP	N	SW	1–90	B	$349	751
Q-System PC Plus	4:2	4P, 2[2]	256K (2MB)	15–30	N	SW	SW	FP	1–90	B	$475	752
Q-System PC Plus	6:2	6P, 2[2]	256K (2MB)	15–30	N	SW	SW	FP	1–90	B	$475	752
TANSTAAFL MFG.												
Easy-Share CX	3:1[3]	4P	256K (1MB)	300–38,400	Y	FP	N	FP	1–255	A	$695	754
Easy-Share CX	7:1[3]	4P, 4[2]	256K (1MB)	300–38,400	Y	FP	N	FP	1–255	A	$945	754
Easy-Share SX	3:1[3]	4S	256K (1MB)	300–38,400	Y	FP	N	FP	1–255	A	$645	756
Easy-Share SX	7:1[3]	4S, 4[2]	256K (1MB)	300–38,400	Y	FP	N	FP	1–255	A	$895	756
WESPERCORP												
FocalPoint Plus	7:1	6S, 2P[3]	256K (1MB)	2000–2500	Y	FP	N	N	30	A	$859	758
WESTERN TELEMATIC												
Lasernet C	8:2	9S, 1P	256K (2MB)	150–19,200	Y	FP	SW	SW	1–300	A	$845	759

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[4]Serial ports can be designated for PCs or printers.
[5]Manufacturer supplies either all serial or all parallel ports.

For more information about all products in this table, circle reader service no. 909.

WHERE TO BUY

(continued)

PCPI
11590 W. Bernardo Ct.
#100
San Diego, CA 92127
619/485-8411,
619/487-5809 (fax)

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557 Lepine Ave.
Dorval, Quebec
H9P 2R2 Canada
514/631-2811,
514/636-5737 (fax)

Q4 Instruments Inc.
1100 Invicta Dr.
Unit 7
Oakville, Ontario
L6H 2K9 Canada
800/268-5156,
416/842-0200,
416/842-0203 (fax)

Reliable Communications
20111 Stevens Creek
Blvd. #100
Cupertino, CA 95014
800/222-0042,
408/996-0230,
408/996-3367 (fax)

Rose Electronics
P.O. Box 742571
Houston, TX 77274
800/333-9343,
713/933-7673,
713/933-0044 (fax)

Sequential Systems
1200 Diamond Cir.
#M-2
Lafayette, CO 80026
303/666-4549,
303/665-0933 (fax)

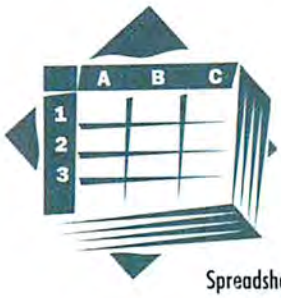
Tanstaafl Manufacturing
1800 Wyatt Dr. #6
Santa Clara, CA 95054
800/776-5676,
408/748-9330,
408/748-9431 (fax)

Wespercorp
17032 Murphy
Irvine, CA 92714
714/261-0606,
714/261-0894 (fax)

Western Telematic
5 Sterling
Irvine, CA 92718
800/854-7226,
714/586-9950,
714/586-9514 (fax)

Mastering 1-2-3 Macro Libraries

With release 2.2, your 1-2-3 macros are easier to use and a whole lot more powerful. Here's how to get quick results from the Macro Library Manager.



Spreadsheets

Steven Stewart Cobb

INSIDE TIPS & TECHNIQUES

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Picture-Perfect Pages With Word
Add graphic impact to everyday documents with *Word 5.0*.

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A Sweet 16-MHz AT Upgrade
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- A DOS trick that lets drive B: look just like drive A:
- Helping *Windows* see COM3:
- Expanding *1-2-3*'s file list
- *Paradox* on the side

Unlike its predecessors, Lotus's *1-2-3* release 2.2 doesn't insist that you store macros in a particular worksheet. Instead, its Macro Library Manager lets you store groups of macros in special worksheetlike files called "libraries." You can load up to ten libraries at a time into memory, where they remain resident as you retrieve or erase your worksheets.

Since you can use library macros in every worksheet you retrieve during a session, you won't have to copy frequently used macros to each worksheet individually. In addition, you can write macros that retrieve or erase worksheets and then keep on running—impossible in earlier versions of the program.

In this article we'll create two macros that take advantage of this new feature. The first retrieves and prints several worksheets. The second sets up a date and time header for printing, a function likely to be useful in any worksheet.

An Impossible Macro

To create a macro to be stored in a library, you begin in the same way you do to create a conventional macro. You simply enter the macro statements in a group of adjacent cells in a *1-2-3* worksheet, then name the appropriate cells.

For example, suppose you want a macro to print four work sheets—NORTH.WK1, SOUTH-.WK1, EAST.WK1, and WEST-.WK1—one after the other. In a blank worksheet, enter the \p

macro as shown in A1..B6 in **FIGURE 1** (remember that you must prefix beginning slashes with an apostrophe). Then assign the names \p and print to cells B1 and B6, respectively (entering <Home>/rnlr<Page Down> <Enter> will do the job). Without the Macro Manager, this macro would be overwritten as soon as it retrieved the first worksheet, and it would stop. With *2.2*'s Macro Library you can keep the macro outside the worksheet where it isn't erased, so it can work as intended.

```
      A        B        C        D        E        F        G
1   \p       /frnorth~{print}
2            /frsouth~{print}
3            /freast~{print}
4            /frwest~{print}
5
6   print    /ppagpq
7
8   \t       {let time,@now}
9            /ppohx{esc}@||
10           {contents next,time,9,120}
11           {if @left(next,1)="0"}{let next,@mid(next,1,8)}
12  next
13           {bs}~qagpq
14
15  time
```

FIGURE 1: When stored in a macro library, <Alt>-P will print four spreadsheets in a row. <Alt>-T puts a date and time stamp in the header, then prints the current worksheet.

Depositing the Macro in a Library

Before you save the macro to a library, you must attach the Macro Library Manager add-in to *1-2-3:* Select */Add-In Attach*, highlight MACROMGR.ADN, press **<Enter>**, choose *7* to assign the Manager to <Alt>-F7, press **<Enter>**, and select *Quit*. (If you've already given <Alt>-<F7> to another add-in, assign the Macro Library Manager to a different key.)

To move the macro to a new library, press **<Alt>-LF7** (or select /Add-In Invoke and pick MACROMGR from the list), select *Save*, enter **printmacs** as the name of the new library, highlight the range (A1..B6) that contains the macro, and press **<Enter>**. The prompt 'Use password to lock library?' appears at this point. If you answer 'Y' and decide to create a password, you can prevent interlopers from editing macros in the library, though they will be able to run them. Next, *1-2-3* erases the cells that contain the saved macro, deletes the associated range names from your worksheet, and saves both in the new library PRNTMACS.MLB.

The Macro Library Manager's Save command stores the library both to disk and to RAM, so the macros in any library are ready for use as soon as you save them. Running this library macro is just like running a macro in your worksheet; just press <Alt>-P when in ready mode and *1-2-3* will retrieve and print the north, south, east, and west spreadsheets. Note that if you want to use your library's macros in a *1-2-3* session other than the one in which you create them, you must use the Macro Library Manager's Load command to return the library to RAM. You also use the Load command to reload a library after you've used the Remove command to recover memory.

Editing the Library

Once you create a library, you can easily edit or delete its macros or add new ones. The only limitations are that the macro must fit in memory and can contain no more than 16,376 cells. To add to the PRNTMACS library a macro that prints the current worksheet with the current date and time in the header, start with an empty worksheet. Press **<Alt>-<F7>**, select *Edit*, and choose *PRNTMACS.MLB*. *1-2-3* will ask whether to ignore or overwrite conflicting range names; since there are none in the empty worksheet, it doesn't matter how you respond.

Highlight the upper-left cell of the range into which you want to place the contents of the library (in this case, A1) and press **<Enter>**. *1-2-3* will copy the contents of the macro library into the blank worksheet. Enter the \t macro from **FIGURE 1** in cells A8..B13, and type **time** in

A15. Then assign the range names \t, next, and time to cells B8, B12, and B15.

To save the edited macro library, invoke the Manager, select *Save PRNTMACS Yes* to overwrite the library in memory and on disk, highlight the cells containing the macros you want to include in the revised library (A1..B15), and press **Enter**. *1-2-3* will replace the existing PRNTMACS.MLB file with the contents and range names of the highlighted cells, erase them from the worksheet, and store the revised library in RAM. Now you can invoke either macro from the library. When you press <Alt>-P, *1-2-3* will retrieve and print the four files. When you press <Alt>-T, *1-2-3* will print the current worksheet with the current date and time at the left and right edge of the header, respectively.

POWER TIP NO. 91

Recapturing Crosstalk Data

If you download information with *Crosstalk XVI* but forget to use the capture command to save it, don't fret. *Crosstalk* has a capture buffer that holds up to 4K of data. To capture information retroactively, type CA < and press <Enter> at the command prompt. In fact, you can specify an exact number of lines to capture by adding a number between 1 and 96 after the command—for example, CA < 13.

Lewis Ngo
Syracuse, New York

Libraries are great for storing macros that automate everyday, every-worksheet editing, graphing, formatting, and printing tasks. If memory is at a premium, you'll probably want to organize your macros into separate, smaller libraries for different purposes. —*Steven Stewart Cobb*

TIPS & TECHNIQUES

Word Processing

Picture-Perfect Pages With Word

Anyone can produce professional-looking pages with Word 5.0's powerful graphics tools. Here are step-by-step instructions for capturing images and integrating them into your documents.

What you need: Microsoft Word 5.0, a graphics file

With *Microsoft Word 5.0*'s new graphics capabilities, you can add impact to everyday documents. *Word* lacks the interactive graphics manipulation and image controls found in desktop publishing programs such as *Ventura* and *PageMaker*, but most users will find it meets their needs. You can import and resize images and position them precisely on the page. You can also add borders, wrap text neatly around an image, and preview the layout and graphics on screen.

This article gives step-by-step instructions for importing a scanner-generated TIFF image into a document, previewing the graphic, adding a caption, framing and placing the image, and printing it out. The same process works with any graphics format—PCX files from *PC Paintbrush*, Lotus PIC files, HPGL plotter files, Encapsulated PostScript (EPS) files, and images captured with *Windows*' clipboard. You can even import screen images captured from other programs with *Word*'s CAPTURE.COM utility.

Get the Picture

The first step is to import the graphic into *Word*. You'll then size the graphic and place it within its frame.

1. Open a blank document screen in *Word*, or open an existing document. Then press **<Esc> FDL** to open the Format Division Layout menu.

2. Tab to the 'number of columns:' option, and type **2 <Enter>** to apply a two-column layout.

3. Press **<Esc> LLG** to call the Library Link Graphics menu.

4. Type the graphics file's path name and file name in the 'filename:' field, or press <F1> and select the file from a list.

5. Tab to the 'file format:' field. *Word* supplies a format description based on the file's extension. If the file has a nonstandard extension, press <F1>, and select a format that matches your file.

6. Tab over to the 'alignment

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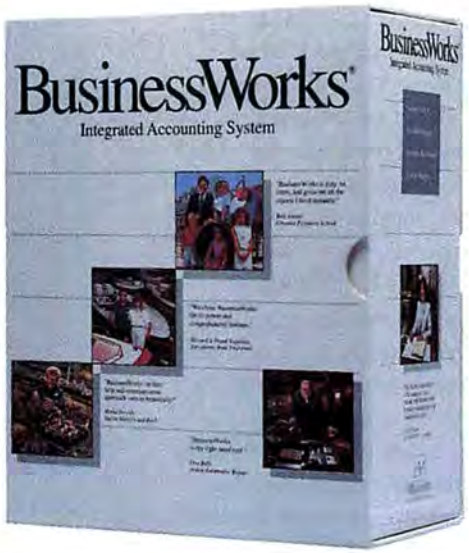

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in frame:' field, press **<F1>** to choose from a list of options that specify how the graphic should be positioned in the frame, and select 'Centered'.

7. Tab to the 'graphics width:' option, and type a width measurement for the graphic. You can resize the graphic to any dimension you like. For this example, type **3** to make the graphic 3 inches wide.

8. Tab to the 'graphics height:' option, press **<F1>**, and select one of the three height choices; for this example, choose 'preserve aspect ratio'. If you want, you can enter a custom measurement instead.

9. The two remaining fields let you add space above and below the graphic. At the 'space before:' and 'space after:' fields, type **.125** in each field to add ⅛ inch.

10. Press **<Enter>** to confirm all your choices.

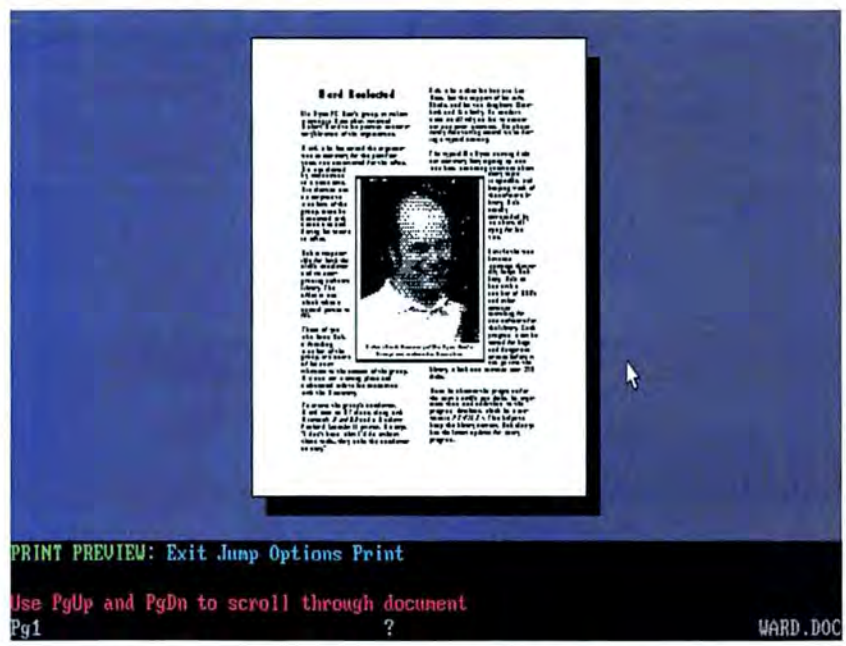
Preview the Graphic

In *Word*'s text entry mode, the graphics are represented on screen by codes, with no indication of the graphics' position. Fortunately, there are two ways to get a clearer picture.

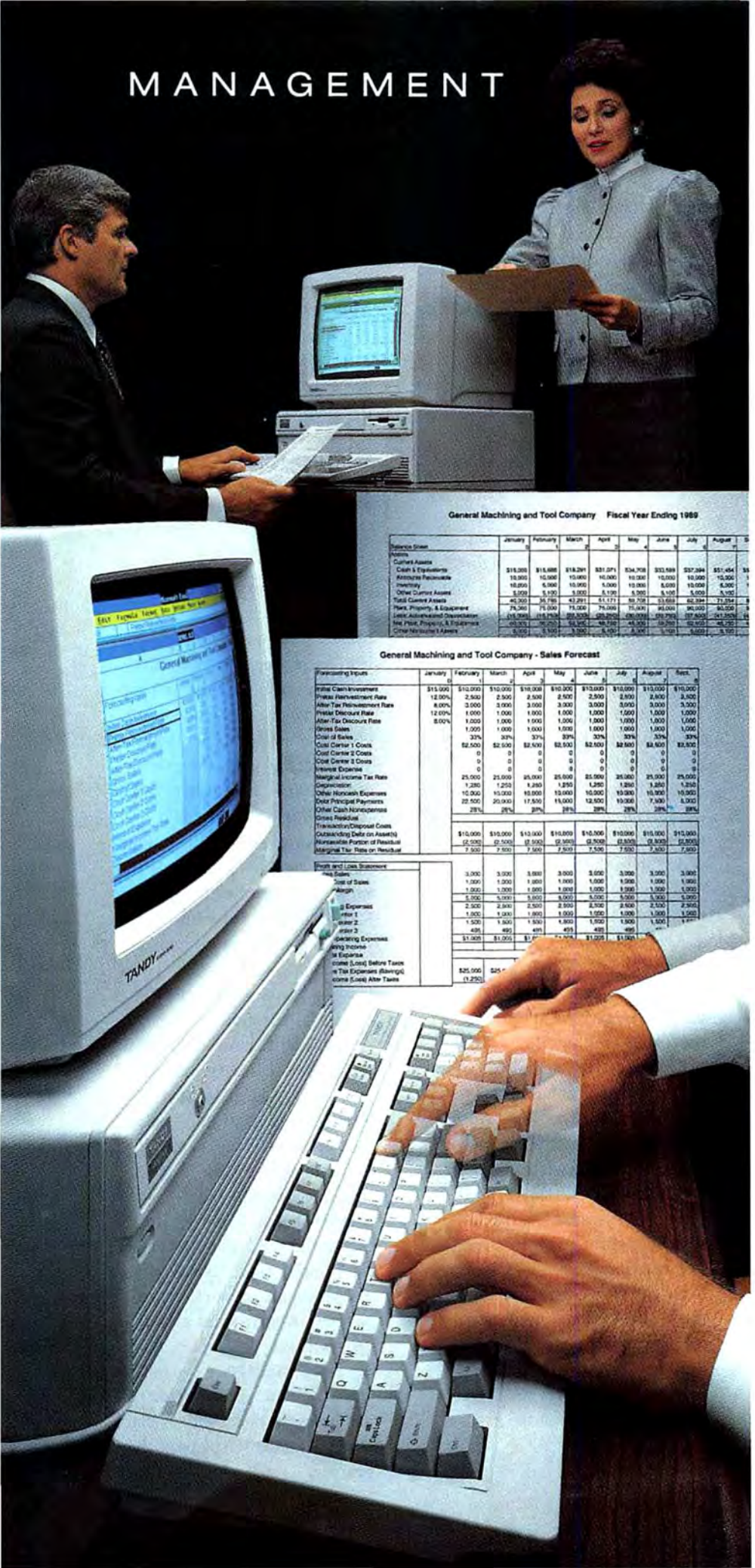
To see how the page will look when printed, press **<Ctrl>-<F9>** to call *Word*'s Print Preview mode, which displays graphics and other formatting. It also provides options for jumping to other pages or bookmarks and displaying facing pages side by side. You can't edit or format in this mode, however, so press **E** when you're ready to return to text mode.

Word's Show Layout mode is another preview option. Unlike in Print Preview, you can't view the graphic itself, but at least you can edit and format the document. Simply press **<Alt>-<F4>**, and columns and line and page breaks are shown, along with the graphics code inside a dotted box. Unfortunately, this mode doesn't always render layouts faithfully. For example, in **SCREEN 1**, the Show Layout mode skips a line under the graphic rather than displaying the actual text flow (shown in the Print Preview mode in **SCREEN 2**). The

SCREEN 1: Word 5.0 provides several new menus to import and format graphics images. Here in the Library Link Graphics menu, you can import a graphic, align it in its frame, resize it, and more. Above the menu, the Show Layout mode displays column formatting (but not graphics). Unfortunately, it displays the text flow around the graphic inaccurately.



SCREEN 2: The final result, as shown in the Print Preview mode. Word 5.0 lets you preview graphics, columns, and other formatting.



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rest of the steps assume you're in *Word*'s standard text editing mode, accessed by pressing <Alt>-<F4> again.

Add a Caption

The next step is to add a caption to the graphic, making sure it's part of the same paragraph as the graphic. Move to the last line of code, and press <End> to move to the end of the line. Then press <Shift>-<Enter> to start a new line without creating a paragraph. You can add more space between the image and the caption by pressing <Shift>-<Enter> again. (To place the caption outside the border, press <Enter> instead of <Shift>-<Enter>.) Type the caption text (you can use any of *Word*'s formatting tools), and press <Enter>.

Frame the Image

With most graphics, you'll want to place a border around the image to separate it from the surrounding text. The process is easy:

1. Move the cursor to the beginning of the graphics code, and press <Esc>FB to open the Format Border menu.

2. Press B to choose a boxed image, then press <Tab> and <F1> to select a line style for the box. *Word* offers four line types: normal and bold single lines, double lines, and thick lines.

3. Select a line type with the cursor keys, and press <Enter>. A box will appear on screen around the code.

If you don't want the image completely boxed, you can place lines on specified sides of the image. You can even shade the area behind the image by tabbing over to the 'background shading:' option and selecting a shading percentage. However, shading is not used in this example.

Perfect Picture Placement

After you import the picture and add a caption and borders, you need to position the image on the page. In this example, you'll center the image within the borders and add space between the image and the borders. To do this, you call upon the Format pOsition menu:

1. Highlight both the code and the caption by pressing <F10>, and press <Esc>FO to access the Format pOsition menu.

2. The cursor will appear on the 'horizontal frame position:' option. Press <F1>, and highlight 'Centered'. If you want, you can type in an exact measurement instead of picking a format from a list.

3. Tab to the 'relative to:' field. The default is to center the frame relative to the column, but because this example uses a two-column format, press M to center it between the left and right margins.

4. Tab to the 'vertical frame position:' field, press <F1>, and highlight 'Centered'.

5. For the vertical frame, the 'relative to:' field's default is 'Margins', which is just what you want, so leave it be and tab to the 'frame width:' field.

6. Press <F1>, and highlight the 'Width of Graphic' option to make the frame the same width as the image. Note: If you increase the frame width, borders and text will be farther from the image. If you make the frame the width of the page, text can't wrap around the graphic. If you make the frame narrower than the image, text and borders will overwrite the image.

7. The 'distance from text:' field in the menu lets you specify the distance between the graphic frame and the surrounding text and control the way the text wraps around the frame. Press <Enter> to accept *Word*'s default of .167 inch.

Add Text and Print

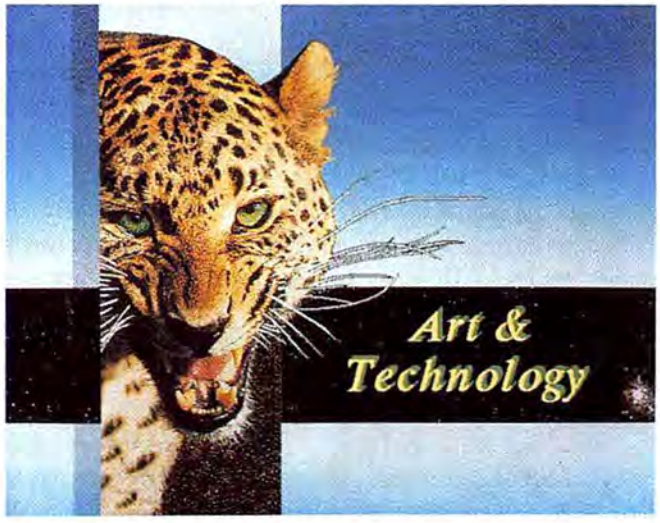
If you started with a blank document, you now need to add text. Move the cursor to the line below the graphics box. Press <Alt>-P to return to normal paragraph format, and then type the text for the document, or press <Esc>TM to merge an existing text file.

The process for importing graphics into existing documents is similar. Because the Format pOsition menu locates the graphic in a fixed location, you can place the graphics code and caption anywhere in the document. (To make editing easier, however, you'll want to place the graphics code between paragraphs rather than within a paragraph.)

The procedure for printing a file that contains graphics is the same as for printing a normal text document. However, if your printer supports more than one resolution, *Word* lets you choose between them. Press <Esc>PO to open the Print Options menu. At the 'graphics resolution:' field, press <F1> to pick from a list of available resolutions. Press <Enter> to confirm your choice, then press P to start printing.

For top quality, it's usually best to choose the highest available resolution. However, the higher the resolution, the longer the printing time. Even low-resolution graphics take time, so you may want to print a draft copy without the graphic. Simply press <Esc>PO, move to the 'draft:' option, press Y<Enter>, and print the document. A blank space will take the place of the graphic.

The Next Generation



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PC Paintbrush IV adapts to the way *you* want to work. With such conveniences as pull-down menus, customizable screens, dialog boxes, split screens, multiple levels of context-sensitive help, and a combination of mouse control and keyboard accelerators.

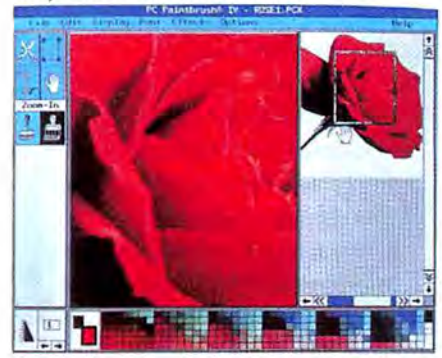

Image editing can be done in zoom-in mode on an adjustable split screen.

So much power. For so little.

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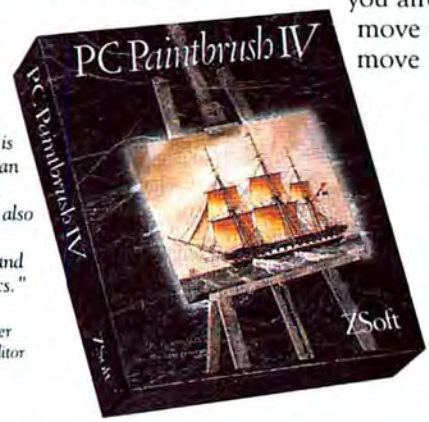

"PC Paintbrush IV is destined to become an important tool, not only for artists, but also for people who use desktop publishing and presentation graphics."

Michael Miller
Executive Editor
InfoWorld
5/1/89

ZSoft
CORPORATION

450 Franklin Road / Suite 100
Marietta, Georgia 30067
(404) 428-0008
FAX: (404) 427-1150
Telex: 6502859318

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640KB RAM required. Image size severely limited by available DOS memory.
PC Paintbrush IV is a trademark of ZSoft Corporation.

*To upgrade, send $35 plus $4.90 shipping and handling and your original disk of PC Paintbrush, Microsoft Paintbrush or LogiPaint to: ZSoft Upgrade, Dept. WX, P.O. Box 8123, San Francisco, CA 94128. Specify 5.25" or 3.5" disk. CA (6%) and TX (7.5%) residents, add sales tax. Canadian customers, add $15.90 for air shipping. Outside N. America, add $15.90 for surface shipping or $24.90 via air. Payments must be in U.S. funds by check, money order, VISA, MasterCard or American Express.

Capturing Screen Images

If you can't save a graphic in one of the formats that *Word* supports, or if the conversion process is tedious, you can call on *Word*'s CAPTURE.COM utility to take a screen shot of anything that appears on your screen. Unless you have a Hercules display, you can also take advantage of CAPTURE.COM's clipping (image-cropping) feature, which is unavailable within *Word* itself. To load and configure CAPTURE.COM, follow these steps:

1. Exit *Word*, then change to the directory containing CAPTURE.COM.

2. The first time you run the program, enter **CAPTURE/I** at the DOS prompt. You'll see a menu of configuration options.

3. The only option you *must* select is the graphics display option; make sure the menu item you choose matches your system. The clipping option is enabled as a default; if you're capturing *Microsoft Windows* images or if you have a Hercules display, you must turn it off.

4. Press **Q** to save the setting and load the program in memory. After configuring CAPTURE.COM once, you can load it at any time by entering CAPTURE without any parameters at the DOS prompt. To change configurations, simply use the /I switch again.

5. Run the desired program to display the image, then press **<Shift>-<Print Screen>**. If clipping is enabled, CAPTURE.COM asks for a file name. Enter an appropriate name, without an extension. If clipping is disabled, CAPTURE.COM automatically saves the image in the file CAPT0001.SCR. The next screenshot will be saved as CAPT0002.SCR, and so on.

6. If you've enabled clipping, you can now crop the image—right within the application—and save to disk only the portion you want. Use the cursor keys to move the hairline cursors. You can control two hairlines at a time. To toggle control between the top and right hairlines and the left and bottom hairlines, press <Tab>.

7. To control cursor speed, press <Gray Plus> to move in larger increments or <Gray Minus> for smaller ones.

8. Once you've cropped the image, press **<Enter>** to save it to disk. Pressing <Esc> aborts the capture without saving the file. To import the image into *Word*, use the Library Link Graphics menu as described earlier. When you've finished using CAPTURE.COM, you can remove it from memory by entering **CAPTURE/E** at the DOS prompt.

CAPTURE.COM can grab text screens as well as graphics. Text screens are saved using the same filing sequence as for graphics, but with the extension LST. The program can even capture text screens as graphics files so they can be sized like graphic images. To be able to do this, simply press T ('Enable/Disable text screens as pictures') when you configure CAPTURE.COM. This feature is ideal for preparing software manuals or other documents that need screen images.

Although *Word 5.0* isn't a full-scale desktop publishing program, its new graphics integration features go a long way toward making your documents picture perfect. And CAPTURE.COM lets you reach out and snag any image on your PC.

—George Campbell

A Sweet 16-MHz AT Upgrade

If your applications need speed but a 386 doesn't fit your budget, the TinyTurbo AT boasts a price/performance ratio that's hard to beat.

What you need: TinyTurbo AT board, a 6-MHz or 8-MHz 80286 computer

In 1985, the AT was considered a speed demon. Today, the AT and its 286 peers seem positively listless. The problem, of course, is that a 6-MHz or 8-MHz 80286 lacks the brawn to speedily run contemporary heavy-duty graphics, spreadsheet, and desktop publishing programs—especially under *Microsoft Windows*.

One solution is to upgrade your AT with a 16-MHz 386 turbo board such as Intel's Inboard 386. But if the $1995 price tag (which includes 1MB of RAM and an installation kit) is too steep, don't fret. If you need 386-like speed but not the ability to run 386 software, Orchid Technology's $599 TinyTurbo AT just might be the answer. The board, built around a 16-MHz 80286, is two-thirds as fast as the Inboard 386 but a third of the cost. That's a price/performance ratio that's hard to beat.

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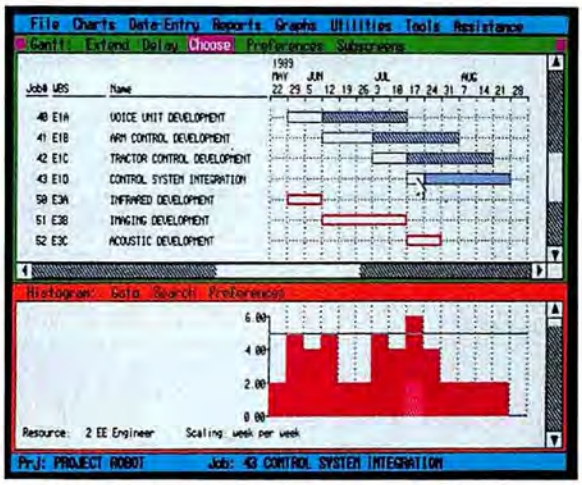
PC MAGAZINE, SEPTEMBER 12, 1989

Everyone promises ease of use. Project Scheduler 4 really delivers. Expert after expert agrees, Project Scheduler 4 is the fast track to automated project management. And once you're started, Project Scheduler 4 keeps you going with outstanding power, world-class speed, and industry-leading capacity. Project Scheduler 4 is the clear choice for today, and tomorrow.



Our Gantt Histogram pinpoints resource overloads.

EXPERT TESTIMONY

PC WEEK, MARCH 13, 1989:
"Easy for novices to learn, but packs enough power and functionality for experienced project managers."

DESIGN NEWS, MARCH 27, 1989:
"PS4 is a thorough and complete management system. Its built-in flexibility and abundant features allow for efficient planning of even the most complex projects."

DANIEL YAHDAV, PM SOLUTIONS, JUNE 1989:
"Project Scheduler 4 earns PM Solutions' highest marks in ease of use. It leads its competition in schedule recalculation and resource leveling performance."

PC MAGAZINE, SEPTEMBER 12, 1989:
"Context-sensitive help and three levels of automatic prompting offer enough assistance that you may never open the fine manual that accompanies the program."

"Project Scheduler 4's project management graphs and charts are simply the best around."

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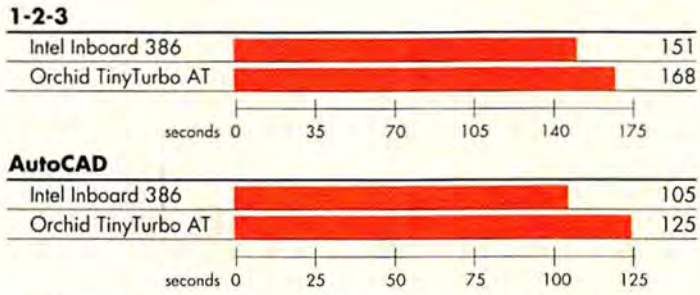
NSTL TEST REPORT

TinyTurbo: Low-Cost Upgrade Stands Tall in Performance

Intel's Inboard 386 gets a run for its money. Though marginally slower and unable to run 32-bit software, the TinyTurbo AT's tiny price and respectable performance give it an edge against the giant.



Methodology
All tests were conducted with the boards installed in a 6-MHz IBM PC AT with a 30MB hard disk. The boards were configured with 2MB of extended memory, a 256K extended-memory disk cache, and a coprocessor.

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 processing and memory access speeds.

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.

Keep in mind that the TinyTurbo AT doesn't hold megabytes of high-speed 32-bit memory. It uses installed system memory, and it won't work in anything but a 6- or 8-MHz 286. Note that it can replace only pin-grid-array 80286s—those that have a ceramic shell with gold pins extending from the bottom. But it will work in dual-speed systems, includes a 32K static RAM cache for speedier processing, and has a socket that can run any 80287 numeric coprocessor at maximum speed—including the new 16-MHz 80287-compatible coprocessor from IIT.

Like any accelerator board, the TinyTurbo is not an upgrade for the fainthearted. Installing the board means yanking the computer's 80286 out of its socket, replacing it with a special plug, connecting that to the TinyTurbo AT with a supplied cable, and plugging the board into a free slot. Unlike with most turbo boards, however, you won't have to install driver software.

Before you install the TinyTurbo AT, make sure you jot down the computer's clock speed and memory configuration. You can usually determine the former by popping off the system cover, locating the 80286, and checking the 80286-*xx* stencil on the top of the chip. The *xx* notes the certified speed in megahertz. To figure out how memory is allocated, either check the system's CONFIG.SYS file for expanded memory and RAM disk drivers, or run a utility such as *The Norton Utilities*' SI.EXE.

Next, ground yourself properly and place the TinyTurbo on its antistatic bag. Check Orchid's well-illustrated manual, and you may find you have to set jumpers that specify the AT's clock speed, conventional/extended/expanded RAM allocation, and whether a coprocessor is installed on the TinyTurbo. You can also select a jumper that sets up a video BIOS cache, which noticeably improves screen refresh. Make sure, however, that this option doesn't conflict with a "ROM shadowing" scheme used by an installed VGA board.

Now, park the computer's hard disk, shut down the system, remove the system cover and all external cables, and pull out any expansion boards obscuring the 2-inch-square 80286 microprocessor. (On some systems, you may have to remove the floppy disk drive or slide out the entire motherboard to get at the chip.) Grip the chip (*not* the socket) with the supplied chip puller, and slowly pull straight up. If the chip resists, you may need to rock it gently back and forth to free it. Store the 80286 chip in a safe place, and plug Orchid's connector and cable into the vacant

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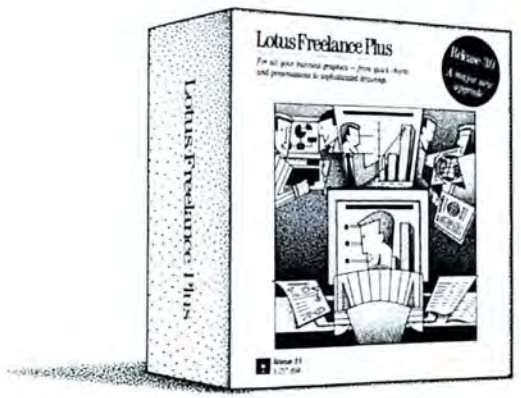

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socket. Attach the other end to the waiting connector on the TinyTurbo, plug the board into a free slot, and you're done.

Reassemble the system, turn it on, and your machine should zip through tasks twice as fast. You'll never drum your fingers again waiting for *WordPerfect* or *dBASE* or *Ventura* to get the job done. However, if you set the jumpers incorrectly, a memory error will flash on screen, and the system will screech to a halt. Turn off the computer, remove the TinyTurbo, and rectify the settings.

Although NSTL benchmarks show the TinyTurbo is darn fast, it doesn't transform your AT into a 386 machine. You can't run *Windows/386* or other cutting-edge applications, and you almost certainly won't be able to run OS/2. But if those limitations aren't important, Orchid's TinyTurbo AT board has everything you need—including a thin price tag and a fat warranty.
—*Matt Lake*

WHERE TO BUY

TinyTurbo AT
Orchid Technology
45365 Northport Loop W
Fremont, CA 94538
800/767-2443, 415/683-0300,
415/490-9312 (fax)
LIST PRICE: $599
REQUIREMENTS: AT or 100 percent compatible
WARRANTY: two years parts and labor
EXTENDED WARRANTY: four years at no extra cost for registered users
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5
OTHER SUPPORT: 24-hour company BBS
Reader service no. 601

Steven Stewart Cobb is a senior author for The Cobb Group, a publisher of books and journals about microcomputer software. George Campbell is a frequent contributor to PC World; *based in Los Osos, California, he specializes in word processing and telecommunications. Robert Lauriston is an assistant editor and Matt Lake is an editorial assistant for* PC World.

USER GROUP TIPS

Helpful hints from members of the nation's user groups

B-Drive Installations

Many installation programs assume that the setup disk is in drive A:, making it impossible for a user with a 5¼-inch drive A: and a 3½-inch drive B: to install an application automatically from a 3½-inch floppy. DOS provides a solution to this problem in its ASSIGN command, which lets you temporarily reassign drive designators. To make an install program read the B: drive as if it were A:, make sure that the file ASSIGN.COM, which came with your copy of DOS, is in either the current directory or one on the path. Then enter the following command at the DOS prompt:

assign a=b b=a

You can now run the installation program. When that process is complete, issue the ASSIGN command without any parameters; this will restore the original drive designators.

Dean Beebe
Capital PC Windows SIG

Regaining COM Ports in Windows

Windows/286 and */386* recognize only two of a PC's serial ports, which can be a problem for people with more than two serial devices. Fortunately for *Windows* users, DOS's MODE command provides a way around this limitation.

If, for example, you have an extra serial printer plugged into COM3:, make sure the file MODE.COM is in your current directory or in one on the path and enter the following lines in your AUTOEXEC.BAT file:

mode com3=96,n,8,1,p
mode lpt2=com3

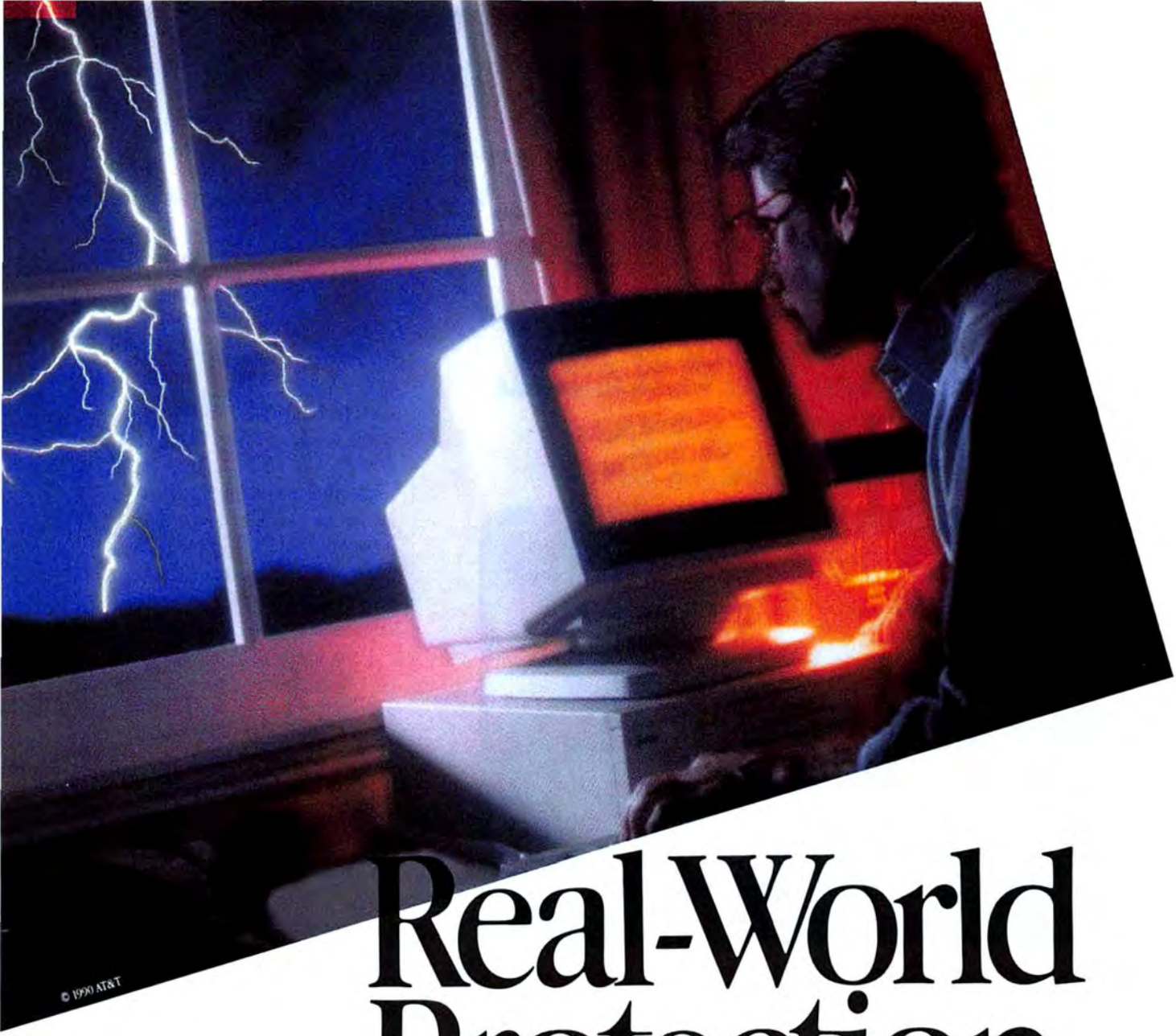
The first MODE command sets the parameters for a printer on COM3:, assuming that the printer operates at 9600 bps. That makes DOS recognize the LPT2: port as COM3:. If LPT2: is occupied on your system, use LPT3: instead. *Windows* accepts parameters for LPT2: and LPT3:, so to make the environment recognize the serial printer, open Microsoft's Control Panel. Install the printer driver, then select the Setup menu. Under the Connections heading, select the printer name and assign it to the LPT port you chose.

Joel Diamond
Windows Technology Group

More 1-2-3 Files on Your Screen

If you have a lot of *1-2-3* worksheet files in a single directory, the File Retrieve file listing, which displays only five files at a time, is hardly adequate. Luckily, this display can be expanded easily.

By pressing <F3> at the 'Name of file to retrieve:' prompt, you will bring up a full-screen, alphabetized listing that displays 105 files at a time, with the date, time, and size of the highlighted



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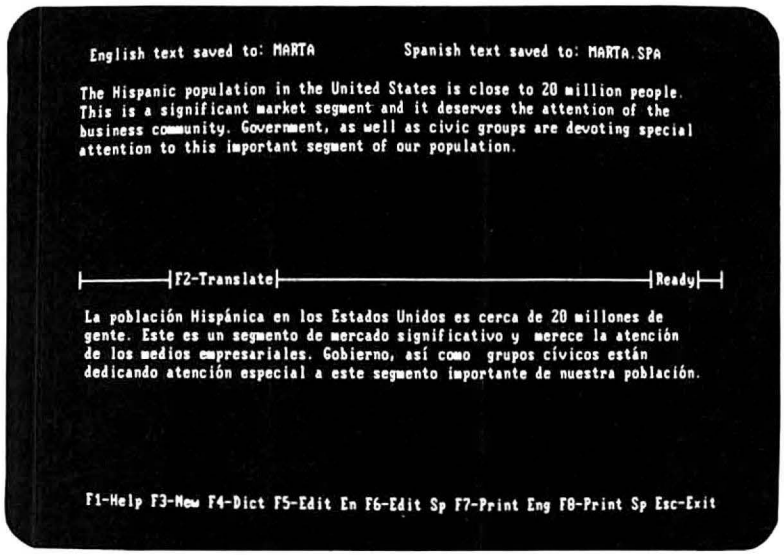

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Circle 84 on reader service card

file at the top of the screen. You can navigate this listing with the standard cursor keys.

Ross Parlette
Silicon Valley Computer Society

A SideWays View of Paradox

Funk Software's *SideWays* printing utility is generally associated with Lotus's *1-2-3*, but it also comes in handy for printing *Paradox* reports in landscape mode. To print a *Paradox* report using *SideWays*, you must be sure that the page length is the same in each program.

From inside the *Paradox* report-design screen, you set the page length by pressing <F10>, selecting Setting PageLayout Length, and entering the number of lines. To create an ASCII file of your report, select Report from the main menu, then Output. Enter your table name, pick a report, select File, and enter a name for your text file.

You can get into *SideWays* from inside *Paradox* by selecting Tools More ToDOS, then typing SIDEWAYS at the DOS prompt. Once there, enter a bottom margin that will give you the same number of lines per page for your report as you entered in *Paradox*. It's now a simple matter to enter the name of your file and print your report.

Elvia M. Sanz
Southern California Paradox Users Group

Chip in! If you're a member of a user group and have tips to share, send them to PC World. *We pay $25 for each published tip. Or if you have a business problem that requires a PC solution, get in touch with our experts. See How to Contact PC World, page 4.*

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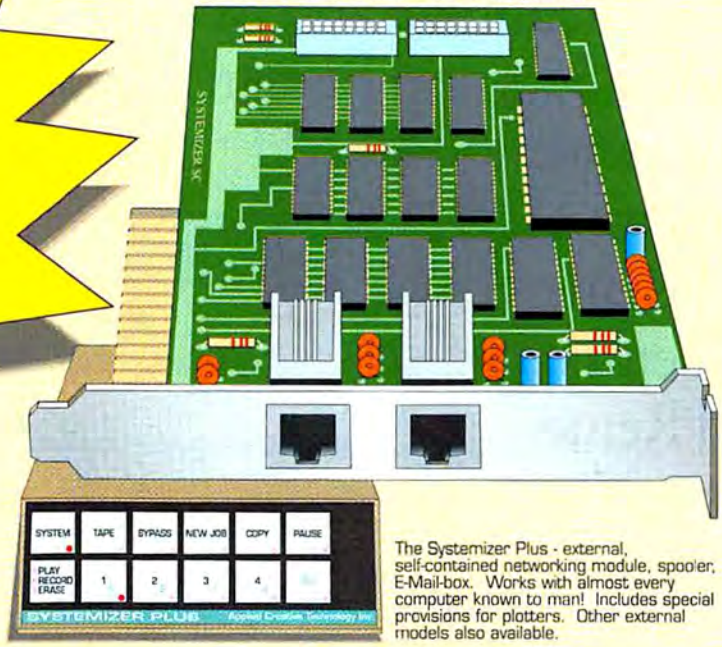
The Systemizer SC - features memory resident printer controller, spooling, E-Mail and file transfer. For all MS-DOS® PC's and compatibles.



The Systemizer Plus - external, self-contained networking module, spooler, E-Mail-box. Works with almost every computer known to man! Includes special provisions for plotters. Other external models also available.

Up to 31 users can...

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- Share Plotters
- Share a Modem
- Exchange E-MAIL
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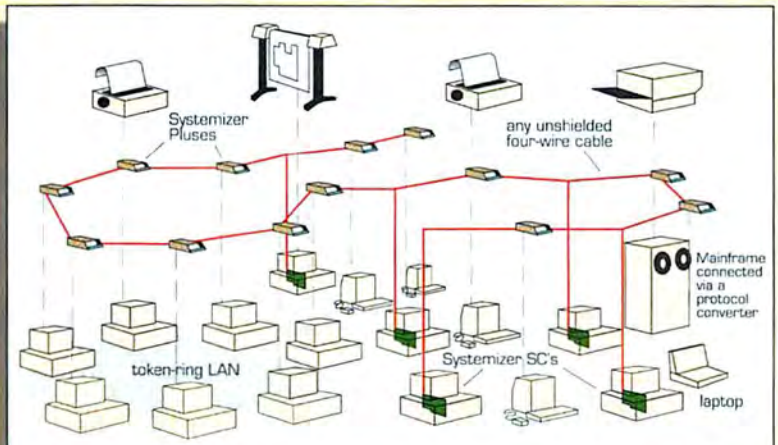

Example: 17 micros, of various brands, *plus* a mainframe, all sharing printers, data and E-Mail via Systemizing. Note how some PC's on a token-ring LAN are also part of the Systemizer LAN.

Systemizing has become the connectivity standard at many of the world's largest corporations and throughout the federal government. Ten's of thousands are already in use. The new Systemizer SC is the latest model in Applied Creative Technology's line of Systemizing products, and it delivers what 95% of corporate computer users want from a Local Area Network— at far less cost and complexity, and yet with much more versatility.

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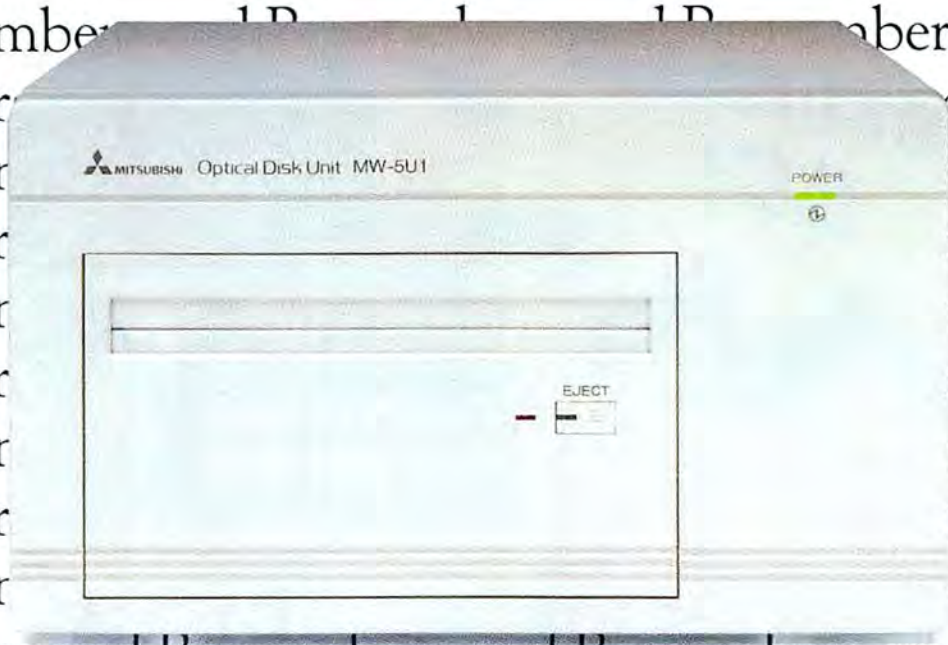

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Circle 174 on reader service card

STAR-DOT-STAR *.*

A global exchange of personal computer discoveries

Load DOS directories into dBASE files, trim unused range names with a 1-2-3 macro, print LaserJet disk files, color-code your DOS prompt, switch directories quickly in WordStar, add multiple directories to PATH, and improve GO.BAT.

Edited by Tom Swan

dBASEd Directories

I use a few simple commands to load DOS directory information into *dBASE* data files. This lets me build a catalog of file names that I can sort, print, and merge using standard *dBASE* tools.

Start by creating a data file (we'll call it MYDIR.DBF) containing the fields listed in **TABLE 1**. Then, either at the dot prompt or by writing them into a program, enter the commands listed in **FIGURE 1**.

Voilà! You now have a standard *dBASE* data file that houses the current directory, ready for processing with LIST, BROWSE, INDEX, REPORT, SUM, and other commands.

Steven Beck
Marshfield, Massachusetts

Editor's note: After extracting the raw directory information from the temporary X field, copy the data to another file without an X field, then ZAP the original data file.

TABLE 1

Create a dBASE file with these fields to hold DOS directory information.

Field Name	Type	Width
X	Character	32
FILE	Character	8
EXT	Character	3
SIZE	Numeric	12
DATE	Date	8

```
! Dir>dir.Prn
use MYDIR
append from DIR.PRN delimited
go bottom
delete
delete for recno()<7
pack
replace all file with substr(x,1,8)
replace all ext with substr(x,10,3)
replace all size with val(substr(x,13,12))
replace all date with ctod(substr(x,25,8))
```

FIGURE 1: Enter these dBASE commands to parse a directory in the X field of a file with the structure shown in TABLE 1.

A Clean Shave for 1-2-3

When developing *1-2-3* worksheets, I often end up with range names that are no longer valid. To clean up, I created a macro to delete any range names with addresses equal to "ERR" (see **FIGURE 2**). I've found the macro to be ideal for shaving the stubble from my templates before I distribute them to customers.

The macro assumes that no \K, REPEAT, or DELCELL range names exist, and that no rows or columns are in use below and to the right of IT7000. To use the macro, load your worksheet, go to a blank area by pressing <End><Home>, type in the macro or combine it from another file, name the first macro line \K, and press <Alt>-K to run it.

J. Stephen Tharp
Fresno, California

Editor's note: To test the macro, create a range name that encom-

(continues)

ANTHONY RUSSO

```
/wtc/wwc/wgpd{goto}\K~{d 2}/rncREPEAT~~{GOTO}IT7000~/wcs20~{r}/wcs52~{l}
/rnt~{r}{end}{d 2}END~{end}{u}/rncDELCELL~IU8190~
{IF @CELLPOINTER("contents")="END"}{end}{u}{l}/rndDELCELL~/wdr{end}{home}~/wdc{r}~{QUIT}
{IF @CELLPOINTER("contents")="ERR"}{l}/c~DELCELL~/rnd{DELCELL}~{r}{d}{branch REPEAT}
{d}{branch REPEAT}
```

FIGURE 2: This 1-2-3 macro cleans up unused ranges.

passes two or more columns in a sample spreadsheet, then delete the last column, which invalidates the range.

Fixing a Choppy Copy

Because I don't have a laser printer, I print my files to disk. I then take the disk to my office and COPY the resulting file to the printer.

Unfortunately, the first few times I tried this, my graphics printouts would end prematurely, chopping off part of the image. The problem is that the COPY command assumes that the first ^Z it encounters is the end of the file—a correct assumption for text files, but not for binary ones. The cure is to use COPY's /B parameter, as in COPY /B MYFILE PRN, which tells COPY this is a binary file that may contain internal ^Z characters.

Michael A. Covington
Athens, Georgia

Color-Coded DOS Prompts

I am relatively new to computers, but I have a complicated hardware setup with two floppy disk drives and three hard disk drives. Although I configured my DOS prompt to display the current drive and directory by inserting a PROMPT PG command in my AUTOEXEC.BAT file, I still had trouble keeping track of my disks and directories.

To make the current drive easier to recognize, I color-coded my DOS prompt to show A:\> in magenta, C:\> in brown, and other drives in other colors. I accomplished the tinting with a set of batch files, one per drive, that contain commands like those in **LISTING 1.**

I store the commands in a file named C.BAT, located in a subdirectory listed in my PATH statement. If I type C<Enter>, I'm automatically logged on to the C: drive while the prompt turns brown. For other drives, I copy the batch file to another name, then replace C: with the desired drive letter and the 33 in the prompt command with another color code. Foreground colors can be brightened (turning brown to yellow and black to gray) by adding ;1 after the color number. Background colors can be specified by including a semicolon and a background color number before the *m*. Attributes are set the same way. [See **TABLE 2** for ANSI.SYS color codes.]

Jim De Fabia
Hollywood, Florida

```
ECHO OFF
C:
PROMPT $e[33m$p$g
```

LISTING 1: Sample batch file commands to color-code your DOS prompt.

Editor's note: To use this scheme, you need a color display, of course, and your CONFIG.SYS file must contain the command DEVICE = ANSI.SYS. Also, ANSI.SYS must be in the boot drive's root directory, or its path must be included in the

(continues)

TABLE 2

These ANSI.SYS values determine the attributes and colors of screen output. Turning on the high-intensity attribute brightens foreground colors (except for black and brown, which turn to gray and yellow, respectively).

Value	Attribute
0	All attributes off
1	High intensity (bold)
2	Normal intensity
4	Underline (monochrome monitor only)
5	Blink
7	Inverse video
8	Concealed (invisible)

Value	Foreground Color
30	Black
31	Red
32	Green
33	Brown
34	Blue
35	Magenta
36	Cyan
37	White

Value	Background Color
40	Black
41	Red
42	Green
43	Brown
44	Blue
45	Magenta
46	Cyan
47	White

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Circle 114 on reader service card

CONFIG.SYS command. Never set the display color to the same color as the background—usually black (30)—you won't be able to see any text on screen.

Quick Switch for WordStar

I use *WordStar* to edit a variety of documents—notes, letters, memos, lists, and so on—and it didn't take long for my directory to become cluttered with dozens of files. But after reorganizing my text collection into subdirec-

(continues)

DEVELOPER'S TOOLBOX

Put a Little Zip in Your Code

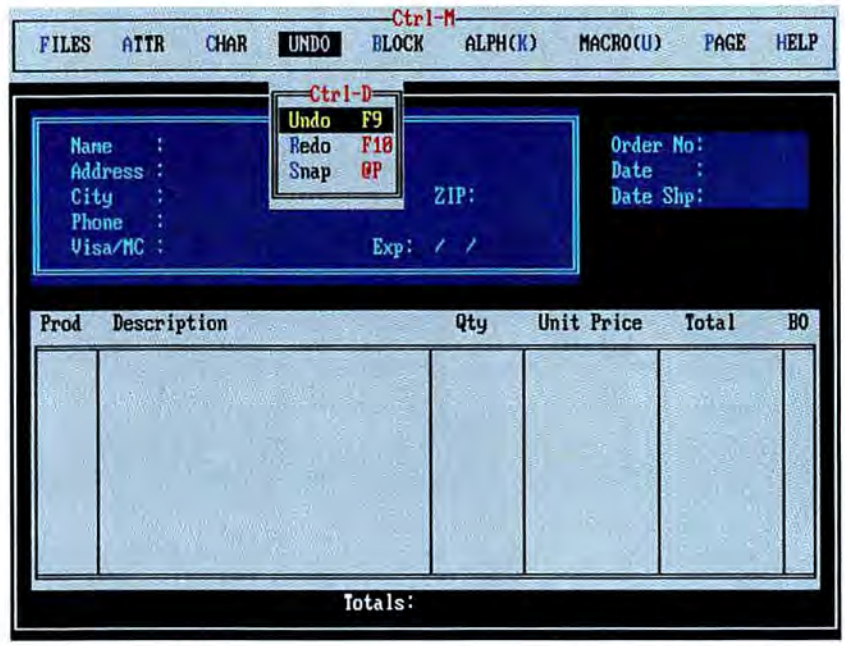
The best tools are simple but inspirational. Consider *ZIPwhere*, from Effective Data Solutions. At first I thought this C function library and data base of 49,000 ZIP codes would be of little use outside the mail room. But after exploring *ZIPwhere*'s depths, I thought of literally dozens of ways to pump up my programs using this unique and powerful product.

High on my to-do list is to use *ZIPwhere* to revise my antiquated order entry system. The tool kit's functions let me design data entry modules that, given only a ZIP code, can automatically fill in city, state, county, and telephone area code fields. Using *ZIPwhere* to validate that information will help prevent typos and therefore cut down on returned mail.

But that's not all. Programmed into *ZIPwhere* is a "Dealer Location" algorithm keyed by ZIP code that pulls up addresses within a specified radius to mileage grid coordinates. Enter a ZIP code and you can identify all nearby address records. Imagine the possibilities: You could find the nearest sales office to follow up a lead, locate the closest warehouse to speed shipments, or plot out the most convenient airports for a business trip—all with only a simple ZIP code. This feature alone makes *ZIPwhere* a unique tool kit and an intelligent partner for data base developers of all persuasions.

To use *ZIPwhere*, you need *Microsoft QuickC* or Borland's *Turbo C* compiler, plus a little disk space. You would expect a ZIP code data base to be a disk hog, but *ZIPwhere* compresses its data file down to a thifty megabyte plus change. An alternate *Zip/Clip* package, which includes *ZIPwhere*, is available for *Clipper* users. It's not possible to link *ZIPwhere* directly into non-*Clipper* dBASE programs—a limitation that bothered me until I discovered Apex Software's *Apex Database Library*, a set of tools that gives my C programs access to dBASE data files. I can now link in *ZIPwhere*'s library.

In addition to *Apex*'s rich function set, this cleanly constructed tool kit includes three parsers for dBASE expressions, useful for computing complex index keys extracted from multiple fields. C programmers who need a gateway to dBASE data files will find *Apex* to be just the ticket.



SCREEN 1: Custom screens such as this order entry display are easy to design with Proto Finish.

And last but not least, I'm prototyping the order entry screens with Genesis Data Systems' *Proto Finish* (formerly *Rapid Prototyping System*). The program's interfaces for C, *Turbo Pascal*, *QuickBASIC*, assembly language, and *Clipper* let me add screen designs directly to my finished code, saving development time (see **SCREEN 1**). I can also use *Proto Finish*'s screen-capture capabilities and 4GL interpreter to construct interactive demonstrations, tuto-

(continues)

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tories, I discovered how difficult it is to change directories from within *WordStar* with the ^KL command. To make the process easier, I use the following technique to create directory-changing macros.

For example, to create a macro that logs *WordStar* to C:\MYNOVEL, press <Esc>? to enter the shorthand macro editor and C to assign the new macro to <Esc>C. Enter a description for the macro, and for the definition enter <Ctrl>-P <Ctrl>-KLC:\MYNOVEL <Ctrl>-P<Ctrl>-M. The definition on screen should read '^KL C:\MYNOVEL^M'. Press <Enter><Enter>Y to exit the shorthand screen and save the new macro. To run the macro, press <Esc>C.

Mary S. Beck
Cedar Rapids, Iowa

Editor's note: When creating your own macros, you can assign each one to any letter, number, or punctuation symbol you wish. Substitute your directory's full path name for C:\MYNOVEL.

AP.BAT—The Sequel

Young J. Han's AP.BAT ["Beating Out New Paths," *Star-Dot-Star*, November 1989] temporarily adds a new directory to the current PATH. The technique works great with one directory, but not with two or more.

I modified AP.BAT (see **LISTING 2**) to recognize multiple directory names. I also added the capability to remove one temporary path and add another without having to run AP twice.

If you receive an 'Out of environment space' error message when using AP.BAT, insert a SHELL command in CONFIG.SYS and reboot to expand the environment. For example, if you boot off drive C:, you can reserve 800 bytes of variable space with the line SHELL = C:\COMMAND.COM C:\ /P /E:800.

Stewart H. C. Hoe
Kuala Lumpur, Malaysia

Editor's note: Make sure that AP.BAT is in a directory in your path. On my system, the command AP C:\TP C:\TC adds my Turbo Pascal *and* Turbo C *directories to the path. If I then type AP C:\WP, the batch file restores the original path and then adds C:\WP. You can also type AP and press <Enter> to display brief instructions.*

Improving GO.BAT

Paul Katzer's GO.BAT ["Cut Down Those Program-Loading Batch Files," *User Group Tips*, November 1989] works well but *(continues)*

DEVELOPER'S TOOLBOX

(continued)

rials, and presentations. For all-around prototyping and design work, *Proto Finish* is at the top of its class.

I welcome your comments. My MCI Mail handle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swan*

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  Draw programs create object-based vector images used for highly detailed technical illustration, graphic design, and fine art. Paint programs work with bit maps—clip art, scanned images, and screen captures. They're commonly used for editing gray-scale files and creating desktop slide presentations.
- **Spreadsheet Utility**
  Programs that add features or enhance existing spreadsheet functions. This category includes add-in word processors and data base managers, file compression programs, report writers, and templates designed for specific tasks, such as tax preparation or financial analysis.
- **Relational Data Base**
  Powerful data managers that allow you to update and interrelate multiple data bases and that come with procedural command languages, application generators, QBE or other sophisticated query systems, band-oriented report writers, and more.
- **Flat-File Data Base**
  Nonprogrammable data managers that typically work with one file at a time and are used to maintain mailing lists, contact lists, and the like. These programs can't edit multiple tables at once, and their relational skills are typically limited to lookup tables.
- **Data Base Utility**
  Products that enhance or extend the power of relational data base managers, such as report generators, graphics add-ons, file conversion and compression programs, compilers, and so on.
- **On-Line Service/BBS**
  On-line services and electronic bulletin boards that offer electronic mail, specialized data bases featuring everything from legal citations to statistical data, interactive forums, public domain and shareware programs, and other services. The first-prize winner will receive a free one-year subscription to the winning service or BBS, or 20 hours of on-line time (whichever is greater).
- **Personal Organizer**
  Personal information managers, desktop managers, text bases, and other products that replace deskbound Rolodexes, notepads, appointment schedulers, and so on.
- **Integrated**
  Programs that incorporate several applications—such as word processing, spreadsheet, graphics, and data management—and share a common interface and command structure. The application may be tightly integrated or in separate modules.
- **Operating System/Environment**
  An operating system or the environment that extends it. Operating environments allow you to share data among different off-the-shelf applications. They're often called windowing environments and sometimes feature graphic user interfaces.
- **Presentation Graphics**
  Programs that primarily produce charts for reports and business presentations.
- **Project Manager**
  Programs that track the tasks and resources associated with a project and graphically display project progress in a Gantt, PERT, or CPM chart.
- **Most Promising Newcomer**
  Vote for the recent software and hardware arrivals that you believe have had the greatest impact on personal computing. *Recent*, in this case, means products released after September 1, 1989.

Non-Awarded Categories:

The following categories won't be awarded—but your vote will definitely be heard in the industry. Use the power and vote—you *can* make a difference.

- **Local Area Network—Board**
  Tell us which LAN you think merits the most attention. We're looking for the names of network adapter boards that link PCs in a LAN—*not* the name of the network's file server or operating system.
- **Local Area Network—Operating System**
  Note which network operating system you think is the best. Please include the version.
- **Best Service and Support—Hardware Company**
  Which commercial hardware company do you think provides the best service and support? When voting, consider the cost, quality, and availability of a company's technical support, availability of on-site repair, toll-free numbers, generous warranties and extended warranties, and other related services, such as a customer BBS or on-line forum.
- **Best Service and Support—Software Company**
  Tell us which commercial software company provides the best service and support, using the guidelines noted above.
- **Best Mail-Order Company**
  Your vote is critical here, since more and more users are buying software and hardware through the mail. Key factors to consider: prices, technical support, on-site repair facilities, refund and return policies, and so on.

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HARDWARE

	Manufacturer	Name of Product	Model Number	
Sample Entry	XYZ COMPANY	PERFECT PC 286	16	
Desktop Computer (first prize)				1
Transportable Computer (second prize)				2
Laptop Computer (third prize)				3
Laser Printer				4
Dot Matrix Printer				5
Monitor				6
Modem				7
Memory Expansion Board				8
Graphics Board				9
Mass Storage				10
Scanner				11
Mouse				12
Most Promising Newcomer—Hardware				13

SOFTWARE

	Manufacturer	Name of Product	Version	
Sample Entry	XYZ COMPANY	TOPWORD	2.1	
Word Processing				14
Word Processing Utility				15
Desktop Publishing				16
Draw/Paint				17
Spreadsheet				18
Spreadsheet Utility				19
Relational Data Base				20
Flat-File Data Base				21
Data Base Utility				22
Communications				23
On-Line Service/BBS				24
Utility				25
Personal Organizer				26
Programming Language				27
Integrated				28
Operating System/Environment				29
Game				30
Presentation Graphics				31
Computer-Aided Design				32
Project Manager				33
Accounting				34
Tax Planning or Preparation				35
Personal Finance				36
Most Promising Newcomer—Software				37

READER POLL (Non-awarded categories)

Local Area Network—Board	Manufacturer:	Product:	Model:	38
Local Area Network—Operating System	Manufacturer:	Product:	Version:	39
Best Service and Support—Hardware Company				40
Best Service and Support—Software Company				41
Best Mail-Order Company				42

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Modem				7
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Graphics Board				9
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Scanner				11
Mouse				12
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Flat-File Data Base				21
Data Base Utility				22
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Project Manager				33
Accounting				34
Tax Planning or Preparation				35
Personal Finance				36
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Circle 302 on reader service card

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```
echo off
if "%1"=="" goto help
if "%1"=="-" goto reset
if not "%oldpath%"=="" set path=%oldpath%
set oldpath=%path%
set para=%1
:getpara
shift
if "%1"=="" goto setit
set para=%para%;%1
goto getpara
:setit
path=%para%;%path%
set para=
goto end
:reset
if "%oldpath%"=="" goto end
set path=%oldpath%
set oldpath=
goto end
:help
echo AP dir1 [dir2...] : Add a directory to PATH
echo AP -              : Reset to default PATH
:end
```

LISTING 2: This improved AP.BAT handles multiple directories.

misses a trick that can save keystrokes. My GO.BAT (see **LISTING 3**) repeats the first parameter on the third line so you can type GO WORD instead of GO WORD WORD. For my GO.BAT to work, you must give your subdirectories the same names as the applications stored there; thus, WORD.EXE must be in a subdirectory named \WORD. The fourth line of the macro is optional; leave it in if you want to return to the root directory after an application finishes.

S. Steve Adkins
Burnsville, Minnesota

Nonplused

A typographical error in **LISTING 3,** MENU.PRG ["Stylish dBASE Menus" *Star-Dot-Star,* October 1989], dropped a plus sign from the eighth line on page 232, where the listing continues.

```
c:
cd\%1
%1 %2 %3 %4 %5 %6 %7 %8 %9
cd\
```

LISTING 3: GO.BAT runs any application with the same name as its directory.

12NUMOPT should be 12+NUMOPT.

David W. Holland
New Braunfels, Texas

Editor's note: Thanks also to Joe Recchia of Pismo Beach, California, for spotting the error.

Tom Swan is the author of Mastering Turbo Pascal 5.5 *(Howard W. Sams and Co., Indianapolis, 1989).*

Share your tips and discoveries with PC World *readers; see How to Contact PC World, page 4.* ●

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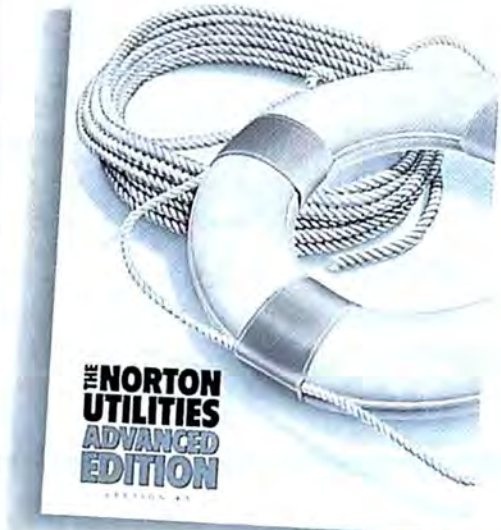

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Circle 91 on reader service card

NETWORK Q&A

Tips and strategies for departmental networking

Dial in? Dial out? Save money and centralize your phone communications with an asynchronous communications server.

David Ferris

Q. *We have a 30-node network. Four of us use modems to access a remote VAX and to get E-mail from MCI. We also have 5 salespeople who log on to the network from around the country using* PC Anywhere *and 5 dedicated PCs in the office. We're about to add 15 new salespeople, and if possible, we'd like to avoid buying 15 more PCs. And as long as we're rethinking our dial-in situation, we'd also like to give everyone in the office dial-out capabilities. Is there an economical way to upgrade and centralize our phone activities?*

Mike Smith
Houston, Texas

ANTHONY RUSSO

A. Absolutely. Not only will you save a bundle, but you'll probably make life a lot easier for your users.

What you need is an asynchronous communications server (ACS) to control the modems and handle incoming and outgoing calls. This is a networked PC (an 80286 will be fine) dedicated to telecommunications, with 640K of RAM and enough COM ports to handle the number of modems you need.

You'll still need a separate modem for every phone line, but since 30 users rarely require phone access at the same time, you should be able to get by with five or six lines. (This figure will vary, of course, depending on individual demands.) You'll also need network-capable telecommunications software so users can dial out, as well as remote dial-in software for your salespeople, but even so you'll save thousands of dollars.

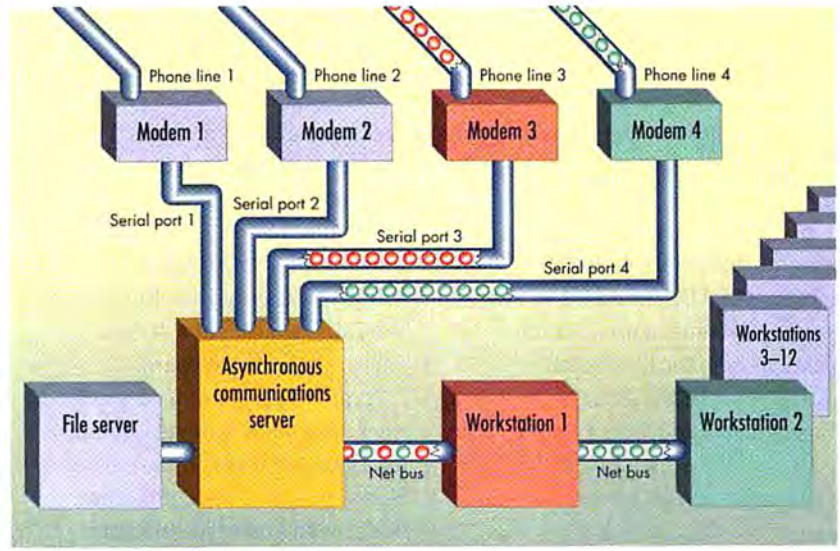
Dialing out and dialing in present different sorts of problems. I'll address the dial-out options in this month's column and look at remote dial-in next month.

Setting Up an Asynchronous Communications Server

Without an ACS, every dial-out user needs a phone line, a modem, and a telecommunications package like *Procomm Plus* running on his or her PC. For 30 users, that means 30 modems, 30 phone lines, and 30 copies of *Procomm Plus*.

(continues)

12 Workstations, Four Modems, One Server



An asynchronous communications server lets all the workstations on a network share a modem pool. In this configuration, whenever a workstation dials out, the call is automatically routed to the first available modem in the ACS pool.

TABLE 1

Individual Modems

Cost breakdown for dial-out access for 40 network users via individual modems.

40 modems at $300	$12,000
40 terminal emulation packages at $195	7800
40 modem cables at $30	1200
Total	$21,000

TABLE 2

Pooled Modems

Cost breakdown for dial-out access for 40 network users via pooled modems.

Communications server PC	$1500
Network adapter	500
Cabling for new PC	300
ACS control software	1500
1 ACS communications adapter	895
5 modems at $300	1500
5 modem cables at $30	150
Telecommunications software on server licensed for 5 users	600
Total	$6945

The ACS approach is very different. Here you dedicate a low-cost PC as an ACS by installing special software and hardware and attaching up to 30 modems. Then anyone on the network can use one of those modems to dial out as if it were attached to his or her own PC.

If you need to attach more modems than there are COM ports in the ACS (usually 1 or 2), you'll need a specialized communications adapter like Novell's WNIM+ or IBM's Artic board. Each adapter provides 4 to 6 COM ports; by installing multiple boards you can get as many as 30 COM ports on a single ACS.

You'll also need to run access-control software such as Novell's *NACS* or IBM's *LANACS* on the communications server. These packages allocate modems, route network traffic into and out of the modems, and send data where it's needed. These packages are hardware specific: *NACS* works only with Novell's WNIM+ board; *LANACS* requires IBM's Artic board.

In addition, you'll need a network version of your telecommunications software on the server. Make sure the package you buy works with your access-control software. For instance, *Crosstalk XVI* works only with *LANACS*, whereas *Crosstalk Mk.4* and *Procomm Plus* work with both *LANACS* and *NACS*.

From the user's standpoint, dialing out via an ACS is indistinguishable from using a standalone telecommunications setup. There's a dialing directory, a script language, file-transfer capabilities, screen capture to disk, and emulation of five to ten common terminal types.

Everybody Into the Pool

What does pooling your modems buy you? A lot.

Hardware and Software Savings If you have a lot of users, the ACS approach is enormously economical. Suppose you have a 40-node network; as **TABLE 1** shows, the costs of installing a modem, cable, and software for each PC would be considerable.

However, if no more than five users need to dial out at the same time (which is fairly typical), you can get by with five pooled modems attached to an ACS. **TABLE 2** shows typical costs for such an installation—a tidy $14,000 in savings over the cost of using individual modems.

Installation/Maintenance Savings Installation of hardware and software takes place on the ACS, not at local PCs. Because users can keep working, this means minimal loss of productivity. Another advantage: If users need to be relocated later, you won't have to change the dial-out cabling.

(continues)

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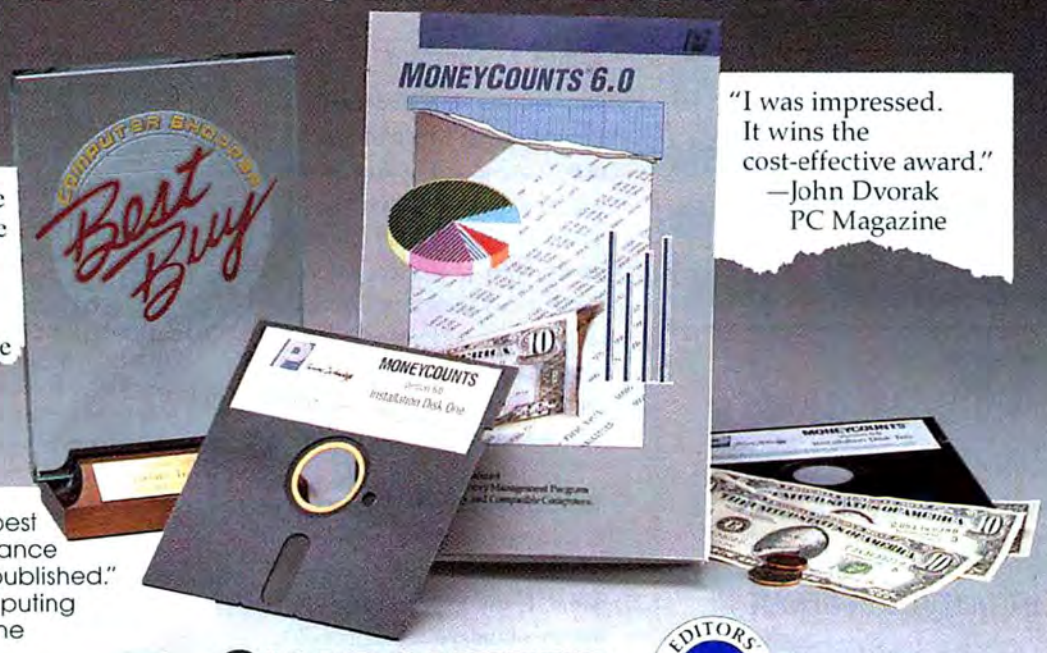

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Things to Consider

Emulations and Protocols

Depending on which minis, mainframes, and on-line services you'll be accessing, you may need specific terminal emulation, file-transfer protocols, and so on. Make sure the network telecommunications package you buy supports the emulations and protocols you need *and* works with your access-control software.

Modem Support While you're at it, make sure your telecom package works with your modems. If you happen to be using nonstandard modems (with hardware error checking, for instance), you could discover a serious lack of software support. Also, not all modems that advertise themselves as Hayes compatible are 100 percent compatible; if you're buying only five modems to handle all your network traffic, you might want to spend a little extra and buy real Hayes boxes.

Baud Rate Faster modems cost more, but they can be a smart buy in a network environment since they get users on and off line quicker, freeing up the ACS for other traffic. Don't buy anything slower than 2400 bps; 9600 bps may make even more sense.

Sold on modem pooling using an ACS? There's more good news ahead. In the next issue, we'll see how to handle incoming calls. ●

David Ferris is the president of Ferris Networks, a San Francisco–based consulting firm specializing in networks.

For more information about all products in this article, circle reader service no. 903.

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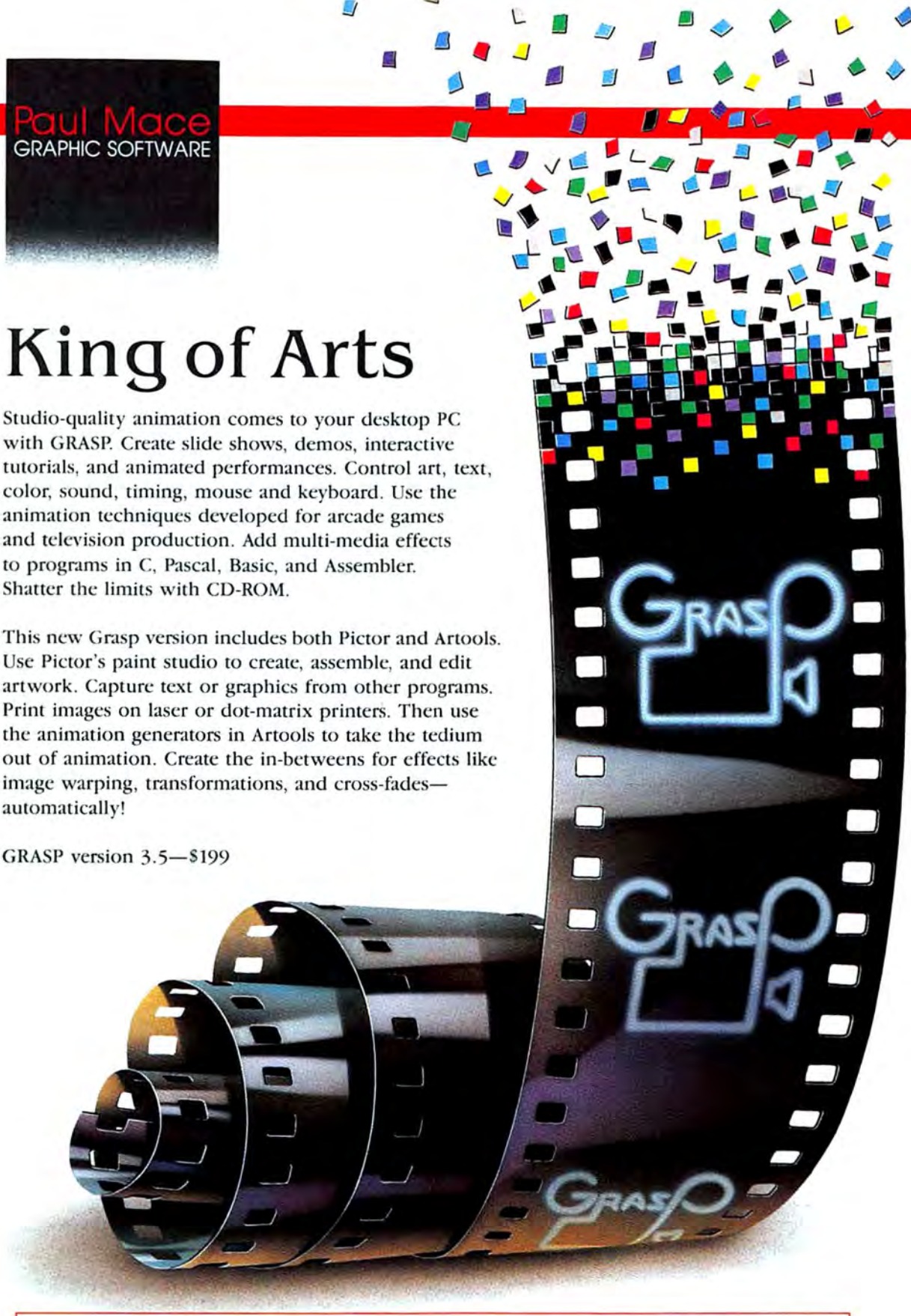

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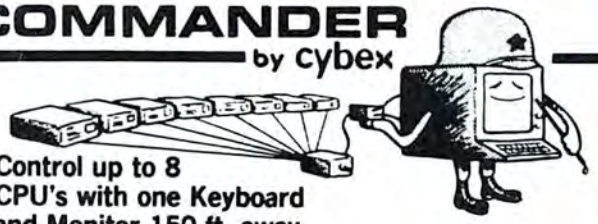

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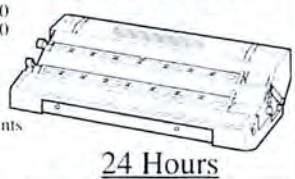

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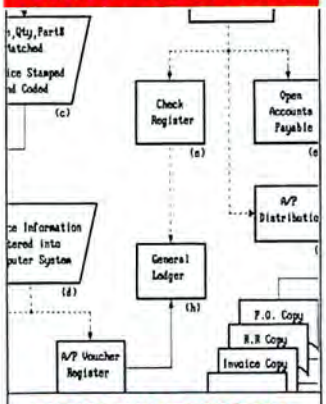

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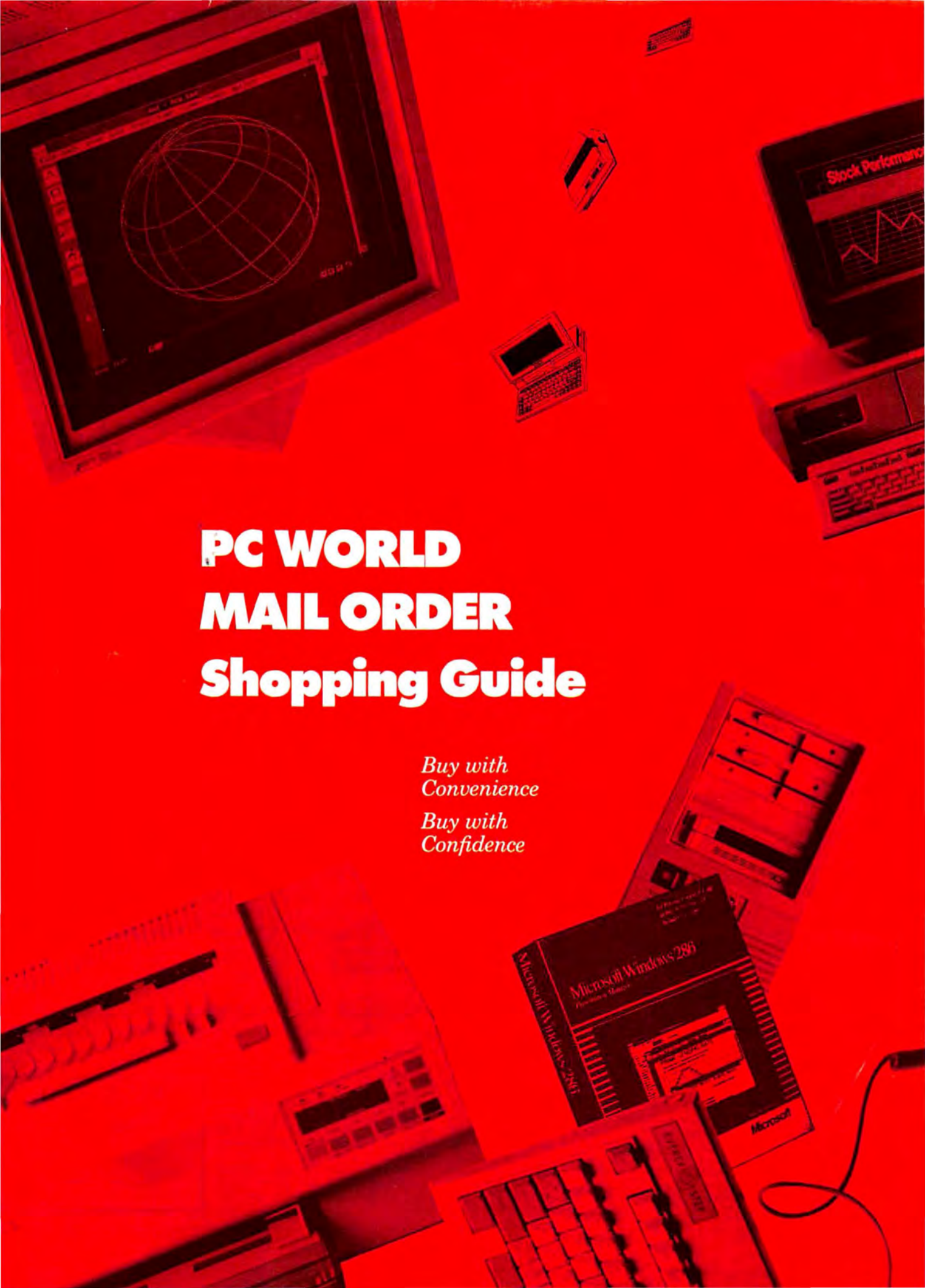

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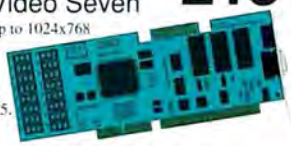

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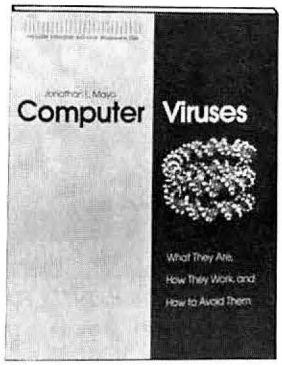

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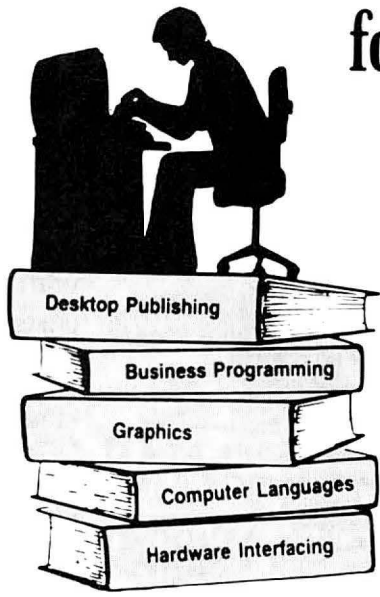

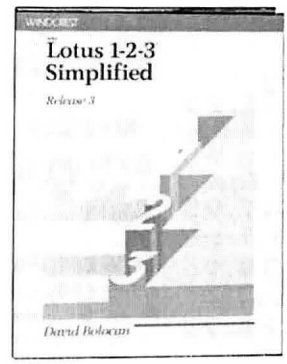

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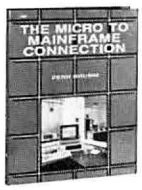

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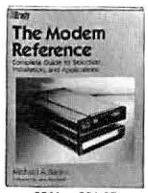

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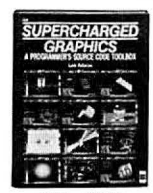

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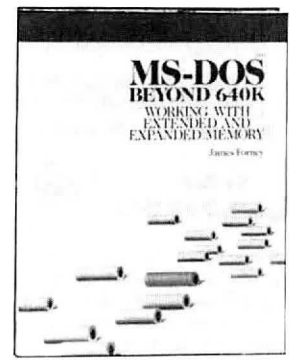

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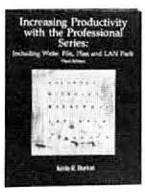

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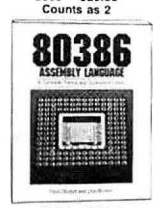

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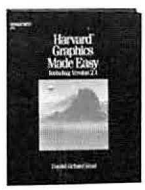

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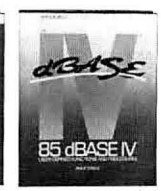

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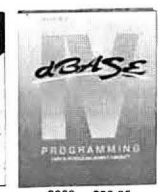

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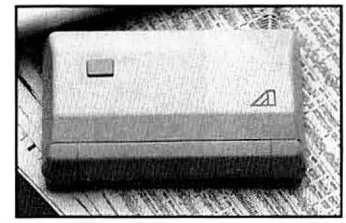

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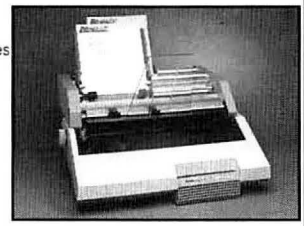

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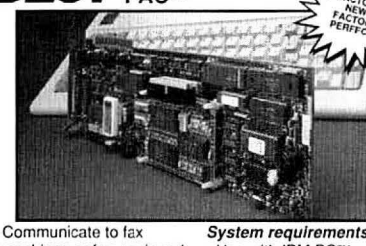

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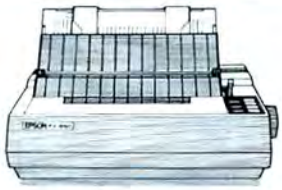

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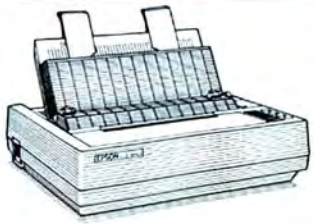

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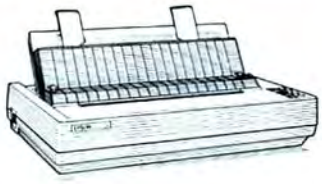

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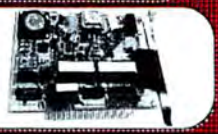

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TAKING IT HOME

The practical guide to home/office computing

A home office could spell tax savings.

Lawrence J. Magid

Do you use a PC to work at home? More than 66 percent of *PC World* readers do. If you're one of those "blessed" with that freedom, this column is for you.

You've no doubt noticed that you face a different set of computing issues at home than you do at the office—perhaps different software, almost certainly different hardware, and, of course, nagging differences in disk size and file format.

If you're like me and have to underwrite your own home computing, you'll want to wring every ounce of value from the investment and minimize work's encroachment on your free time. In the coming months, I'm going to explore ways to do just that, so send me your questions and suggestions. Meanwhile, the calendar says it's that time of year when Uncle Sam tries to wring a few extra dollars out of us.

I'm sure you've heard that working at home means potential tax deductions for computer, supplies, and work space. But these write-offs can be tricky—especially the home office. I'm not a CPA and can't give professional advice, but I want to mention a few potential tax benefits to explore with your accountant.

Start with the PC. If it's used for business more than half the time, you may be able to write off all or part of the price in a single year. Ditto for other equipment, software, and on-line information services as well as a business phone line.

Even if used for business less than half the time, equipment and programs can be depreciated. But your home equipment must be "for the convenience of your employer" to be declared an employee expense, and if you have a PC at the office, you might not qualify. It's easier to make a case if you have a side business.

The IRS scrutinizes deductions for home-office space even more closely. You may be able to deduct a portion of rent or mortgage, utilities, and maintenance; but you have to prove that working at home is a condition of employment or you have a side business.

Good record keeping is essential for tax purposes, obviously, and you'll find plenty of tax and personal finance programs that help (see "Personal Finance Software Goes to Work," February 1990); you may already use a check printer like *Quicken 3*. Such programs also offer an efficient way to record and organize different categories of business income and expenses. You then can easily generate summary reports for your tax preparer or transfer the data to one of the tax preparation programs.

ChipSoft's *TurboTax*, the winner of *PC World*'s World Class award four years running, directly reads files from *Quicken* and handles standard ASCII files from other record keepers. *Andrew Tobias' TaxCut* is an interesting alternative. It accepts information from *Quicken* and the famous *Andrew Tobias' Managing Your Money* and now is sold with the *Ask Dan* "expert system," which provides instant advice from tax attorney Daniel Caine. *TurboTax* has excellent help features and some tax advice, but *TaxCut* goes one better, conducting an interactive Q. and A. session with you before making recommendations.

Even if you plan to take your returns to a tax professional—a good idea—these programs help you organize your thoughts and your records and give you a better understanding of the tax game as it applies to you. If you're lucky, that means more dollars will stay in your pocket. ●

Lawrence J. Magid is a syndicated computer columnist.

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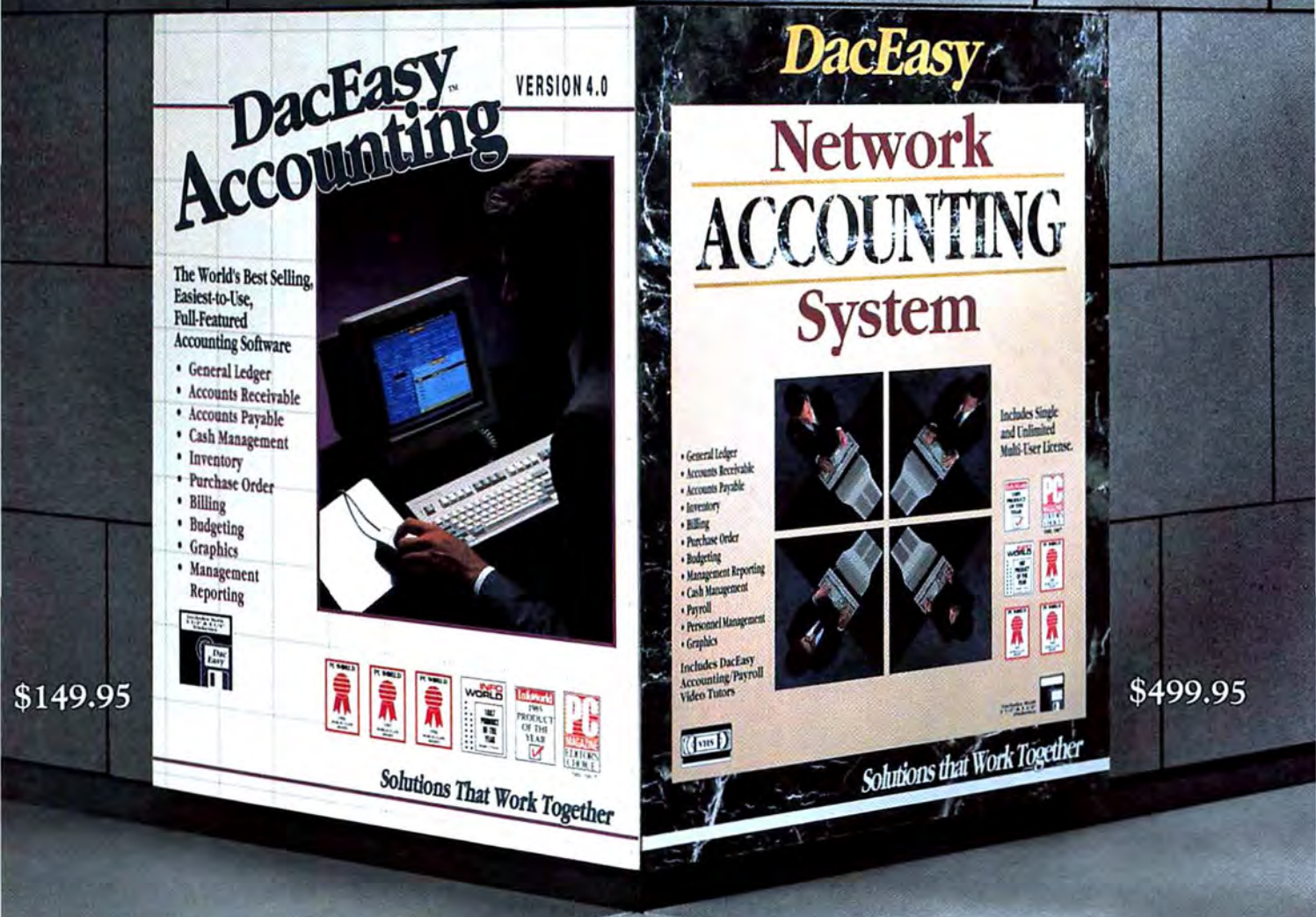

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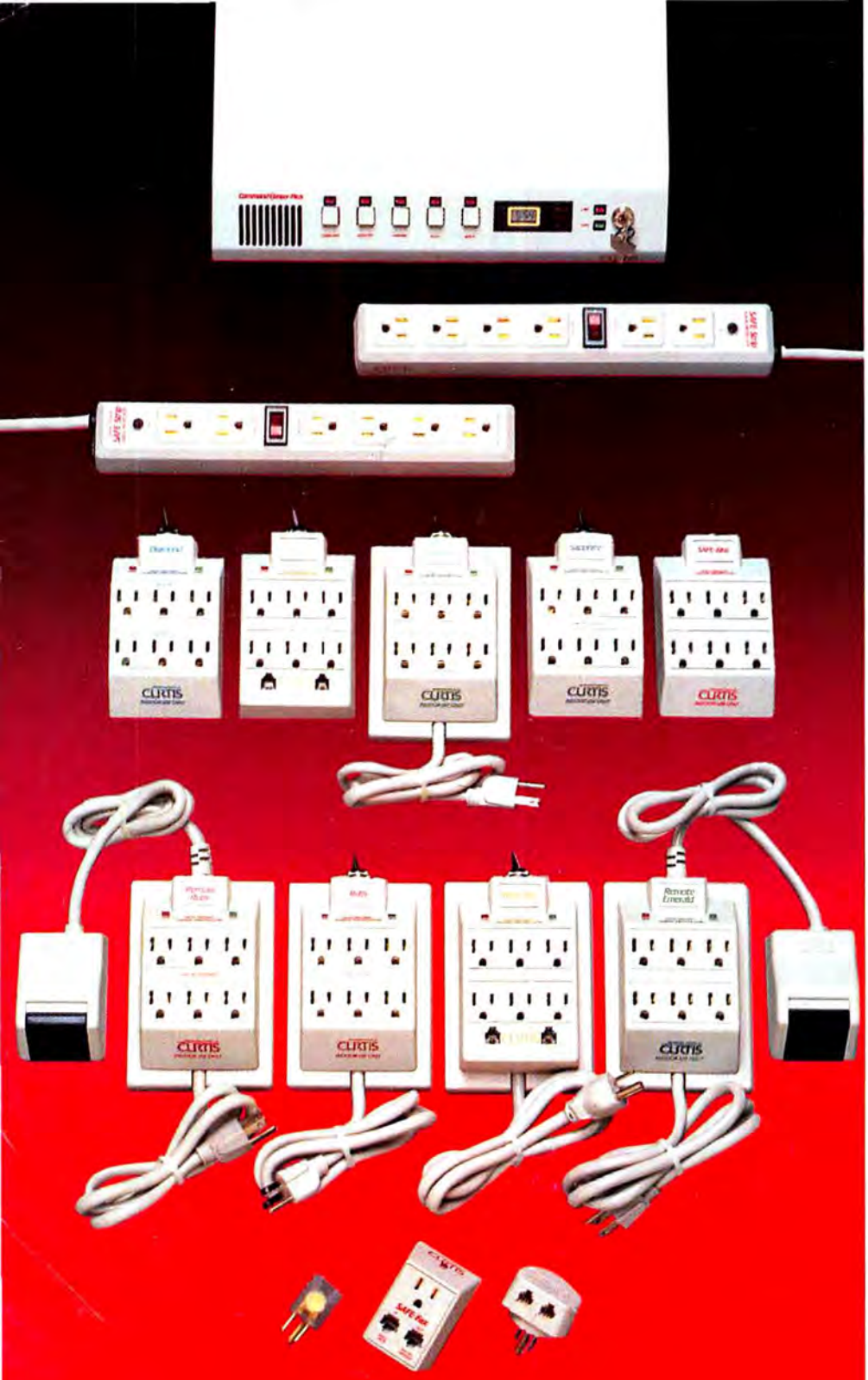

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