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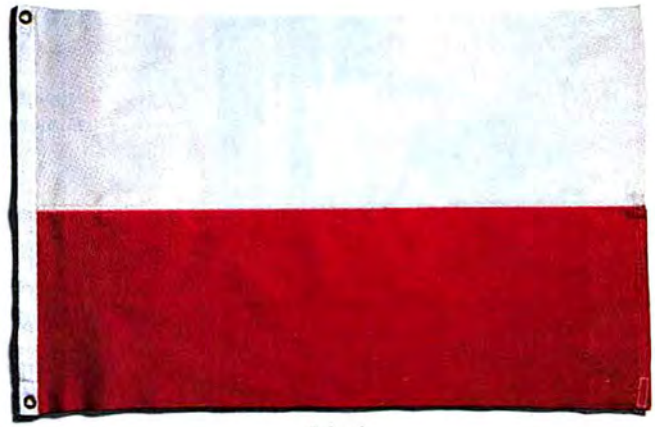

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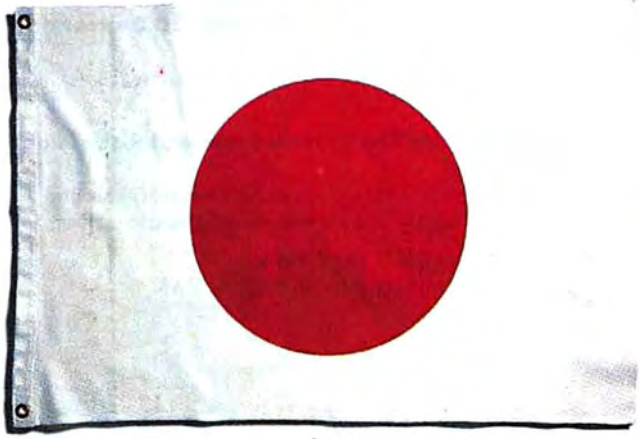

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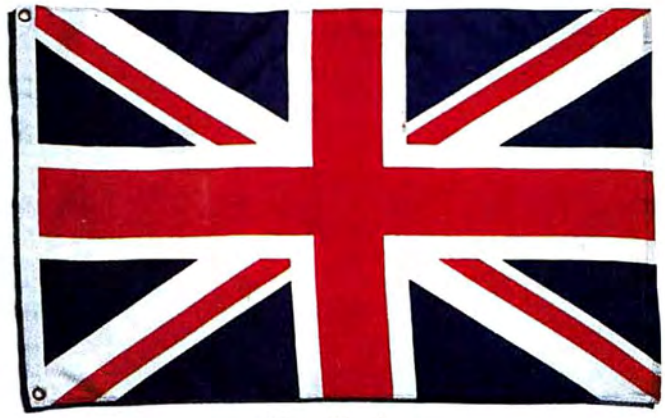

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Cover photograph by Fred Stimson

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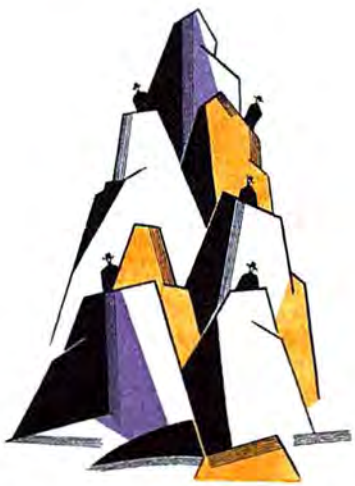

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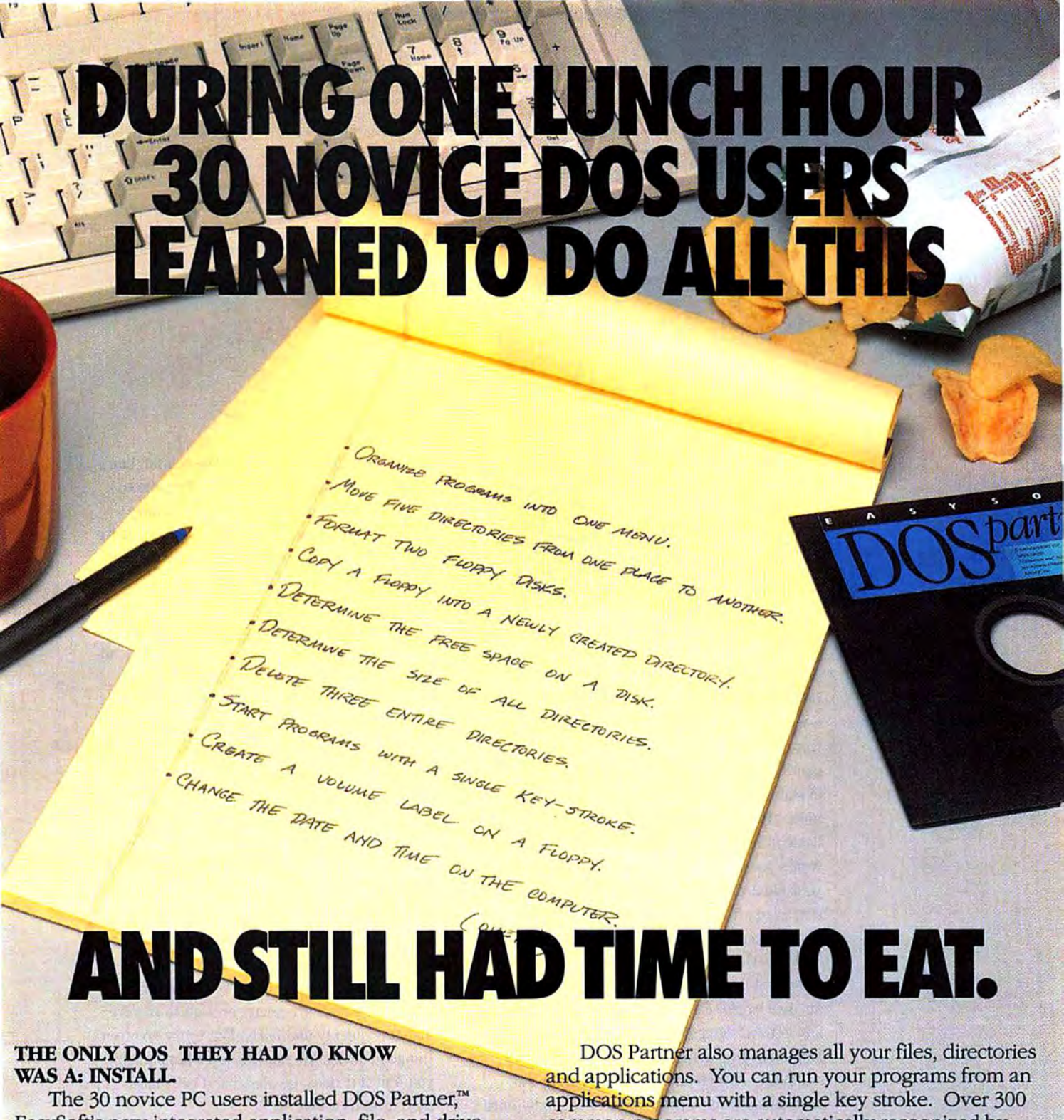

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Consumer Watch editor Roberta Furger

There's absolutely nothing intuitive about being a smart computer consumer." That's the considered opinion of *PC World*'s most ardent consumerist, Roberta Furger. "Making intelligent buying decisions costs time *and* money," explains the editor of our *Consumer Watch* column. "It takes precious time to track down reliable information, and of course every vendor wants you to believe that its product is worth your hard-earned dollars. And the sad irony is that even after you invest all that time and money, you can still get less than a fair deal."

When that happens, *PC World* readers have a court of last resort in *Consumer Watch*. "In an ideal world, *Consumer Watch* wouldn't get any letters," Furger says. Fortunately for her long-term employment prospects, the *CW* mailbox sees a steady stream of horror stories, lamentations, cautionary tales, and—once in a while—words of praise about computer vendors.

The questions Furger selects for her column make it one of *PC World*'s most popular features, but there's much, much more to *Consumer Watch*. For every letter you read in these pages, our *CW* staff researches and resolves dozens. "*Consumer Watch* gives individual readers some clout," Furger explains. "When we get involved, there's a much better chance they'll be heard. And the column benefits even people who don't take the time to write. One letter means more people have probably experienced the same problem. If we get five letters with the same complaint, that means a *lot* of people are having difficulties with a company."

Furger and her crew also beat the drum to convince companies to fix policies that take advantage of consumers. "For example," she asks, "if you order a product by mail and pay with a credit card, when do you get charged? If your card gets debited before the product is shipped, it may be legal, but it's not fair."

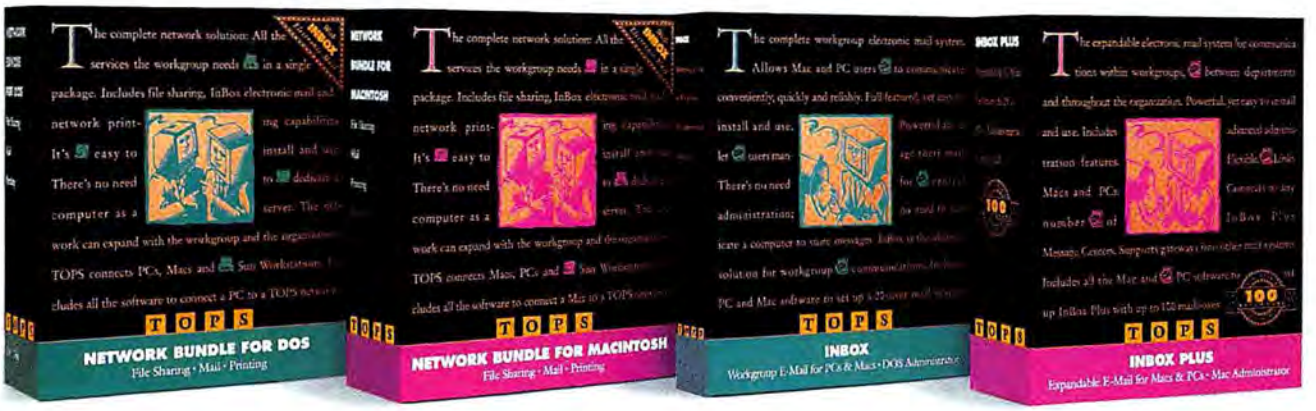
Does the torrent of complaints suggest that there's an ethics gap among hardware and software vendors? "Thankfully," Furger says, "there aren't that many out-and-out crooks. In most cases, problems arise because companies have grown so fast that customers just get lost in the shuffle. Our job is to keep steady pressure on the industry—to remind them that it's in their best interests to serve the buyer."

Most vendors are smart enough to resolve disputes quickly and fairly. But every so often things go awry. We hope it never happens to you, but if it does, go ahead and get mad—then drop us a line. ●

Ed Bott

Ed Bott
Managing Editor

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



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Novell Sells Name Service

Multiserver LAN Facility Fixes Major Strategic Shortcoming on NetWare Servers

Novell has announced a global name service for NetWare 286 and 386 servers that will simplify both LAN administration and user access to multiple servers' facilities. Billed as only one step toward a full hierarchical naming service, the $1995 *NetWare Name Service (NNS)* still greatly simplifies the procedure for addressing workstations or printers in a multiserver environment. It lets a LAN administrator create a domain of up to 400 servers and 5000 users, identifying printers, gateways, and other services so that users can call upon them by name rather than by searching across servers. In the event of a change, the administrator can use *NNS*'s NETCON utility to update domain and user profile scripts across all servers in a domain simultaneously. Updates can take place after hours, and *NNS* requires no change to network software currently installed. Vice President of Marketing Mark Calkins estimates that as many as 40 percent of Novell LANs have multiple servers, adding that this segment has great strategic importance for the company. In a similar move, Novell has updated the *NetWare Print Server* to give up to 8 servers access to a printer and to let users access up to 16 printers attached to DOS workstations anywhere on a net.

Memory Prices Rising?

DRAMs Are Probably as Cheap as They'll Get, So Buy Extra Memory Sooner Rather Than Later

PC makers are awash in cheap dynamic random access memory (DRAM) chips right now, but some fear demand will outstrip supply this year, driving up PC memory prices or even causing shortages. While the Japanese, who dominate DRAMs, are not likely to repeat the production cutback mistake that touched off the 1988 DRAM shortage, they seem to be underestimating the potential demand of consumer electronics products, says Albert Wong, cofounder of AST Research and founder of AMKLY Systems, a new Compaq-compatible memory board supplier. If a serious shortage occurs, the Japanese will have a strong incentive to supply their large consumer electronics divisions and their own PC operations before supplying U.S. PC makers, agrees In-Stat senior analyst Mike Feibus. Larry Hootnick, president of Intel's Embedded Memory/Controller Group, also expects growing consumer electronics demand, adding that February's 1-megabit DRAM price of around $60 per megabyte is probably the all-time low for this cycle. The Koreans, led by Samsung, dumped so many DRAMs on the market this year that prices were halved and the Japanese stranglehold broken. But with prices so low for 1 megabit, some fear that the Japanese may shift production toward the higher-value 4-megabit DRAMs, further reducing 1-megabit supplies in the long term. Intel has expanded its DRAM remarketing efforts through a joint venture with Japan's NMB Semiconductor in order to provide Intel processor clients with a one-stop chip supply, says Hootnick. Other U.S. firms also are getting back into unprofitable DRAMs, mostly for defensive reasons, adds Feibus.

PageMaker 4.0 Coming

Aldus Ships Macintosh Version of Desktop Publisher, a Precursor to Windows Offering

Aldus Corporation has introduced *PageMaker 4.0* for the Macintosh, giving PC users a glimpse of what they can expect in the long-awaited *Windows*-version upgrade. Although Aldus won't comment on specifics of the *Windows* version, the company has consistently provided common features and functions across platforms and will continue that strategy, says *PageMaker* product manager Mike Sherwood. The Mac version's most notable feature is the Story Editor, a text window for faster word processing. Also new are a spelling checker and search-and-replace capabilities, as well as the ability to create a table of contents and a multilevel index. These last two, and a new Book feature for linking multiple publications (or chapters), help with long documents. Aldus has enhanced network support, adding the ability to notify users of changes to a document so that they can update their copies. Support for long documents and workgroup–based creation of publications are features that compete directly with rival *Ventura Publisher*, says International Data Corporation analyst Joan-Carol Brigham, who adds that *PageMaker* still trails *Ventura* in that regard. Aldus insists there will be no word on the PC version until Microsoft announces *Windows 3.0*.

DOS Extenders Standardizing

DPMI Spec to Regulate Multitasking With Large Programs

In a move that should enhance DOS applications and provide yet another pillar under the operating system, a group of leading software vendors has "agreed to agree" on a standard for DOS extenders in multitasking environments. Meeting at Intel's invitation, Lotus, Microsoft, Borland, and DOS extender vendors such as Rational Technology and Phar Lap established a committee that will draw up a DOS Protected Mode Interface (DPMI) specification to govern the interaction of large applications with each other, DOS, and OS/2. Memory-hungry applications like *1-2-3* release 3, Borland's *Paradox 386*, and Ashton-Tate's *dBASE IV* already employ the wares of Rational Technology or Phar Lap to address memory beyond DOS's 640K barrier. Their adherence to the Virtual Control Program Interface (VCPI) ensures smooth operation in a single-tasking environment. But Microsoft wants an industry standard that prevents conflicts with OS/2, *Windows 3.0*, and other environments that themselves insist on controlling hardware and how multiple applications access it. For the user, DPMI means that a multitasking environment can run several large DOS extender applications simultaneously by allotting processor time among them so that background applications don't need to shut down when a foreground application is running. An estimated 1 million copies of DOS extender applications are installed.

NEC Shows Laptop

386SX Machine Defines New Market Segment That Replaces Much of 286 Market

Customers who might have purchased 17-pound 286-based laptops last year will probably opt for 15-pound 386SX-based models this year, predicts NEC product marketing manager J.T. McDonald. NEC hopes to capitalize on this trend with its ProSpeed 386SX. The SX laptop is similar to the year-old ProSpeed 386 but sacrifices some of the expandability and desktop convenience of its docking station–equipped sibling. Still, it is 2 pounds lighter, it offers a battery life of 3 to 4 hours (compared to the 386's 1 hour), and its $5999 40MB version and $6799 100MB version are $600 and $900 cheaper, respectively, than comparable ProSpeed 386 models. These advantages, says McDonald, will realign the laptop market into two core segments—386SXs and notebooks. He expects products like the ProSpeed 386SX to garner that 25 percent of portables users currently served by 286-based equivalents, while only about 5 percent of buyers will opt for full 386-based models. Up to 50 percent of users will be attracted to very small notebook portables like NEC's 4.4-pound UltraLite. But there is a sizable group of middle managers, accountants, software developers, and others who spend half their time on the road and need more power and storage than the notebooks provide but with less weight than full 386s, says McDonald.

IBM Debuts Workstations

Next-Generation RISC Machines and PS/2s Will Run NextStep as Option

IBM has unleashed a family of technical workstations and servers it claims leapfrog rival machines from Sun, Hewlett-Packard, and DEC by exploiting second-generation RISC chip technology. The new POWER (Performance Optimized With Enhanced RISC) models start with a $12,995 offering (which IBM touts as "the world's most powerful desktop workstation") and run AIX, IBM's version of UNIX. "These are really hot products," says Amy Wohl of Wohl Associates, expressing the consensus among analysts. "There's a lot of power here, and this is an industry where speed is nearly everything." However, she points out that almost no POWER software is available now and questions IBM's estimate of 1500 third-party applications by year-end. Then, too, IBM must sort out marketing and distribution for the engineering/scientific arena. IBM's entry into this segment in 1986 with the RT PC gained a pitiful market share, but Wohl expects the POWER machines to make IBM "an important player." Among the graphical environments available, one is based on software from the Open Software Foundation consortium and another is a version of Next, Inc.'s NextStep that IBM also plans to offer on PS/2s under AIX late this summer. Next chairman Steve Jobs says applications can be moved among all three platforms with minimal effort and hopes that IBM's blessing will speed application development. But IBM is keeping its environment options open, even hinting that the POWER machines may offer OS/2 later. ●

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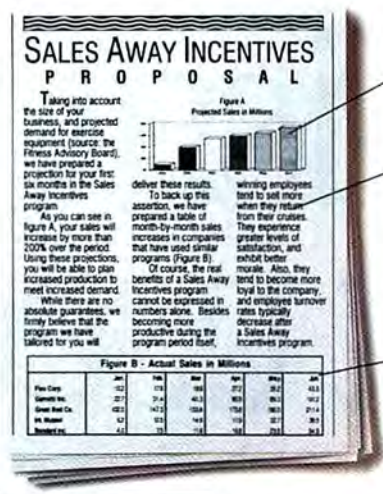

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FRED STIMSON

Richard Landry

Beyond Look-and-Feel

Look-and-feel lawsuits are yesterday's battleground for yesterday's software. Tomorrow's programs will have more in common than ever before.

Do you remember the look-and-feel controversy of 1987? Lotus, undisputed kingpin of the spreadsheet market, flattened fledgling rivals Paperback Software and Mosaic Software with a lawsuit charging that their products *VP-Planner* and *Twin* illegally copied the screen design, menus, and commands of best-seller *1-2-3*. Most observers, including a vast majority of *PC World* readers surveyed at the time, gave a big thumbs-down to Lotus for using the courts to stifle competition. Lotus fired back that copycat software suppressed innovation, making it less likely that users would continue to get new and better PC solutions.

Three years later, the famous suit has finally come to trial, and Lotus seems poised for an easy victory. Meanwhile, for the rest of the software community, look-and-feel has moved out of the courtroom and back into the development lab, where the name of the game is to build the next generation of products with unprecedented similarity to one another in form and function. In fact, today the whole notion that users benefit when applications don't look and act alike seems outmoded and faintly ridiculous.

A New World of Cooperation Protecting the look and feel of a software package from cheap knockoffs makes sense in a world of stand-alone applications. After all, if somebody else profits from your research and development efforts, then you might not continue to enhance your product, making it ever more complete and useful—right?

But running ever more powerful stand-alone software isn't the order of the day for most people; nor is buying single-vendor solutions. Instead, the real bang in PC productivity comes from tapping the computer's talents as a powerful communications device. Word processing, spreadsheet, data base, graphics, and LAN E-mail programs—they're all needed to help people analyze and transmit vital business information, and no vendor has the single best tool in all these categories. Still, users must be able to move information easily from one program to the next. They can't afford the time it takes to learn new applications from scratch or to resolve incompatibilities between programs. That puts the burden on software packages to function in a consistent way and to work seamlessly together. Even natural competitors must cooperate to achieve that end.

Ironically, Lotus seems to understand this point better than most. Even while anticipating a courtroom victory, Lotus is working feverishly to ensure that its next-generation software operates smoothly with other major applications. Lotus's *1-2-3* and *Freelance* are already leaders in their fields. On the data base front, Lotus bought Sybase, a technology partner in the development of Microsoft's *SQL Server*, and created *DataLens*, which lets developers easily move data base info into and out of *1-2-3*. And in word processing, Lotus struck the most potent deal of all—a technology-sharing agreement designed to ensure that *1-2-3/G* and all other Lotus products built for OS/2's Presentation Manager will work intimately with *WordPerfect* for PM.

(continues)

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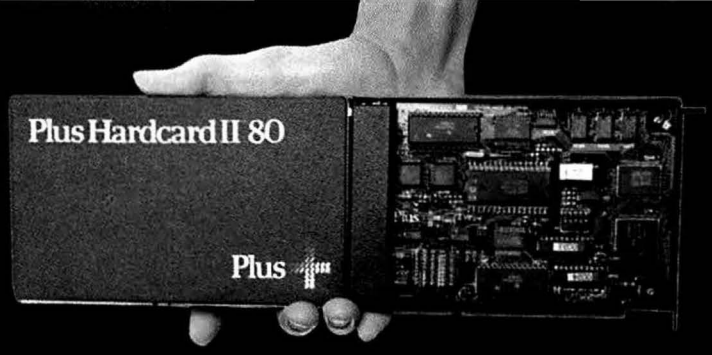

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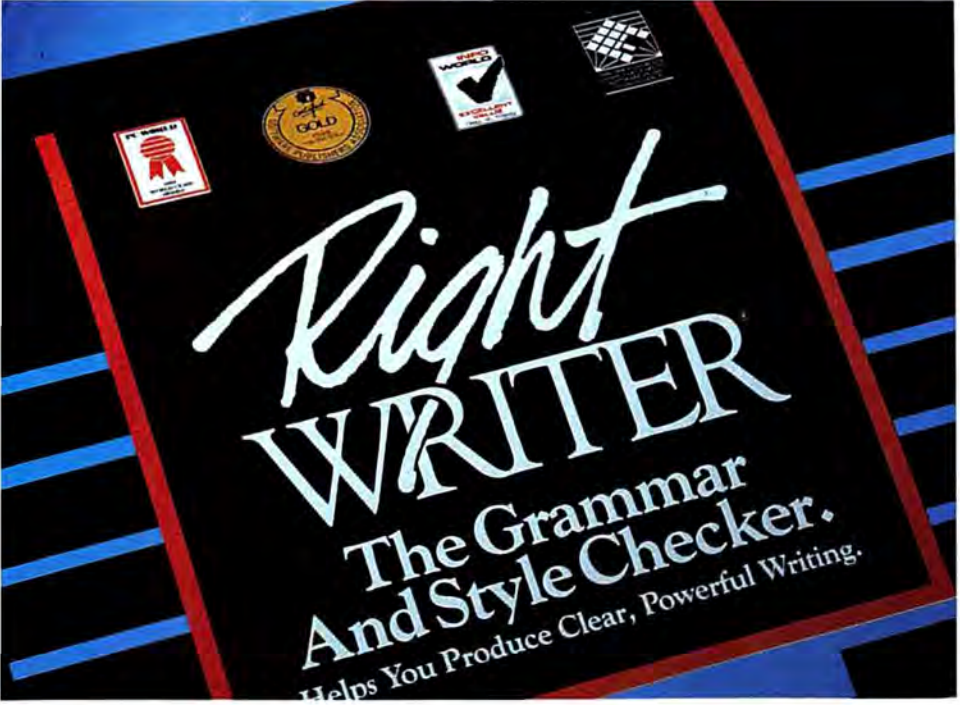

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Circle 226 on reader service card

RICHARD LANDRY

Microsoft hasn't been asleep in this arena, either. Even while it argues with Apple over ownership of the Macintosh/*Windows* interface, Microsoft is hard at work with Apple on a common font format that will let users view and print the same document in a consistent way, whether from within a *Windows*, a PM, or a Mac program. More important, Microsoft is working with leading *Windows* vendors to establish Dynamic Data Exchange (DDE) as a standard protocol to let *Windows* and PM applications trade information seamlessly. In some cases it will genuinely be hard to tell where one application begins and the other ends, as with *Excel* and the data base add-in *Q+E*.

The Law of Open Standards

Legal maneuvers have a way of distracting people from the most pressing matters. In the case of software look-and-feel, the law is pushing the industry in precisely the wrong direction, a point that look-and-feel holdouts like Ashton-Tate should consider. While A-T presses rivals like Fox for control of the dBASE standard, will technology lead users to look elsewhere for an *open* data base standard that ensures all brands of software can work together?

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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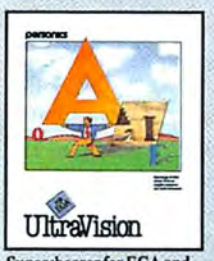

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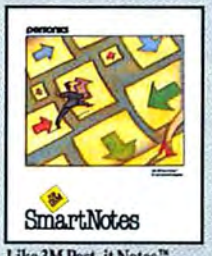

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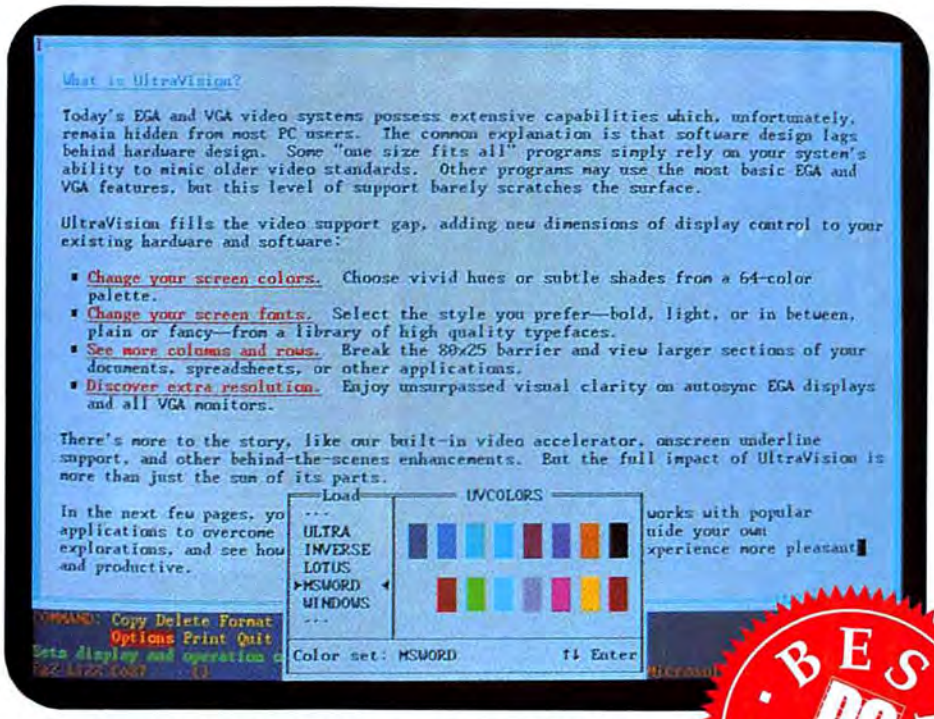

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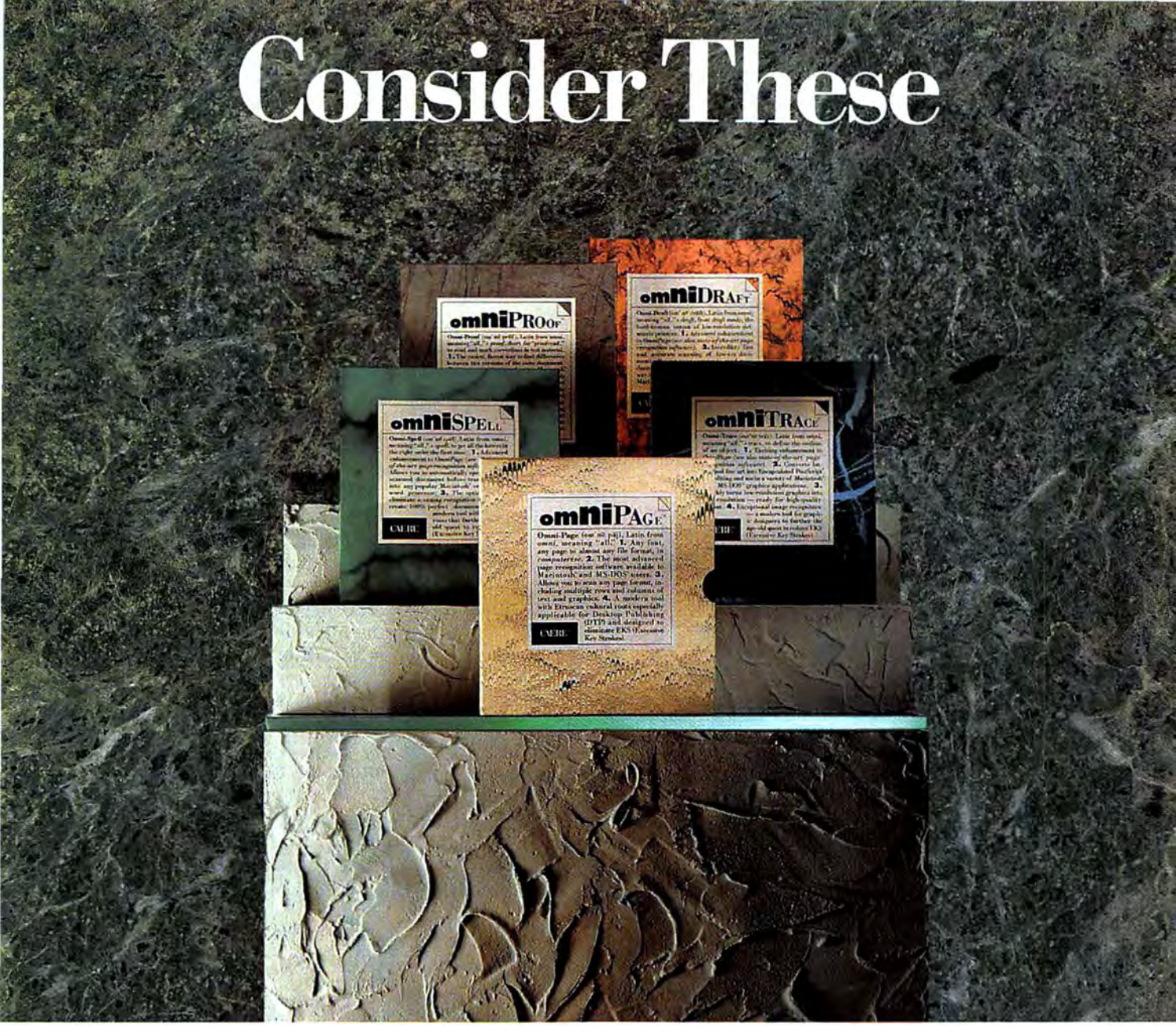

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*Excessive Key Strokes (EKS) has been known to cause knee quivers and thumb spasms in data entry personnel, engineers and graphic designers who work with computers.

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

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LETTERS

Reactions and responses from the PC World community

Windows Is the Bridge

Richard Landry's January 1990 editorial states that IBM is finally endorsing *Windows* for its low-end systems with 2MB of memory and 30MB or less of hard disk space. While it's nice to know IBM finally recognizes someone else's multitasking environment for the PC, Big Blue's endorsement doesn't amount to much. Most people with *Windows* would prefer to run it on a 386 with at least 4MB of RAM and a 40MB hard disk—but that would start encroaching on the territory IBM has earmarked for OS/2. I'm with you, Mr. Landry—for now, at least, OS/2 belongs only at the heart of a network. My PC is better off with *Windows*.

Gary I. Jones
Indianapolis, Indiana

Cookie Fiends and Cat Lovers

In your December 1989 review of 12-MHz ATs, you pictured the systems alongside crumbly cookies, a glass of milk, a bottle of wine, and a cat.... The only thing you forgot was an overflowing ashtray. Shame on you! Crumbs and spills from food and drink can get into the computer and keyboard mechanisms and wreak havoc there. I never tolerate food, drink, or smoking in the computer area. Besides, occasionally getting up and walking away is good for the circulation.

Ursula Chautems
Pierrefonds, Quebec, Canada

BUD PEEN

Your home-office photographs highlight one of the most serious problems facing home PC users—not price, performance, or picking a version of *1-2-3*, but keeping your cat away from the machine. Shedding cats are a nuisance around delicate machinery, but unfortunately they seem to be magnetically attracted to it. It's a relief to know your photographer had the same problem!

T. M. Dennis
Boise, Idaho

Not a Pretty Face

What a rude surprise to see Pacific Data's 25 Cartridges in One listed in "Top Ten Upgrades for Under $500" [December 1989]. Its 172 fonts are variations, in point size, orientation, and style, of only six typefaces—and 102 of the 172 are repeat fonts, differing only in their character sets! Compared to Bitstream's Fontware, the cartridge was easy to install. But Bitstream's installation kit, complete with three typefaces scalable to any size, comes free with *WordPerfect 5.0*, making 25 Cartridges in One seem a poor value.

Daniel Lee
San Diego, California

The comparison between soft fonts and cartridge fonts is not so simple. For an in-depth discussion of the relative merits of both types of fonts, see The Help Screen *in this issue. —Ed.*

Menu Master

Thank you for Scott Spanbauer's January how-to article on using *The Norton Utilities* to set up a menu system. It makes what appears to be a daunting task into something simple.

Spanbauer was right about the menu system being too slow on an XT. The solution—setting up a RAM disk—certainly works, but only if you have the memory. Here's another speed-up method *(continues)*

ANTHONY RUSSO

We've taken someth documents. The

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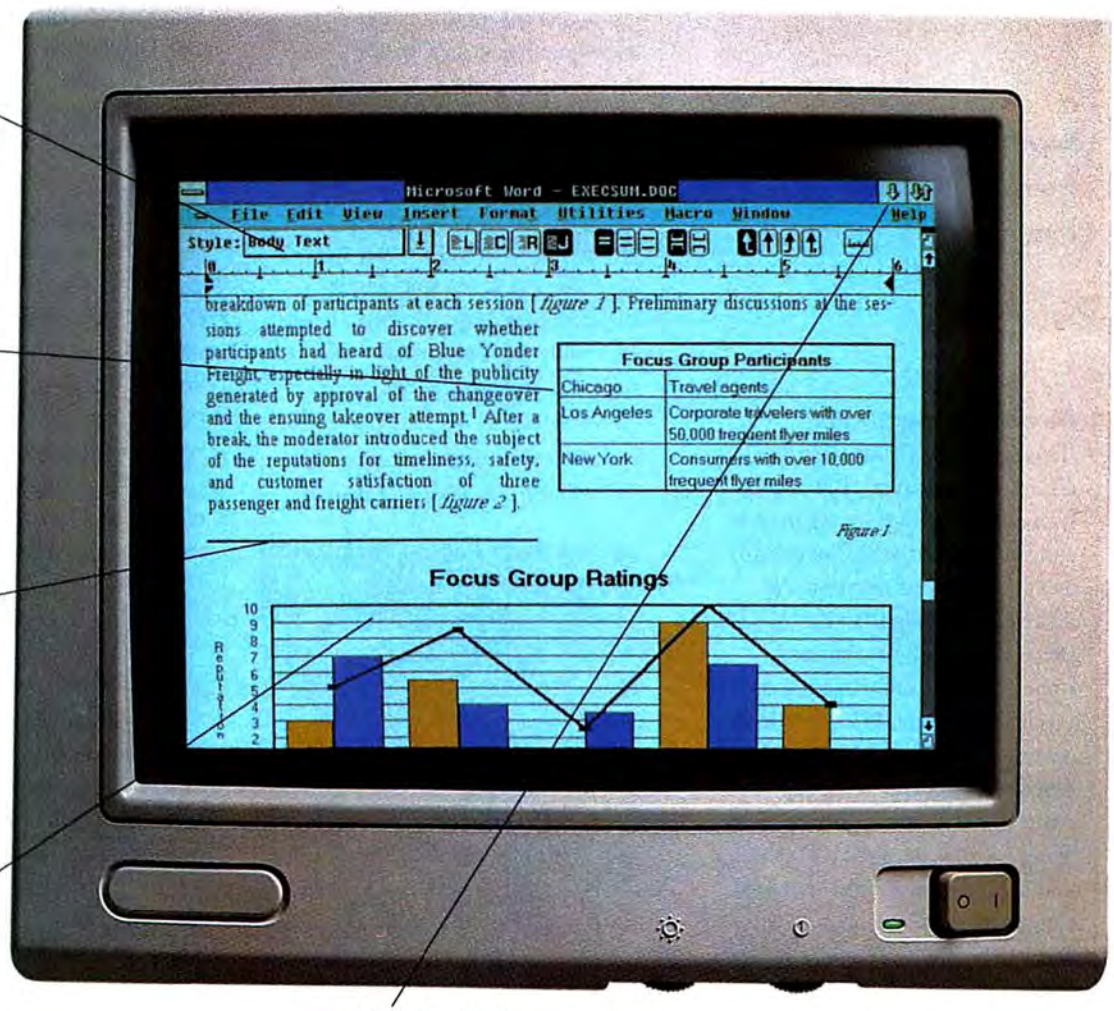

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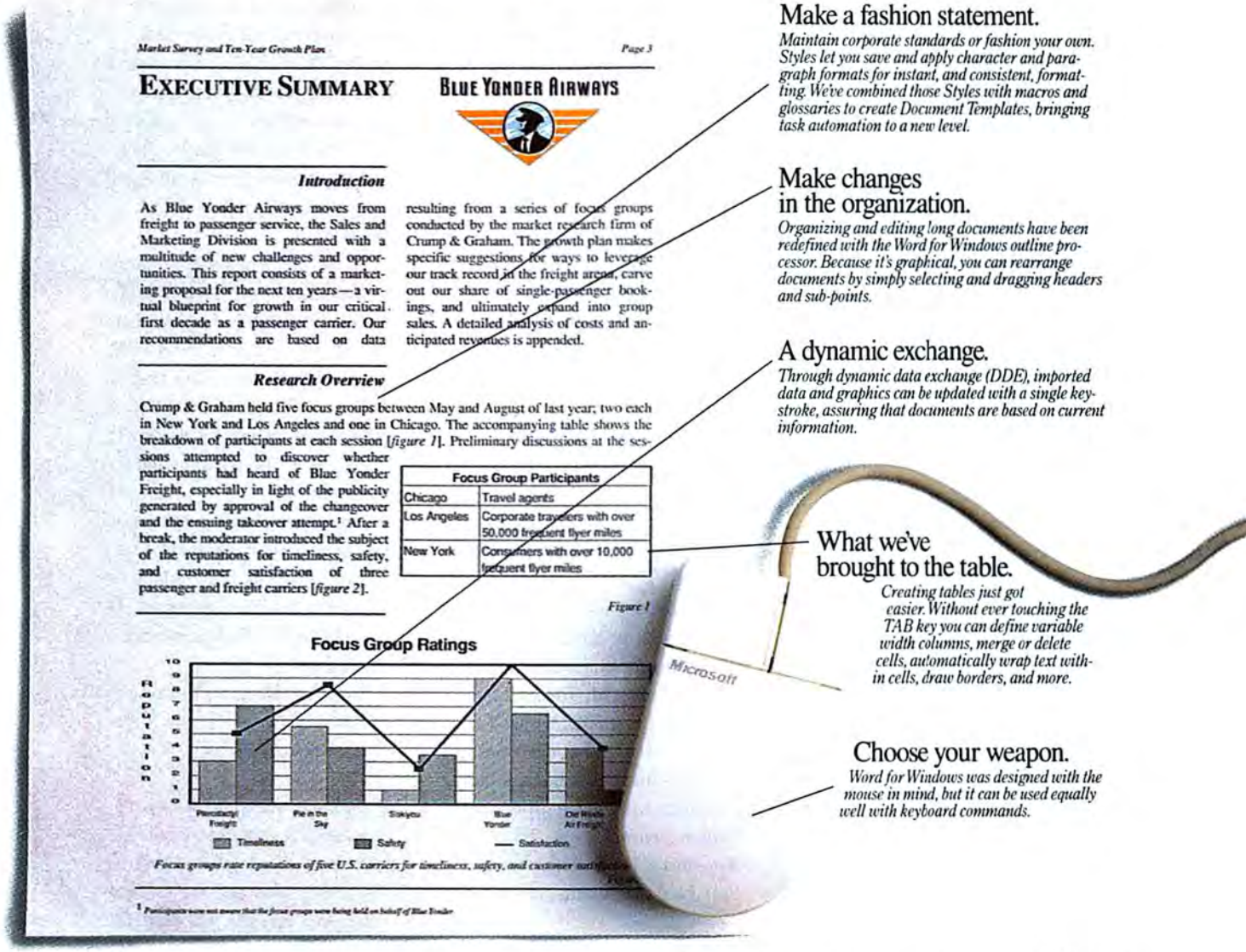

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that anyone can use: Specify the drive and directory when calling up the files so that DOS knows where to find them without having to search the path. One of the first lines listed in your MENU.BAT, 'be sa reverse', would thus read 'c:\nu\be sa reverse'.

Erik Skamser
Chicago, Illinois

Off to a HeadStart?

I am puzzled by your coverage of the HeadStart III. After you selected this system as a Best Buy in June 1989 [*The Hardware Shelf*], November's *Consumer Watch* stated that none of the software bundled with the system works on any other system. In December 1989's roundup ("12-MHz ATs: Home-Office Alternatives"), John Diebold spoke very highly of this computer, rating it "second best" in the roundup and "almost good enough for a Best Buy." He doesn't mention the software incompatibility. Whose advice should I follow?

T. T. Vandergraaf
Pinawa, Manitoba, Canada

Why does a Best Buy from June fall short of the mark in December? PC World's *Best Buy is awarded only to the products that represent outstanding value in a category. Not every review has one. When the overall standard of products in a given market rises and prices drop—as was the case with 12-MHz ATs—Best Buys aren't automatically awarded to former recipients.*

HeadStart bundles Framework *and other programs as a value-added bonus to their customers. This software is licensed for use on one system only and is modified to work only with the HeadStart system. Files produced by the bundled software are compatible with regular versions of the programs. —Ed.*

Crossing the Channel

The January 1990 review of MCA compatibles, "Micro Channel Clones Flunk the Test," was a departure from the normal good journalism in *PC World*. You chose to define Micro Channel compatibility not according to standards set by IBM and upheld by MCA vendors, but by the ability to run the entire spectrum of peripherals that work on IBM systems.

Even among IBM products, not every peripheral will run in every combination with every system. Of the dozens of products you tested, only four showed any problems—and that's a better rate than the AT standard achieved. The fact that some boards work more smoothly on IBM machines than on compatibles implies that the boards' designers tested them only on IBM machines.

Your most serious accusation is that American Mitac's MPS 2386 system could not function as a file server with Token-Ring and Arcnet PC 100MCA boards. In our own labs and at customer sites, there has never been a single problem with these products.

Shawn Leuthold
American Mitac Corporation
San Jose, California

I am disappointed by your January MCA roundup. Worse, I'm confused by the change in review standards from your April 1989 review of the Tandy 5000MC.

[In January] you found Grid and Tandy machines incompatible with a Hayes 2400P internal modem. We have verified our design with an external Hayes version. It also works with IBM's modem—who are we measuring compatibility with?

Our engineers have run our design with both the IBM Token-Ring and SMCA Arcnet cards named. Did your reviewers contact anyone here about the alleged problem? I find no evidence of it.

In April you said "Tandy's drive options are much more flexible than IBM's." We achieved that flexibility by using an *industry*-standard rather than MCA-standard connector. How come a noteworthy plus in April is a noteworthy minus in January?

Proprietary memory slots until now have never been considered incompatible. In your April review, you tested a 32-bit IBM memory card, reporting that it "ran as well with the 5000MC as with the Model 80 we stole [it] from." Now, there's a memory incompatibility?

[In January] it appears a good rating could only be earned by a "clone," and that value-added designs are being discouraged. Is this *really PC World*'s intention?

Ed Juge
Director, Market Planning
Radio Shack
Fort Worth, Texas

If there are compatibility problems with a system, we want users to find out about them when they read our review, not after they buy the machine. Our view on compatibility is quite simple: If a system is advertised as MCA compatible, it should work properly with MCA peripherals. We do change our compatibility test suites as new peripherals become available.

Take the Hayes Smartmodem 2400P. It worked perfectly in the

(continues)

Ted Standish has a bear of a job.

As Director of Information Resources for the North Atlantic Shaving Group of The Gillette Company, he has the task of simplifying and standardizing the business systems of the Company's European and North American divisions.

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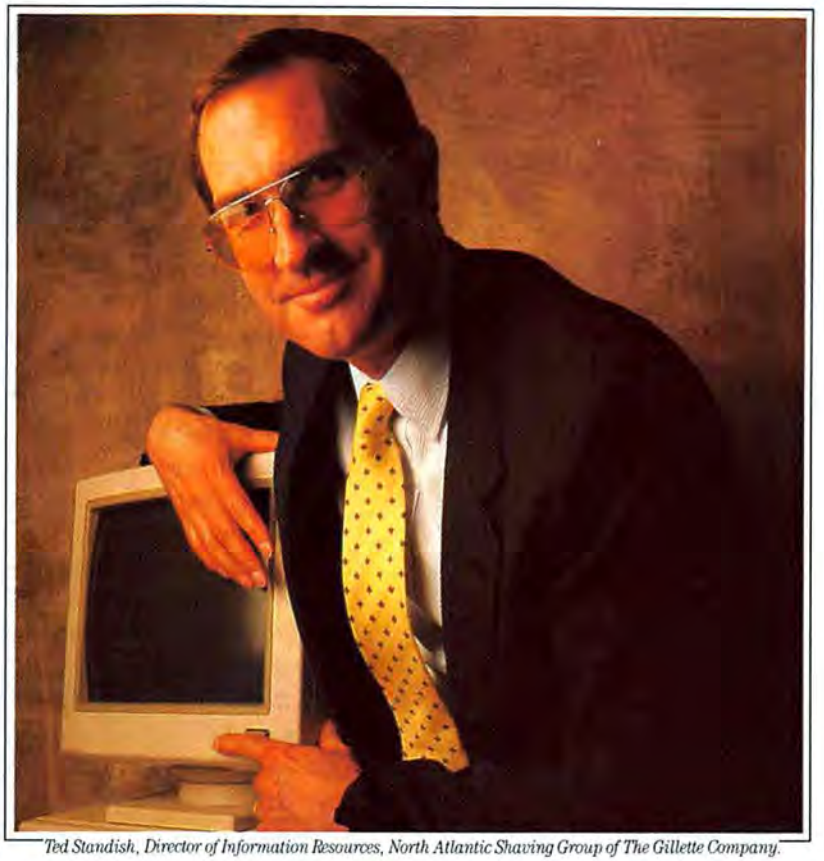

Ted Standish, Director of Information Resources, North Atlantic Shaving Group of The Gillette Company.

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IBM PS/2 Model 70 and Model 55SX (and in the NCR), but it would not configure ports or interrupts correctly on the Tandy, the Grid, or the American Mitac; there were also errors during the power-on self test. A user who bought a Hayes 2400P expecting it to work in one of those PCs would run into the same problems.

We're glad to hear that Tandy and Mitac were able to make their respective systems work as file servers—but using the installation software provided, NSTL technicians were not. (They had no problems with an IBM PS/2 Model 70.) Again, end users would encounter difficulties. We stand behind the article's conclusion: These systems lack a level of MCA compatibility sufficient to justify recommendation.

Mr. Juge is correct about the wisdom of choosing industry-standard connectors. In our attempt to warn users that they would be unable to install peripherals using a PS/2-style floppy drive connector, we should have explained that they would certainly be able to use AT-style peripherals (which are both abundant and cheaper) without any loss of functionality. We regret the omission.

We know that both Tandy and American Mitac have worked hard to make their systems good values; we hope our tests will help them deliver on that promise by pointing out some problem areas. —Michael Goodwin and Karl Koessel

Corrections and Clarifications

Power Tip No. 73 (November 1989, page 212) omitted a critical element. The DOS command DIR *. lists subdirectories and files without extensions.

Our December 1989 *Product Outlook* item about Pan Overseas' Echo 386 contained a number of errors. The company is currently shipping only one model, running at 20 MHz, which is priced at $7499.

The output samples in our January 1990 fax board review were labeled incorrectly: The captions for the Intel Connection CoProcessor and the Panasonic FX-BM89 Plus 2 were switched. *PC World* regrets the errors.

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

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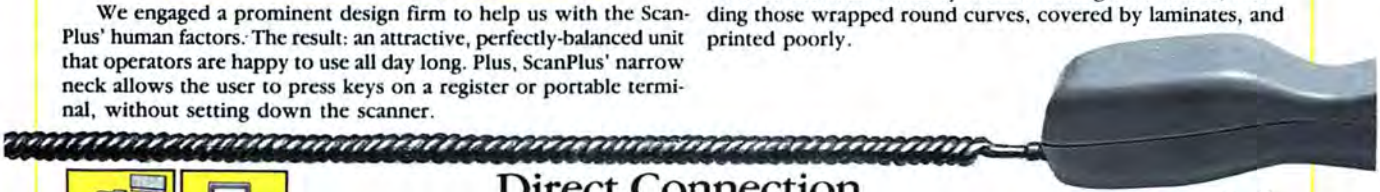

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100 MB VGA color system	$2,916

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80286 16Mhz

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- MS DOS (choose 3.3 or 4.01)
- Integrated Floppy Controller
- Memory Management Software

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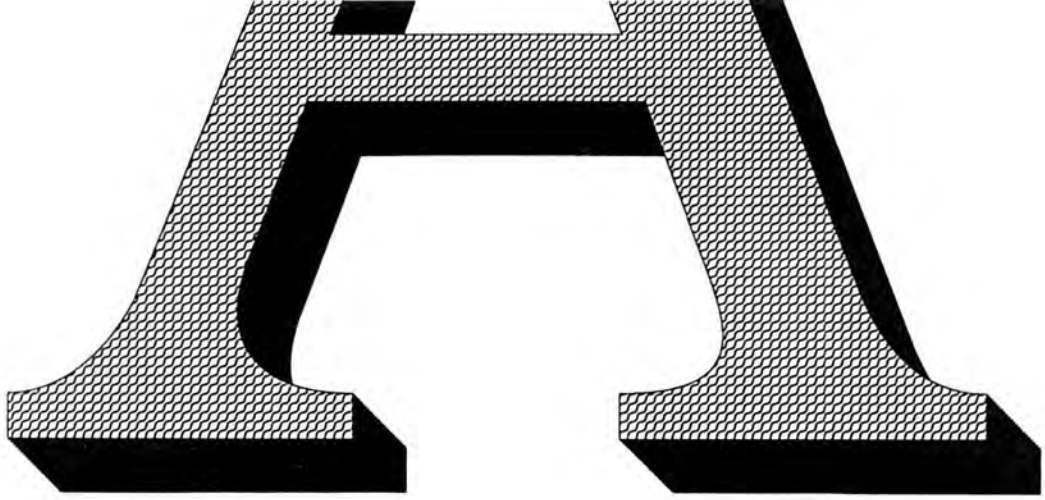

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Karl Koessel

Managing Life's Imperfections

Q. *DOS's CHKDSK [check disk] command tells me how much storage space is on my hard disk. It reports how much is used—by hidden files, directories, and user files—and how much is unused and available. It also reveals how much is lost to bad sectors.*

I understand that formatting divides each hard disk track into 512-byte segments and that an imperfection along a track—no matter how small—renders the entire sector containing the defect unusable. But I wonder just how many bad sectors are acceptable on a hard disk?

W. A. Schneider
Englewood, Colorado

A. If you pay $600 for a 20MB hard drive that has 20 bad sectors, you're being cheated out of almost 30 cents, or what amounts to less than 1/20 of 1 percent of your total storage space. Obviously, neither money nor storage is the issue. However, the number of bad sectors is indicative of the quality of the disk's media and, by extrapolation, its manufacturing.

I would say that a disk that has an average of more than two bad sectors per megabyte is unacceptable. A hard disk with hundreds of bad sectors might live a full and trouble-free life. Statistically, however, disks with more bad sectors are more likely to develop problems.

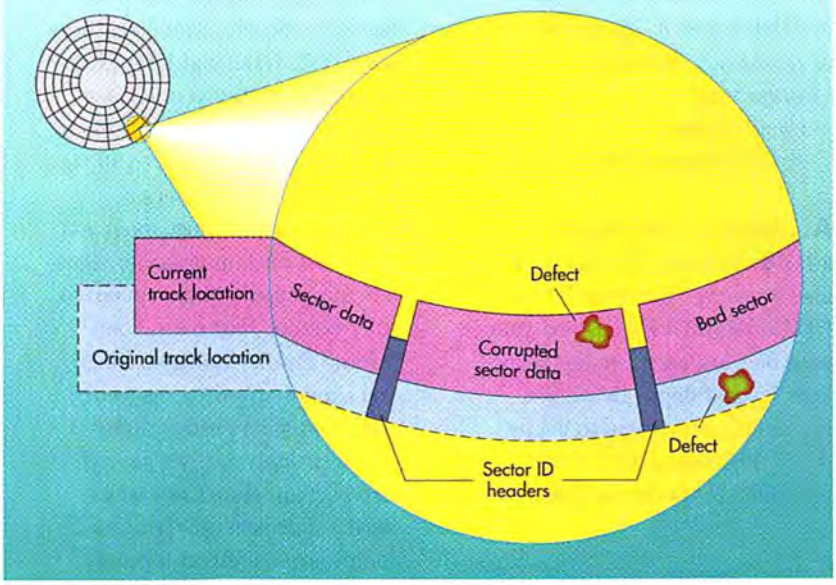
Not all defects lie within a sector's track (see **FIGURE 1**, adapted from literature included with Gibson Research's *SpinRite* hard disk utility)—some are be-

(continues)

FIGURE 1

A Close-Up Look at Your Hard Disk

A hard disk's heads can be jarred slightly out of place, resulting in drifting sectors. If a sector drifts across a defect that was originally between tracks, data is corrupted.



ANTHONY RUSSO

tween tracks. As the drive heads move back and forth over the disk, they may be jarred slightly out of place, resulting in "drifting" tracks. If a good sector drifts across a defect, it loses its data. It seems to follow that the more bad sectors a disk has, the more defects there are between tracks waiting to cause trouble.

By the way, CHKDSK never sees the bad sectors of modern SCSI drives. The drive handles bad sectors itself, so CHKDSK thinks there aren't any (though the total size it reports will shrink as bad sectors are "masked" out).

Bulletproof Backup

Q. *I recently purchased a program called* CheckFree *to handle all my banking transactions electronically. I realize that backing up my data after each session is essential, since a loss would leave me in the dark about my checking account. However, I'm a new user and not sure of the best way to go.*

All I really need to back up are data files that have changed since the last backup. Should I use DOS's BACKUP command, or would you recommend another program?

Chris Hansen
Santa Barbara, California

A. *CheckFree* data files have a DMS extension. You should also preserve your user ID file, CPB.UID. If CPB.UID and your data files are each smaller than your largest floppy drive, you can simply copy them to floppy disks. Then use DOS's COMP command to verify the copies. If COMP reports a mismatch, repeat the process.

If the files are larger than your largest floppy drive, you must use a backup program. DOS's BACKUP command is certainly sufficient to do the job. Let's assume your *CheckFree* files are in the directory C:\CF. First, use the command BACKUP C:\CF\CPB.UID A:. Then issue BACKUP C:\CF*.DMS A: /A. The /A switch, for add, specifies that this backup should add its new files to those already on the backup disk (so you don't lose the backup of CPB.UID). Don't use BACKUP's /M switch, which causes BACKUP to ignore files that haven't changed since the last backup—you want to back up all your data files.

Other backup programs can be faster and easier to use than BACKUP (see "Fast Floppy Backup," January 1989, and the item on *SitBack* in *Product Outlook*, February 1989). Often, they let you save a list of the files to be backed up, enabling you to back up the CPB.UID and DMS files using a single command.

CheckFree 2.0 includes a proprietary backup routine (found on the File Utilities menu) that backs up the essential files (those with DAT, IDX, and UID extensions), prompting you for new disks as needed. The upgrade to the new version is free to all registered *CheckFree* users.

In any case, I must warn you that most backup programs have one major flaw—they will fail to fully restore your data if one backup disk is damaged. Since you cannot afford to lose your data, you must ensure that you can accurately restore your entire backup. Here's one way to verify your backup: Create a temporary subdirectory and copy CPB.UID and the data files into it. After verifying the copies using COMP, back up the *CheckFree* directory's ID and data files. Then, restore the *CheckFree* files and use COMP to compare the restored files with those in the temporary directory.

Data Unaffected by DOS Upgrade

Q. *I use DOS 2.1 with my hard-disk–equipped PC clone to run a spreadsheet, a word processor, and various other software. All the data files were created under DOS 2.1.*

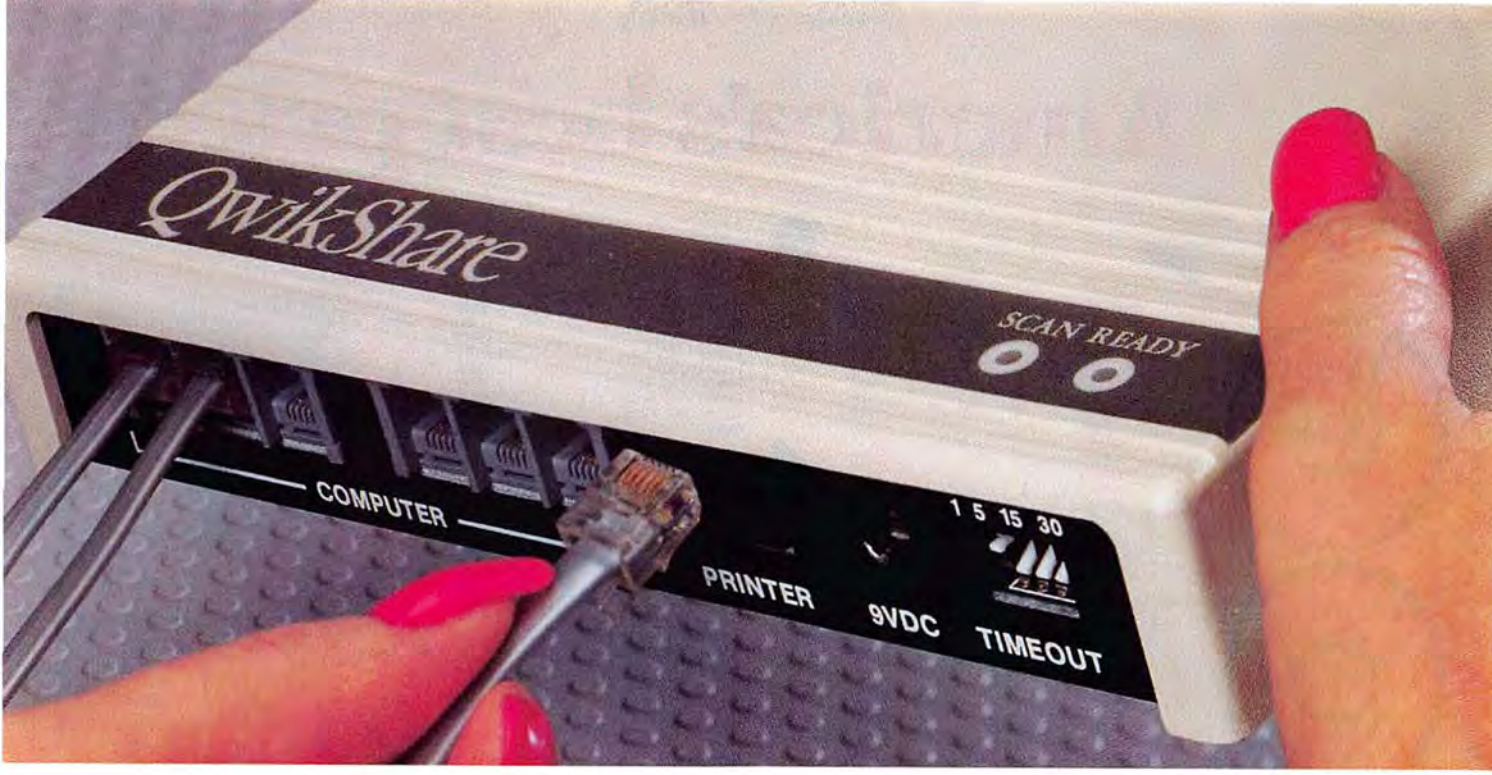
*Several programs that I've read about require DOS 3.0 or a later version. Would installing DOS 3.*x *affect data that was saved under DOS 2.1? Will I be able to access and edit that data once I change to DOS 3.*x*? What other changes, if any, would I have to make?*

Werner Freundlich
Upper Montclair, New Jersey

A. DOS versions are upwardly compatible—that is, each DOS version can read and write all the formats that previous versions can. You'll have no difficulty accessing, reading, or editing your data. You will, however, have problems installing DOS 3.*x* or a later version on your hard disk.

When a disk is formatted to be bootable, two hidden system files are placed at the beginning of the disk. Those two files must be the first files in the directory, and one (containing the default system device drivers) must occupy contiguous sectors for the disk to boot. Upgrading from

(continues)



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DOS 2.0 to 2.1 was fairly easy, since you could use the SYS command to simply overwrite DOS 2.0's original system files with DOS 2.1's.

Unfortunately, you can't do the same when upgrading from DOS 2.*x* to DOS 3.*x* because the new version's system files are larger. To make room for DOS 3.*x*'s system files, you must back up your data files and reformat the disk using the DOS 3.*x* command FORMAT C:/S/V. Then restore all but the system and DOS command files. Finally, copy the new DOS's command files to the hard disk's DOS directory and verify the copies using COMP.

Converting Program Disks

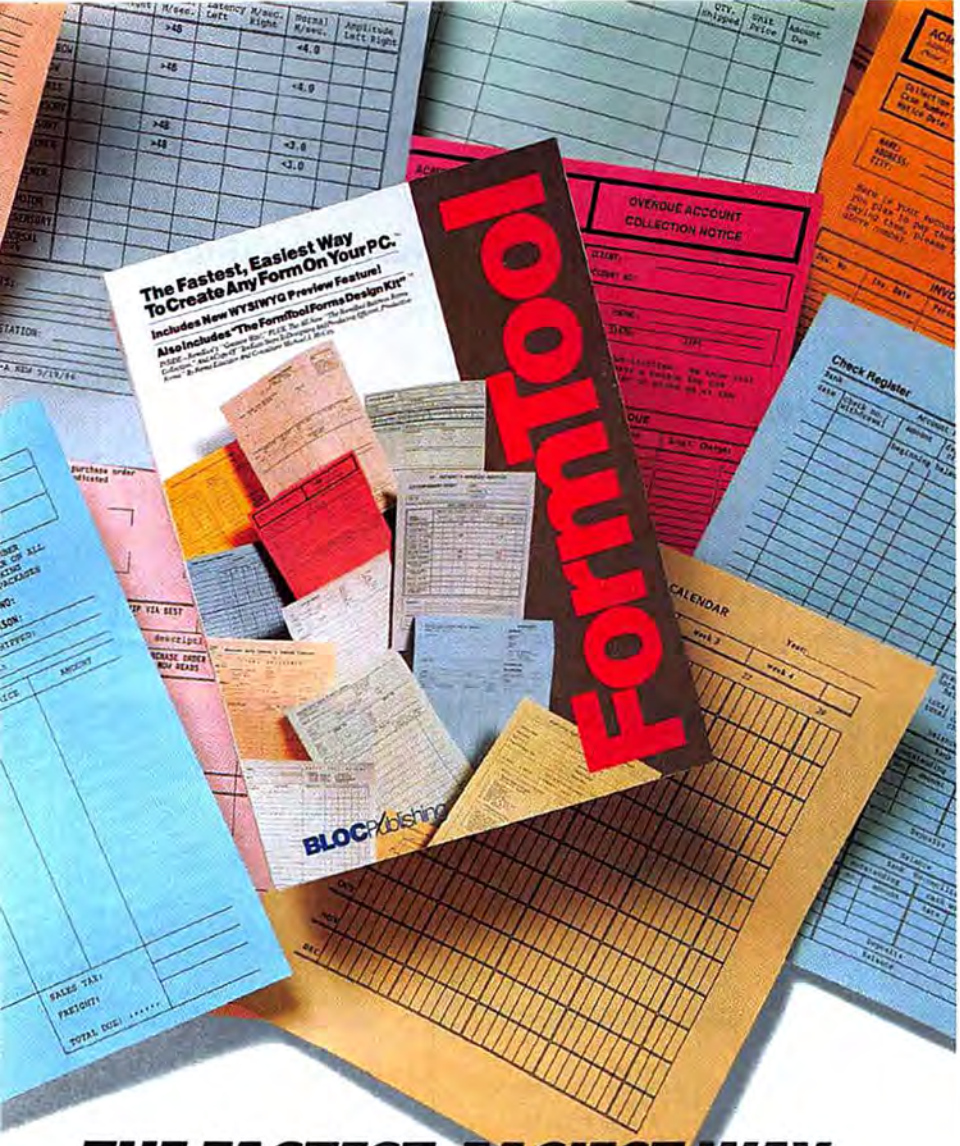
Q. *I've purchased an IBM PS/2 Model 70 to replace my XT. How do I transfer my programs, while preserving their installation routines, from 5¼-inch 360K disks onto the 3½-inch 1.44MB floppies that my PS/2 uses? I'd like to take advantage of the 3½-inch disks' larger capacity and leave my XT days behind me.*

Can I just copy the files, or is a more sophisticated procedure necessary?

Charles T. Petchel
New York, New York

A. Assuming that you have a relatively small collection of software, your simplest solution might be to contact the manufacturers. If the price is right, you can upgrade your programs with new versions on 3½-inch disks. This approach is also an excellent way to ensure that you're using the most recent release of

(continues)



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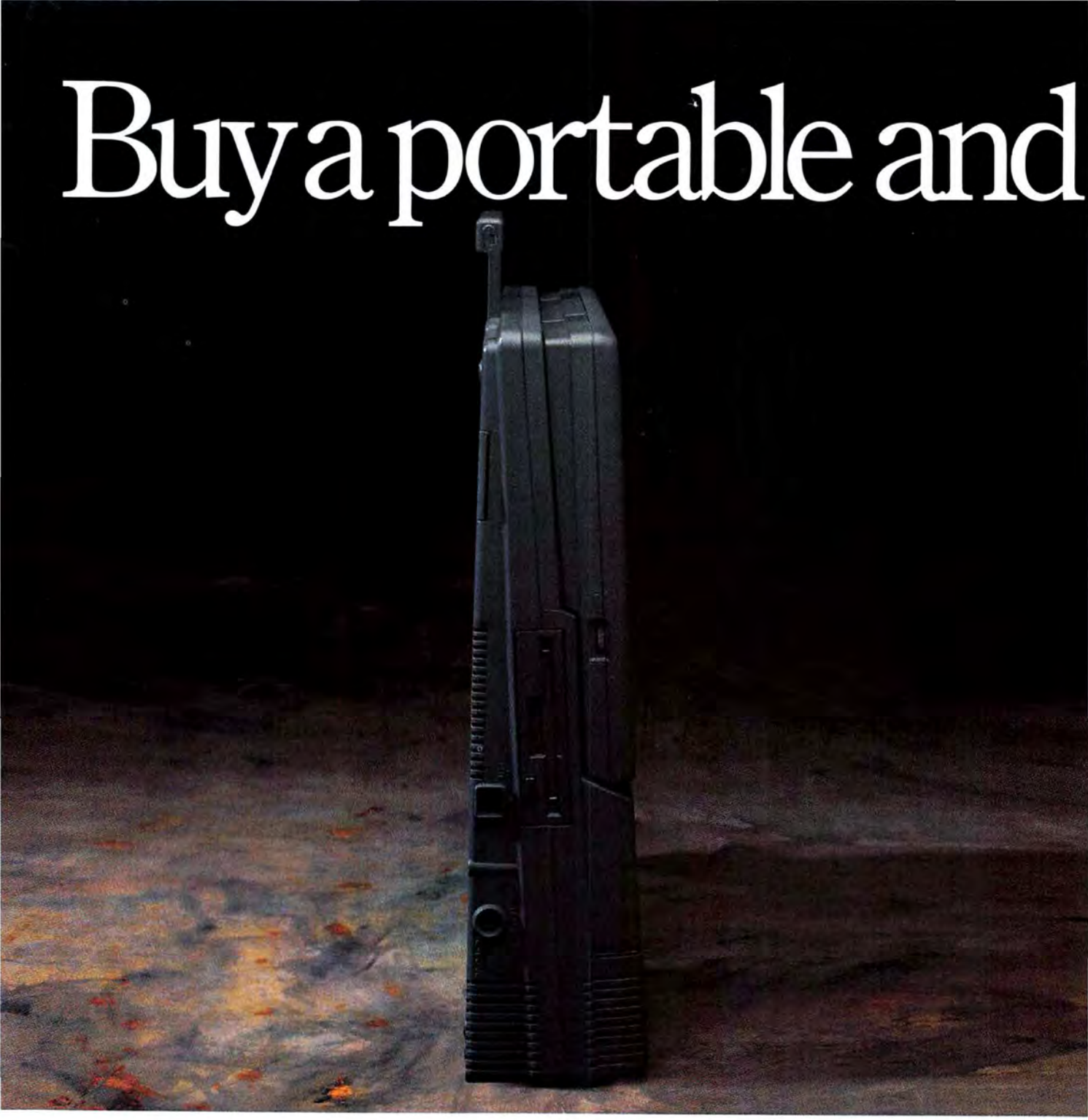

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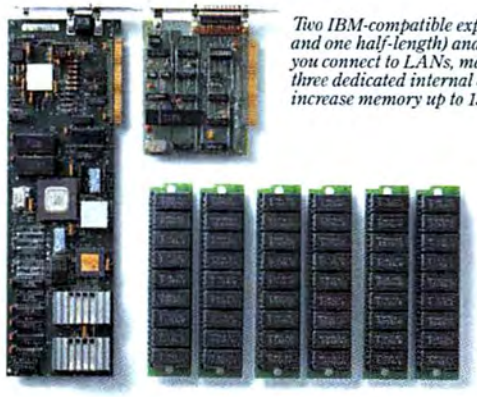

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the programs, many of which may now have VGA support in their installation routines.

But there's no reason you can't make 3½-inch copies of the versions you have now—unless, of course, they're copy protected. Those that you install by simply copying files to a directory pose no special problems, as long as you have both sizes of drives. Using an external 5¼-inch floppy drive or a file transfer program with a link between your XT and your PS/2, you can simply copy the files onto 1.44MB disks, packing as much as four 360K disks' worth of files onto a single 1.44MB disk.

However, programs with installation routines that check for a volume label on each disk are a bit more complicated to transfer. (This type of program prompts you for specific disks during installation.) In this case you won't be able to reduce the number of disks. And in addition to copying the files, you have to give each disk its proper volume label, which requires DOS 3.0 or a later version.

Unless you have software on high-density disks, you'll never copy more than 360K to each 3½-inch disk. Save some money by using 720K disks instead of 1.44MB ones. For each 5¼-inch program disk, use the command LABEL A: to learn that disk's volume label. Then put an identical label on a 3½-inch disk by using the command FORMAT A: /N:9 /T:80 /V (or FORMAT A: /F:720 /V for DOS 4.*x*) or by using LABEL A: if the disk is already formatted. Finally, copy the files and verify them using COMP.

Font Fortune

Q. *I am a seasoned user of* Microsoft Word *version 5.0 and would like to expand my font library for my Hewlett-Packard LaserJet 500 Plus. Presently I have Times Roman and Helvetica soft fonts in sizes 6 through 30 points.*

I would like to obtain a wider variety of soft fonts in several sizes and in the most cost-efficient manner. What's your advice?

H. Gray
Kingston, Jamaica, W.I.

A. Efficient use of soft fonts begins with a suitable foundation of cartridge fonts. A cartridge with *(continues)*

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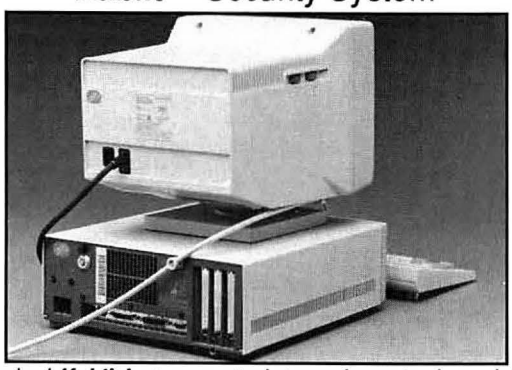

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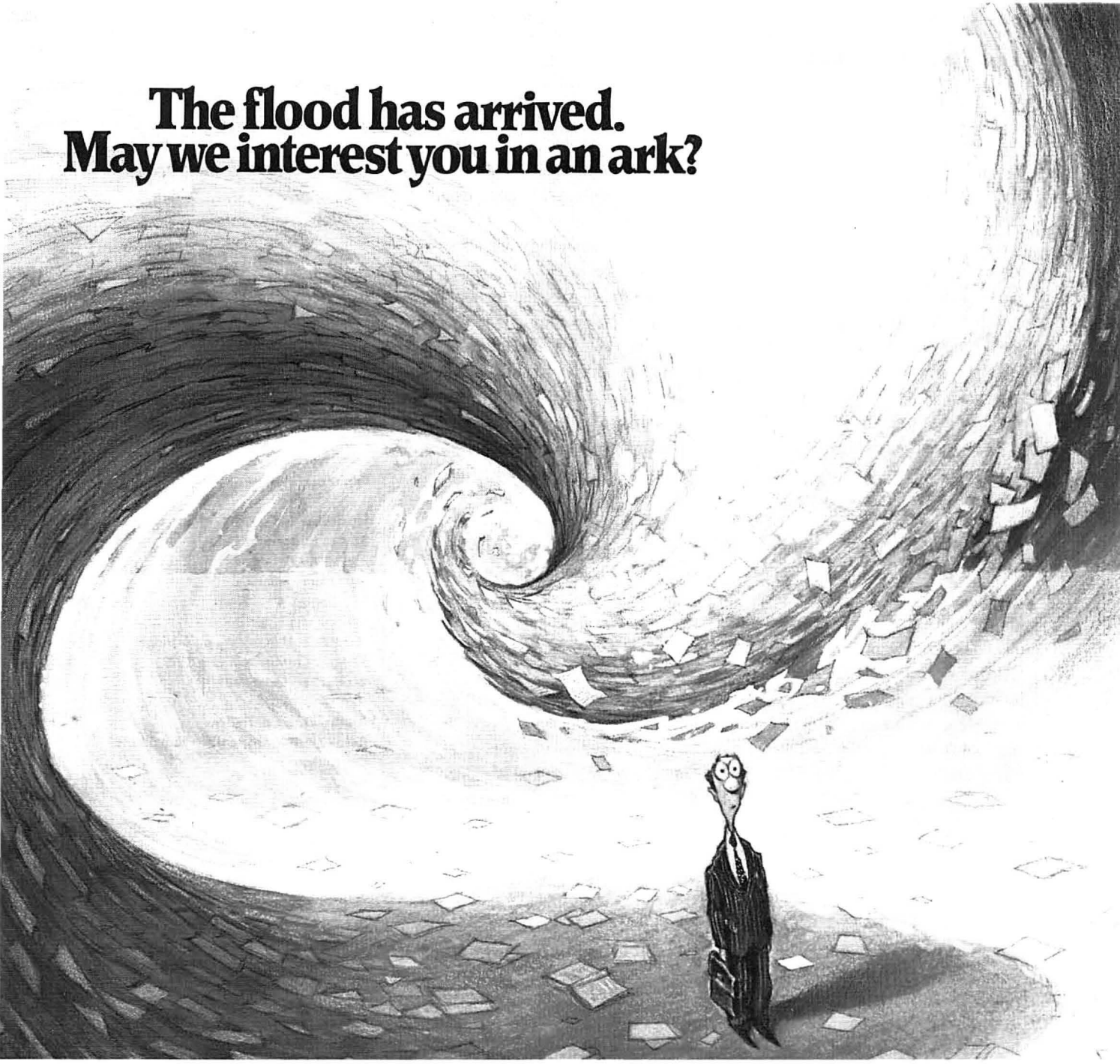
In Canada call 1-800-663-1061

Circle 217 on reader service card

The flood has arrived. May we interest you in an ark?



You are currently the target of thousands of pieces of information a day. So we'll get straight to the point.

You can sit by and find yourself inundated by all that. Or you can choose the perfect vessel to navigate it: Dow Jones News/Retrieval®.

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So the next time you feel yourself drowning, reach for that life preserver on your desk with all the buttons on it. And call Dow Jones News/Retrieval at 1-800-225-3170, Ext. 685.

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the right mix of fonts can minimize the disk space needed to store fonts, reduce the time spent downloading, and conserve the use of printer memory. Because printer memory is used for both soft fonts and graphic images, the fewer and smaller the fonts you download, the larger and sharper the graphic images you'll be able to print.

Today's font cartridges hold 2 to 25 times as many fonts as the originals, although higher-density ROM chips render many of the cartridges incompatible with pre-Series II LaserJets. HP's ProCollection cartridge, for example, contains 65 fonts in various point sizes from 3.6 to 14. (HP has consolidated the rest of its cartridge fonts into nine new cartridges, but unfortunately they won't work in early models like yours.)

Another option is Pacific Data Product's 25 Cartridges in One, which packs 172 fonts, in point sizes from 3.6 to 18, into one cartridge. The company also offers Headlines in a Cartridge, which contains 18 Helvetica and Times Roman fonts in 14, 18, 24, 30, 36, and 48 points (though the original LaserJet, the Plus, and your 500 Plus cannot print 36- or 48-point characters or a few 30-point characters). Cartridges with large fonts allow you to free up quite a bit of disk space.

Also take a look at the Everex cartridges. The company's A-to-Z HP-Compatible Multifont Cartridge has 231 fonts (including line-drawing and bar-coding symbols) from 6 to 18 points. The less-ambitious All-In-One Cartridge contains 114 fonts from 3.3 to 14 points.

Soft font technology has also matured. You can now buy a combination font-generator/font-management program, as well as separately sold typeface packages from which you generate screen and downloadable printer fonts for use with most major word processors, desktop publishing programs, *Windows*, and some other programs. Font generator programs also allow you to create reduced symbol sets (a subset of a font's characters) to minimize the use of printer memory, which is especially important when using large fonts. The programs' management functions ease selecting and downloading generated fonts.

HP's *Type Director* generates "matching" printer and screen fonts from any of the company's 27 *Scalable Typeface* or 5 *Scalable Typeface Collections* packages. The fonts may be any size from 4 to 200 points in ½-point increments. *Type Director* is also bundled into HP's *Premier Collection*, which includes 12 faces.

Using the installation module of Bitstream's *Fontware 3.0 Starter Kit* with any of that company's 52 *Fontware Typeface Packages* or 6 *Fontware Typeface Collections*, you can create fonts from 2 to 144 points in ⅒-point increments. *Starter Kits*, which include a couple of typefaces, are also available directly from application vendors and often at a discount.

For more information about all products in this item, circle reader service no. 913.

WHERE TO BUY

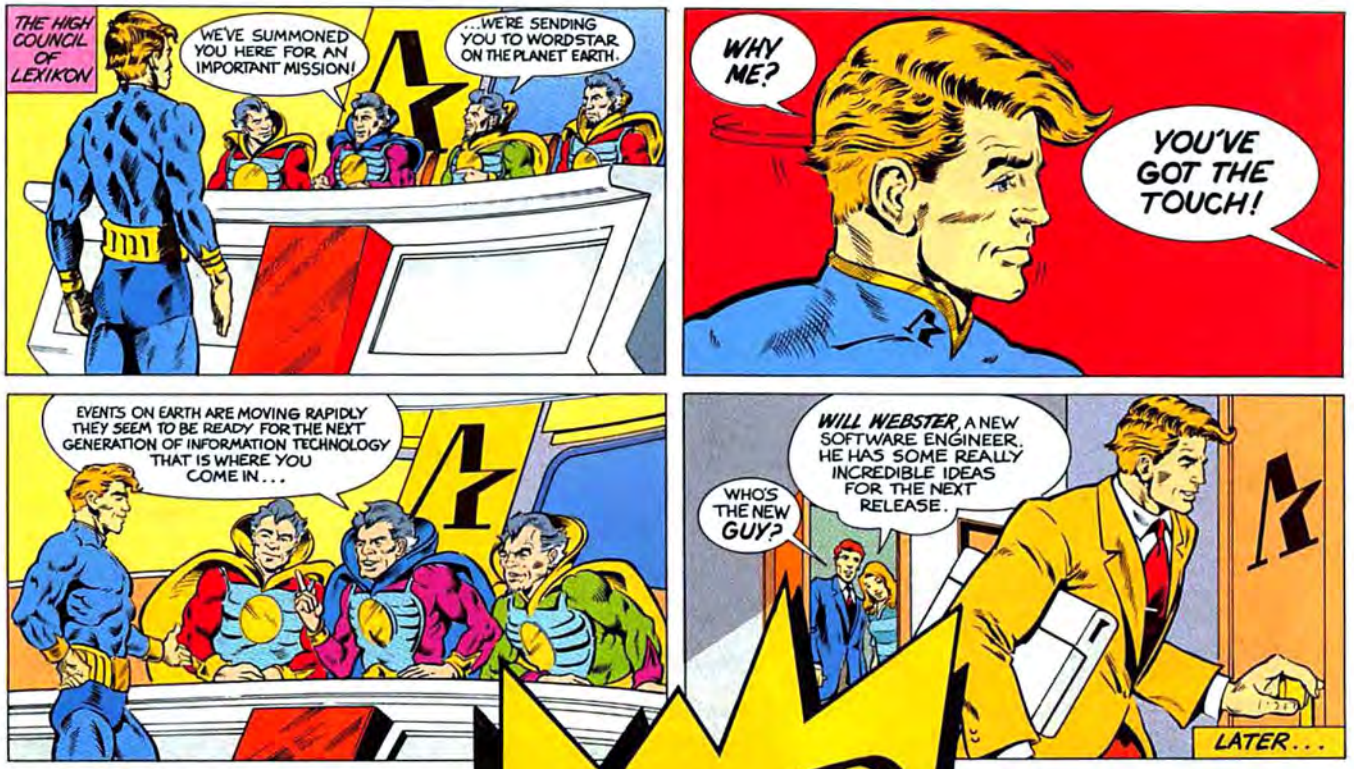
Premier Collection
ProCollection
Scalable Typeface
Scalable Typeface Collections
Type Director
Hewlett-Packard
Company Inquiries
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
LIST PRICE: Premier Collection $225, ProCollection $300, Scalable Typeface $99 each, Scalable Typeface Collections $199 each, Type Director $95
Reader service no. 680

Headlines in a Cartridge
25 Cartridges in One
Pacific Data Products
6404 Nancy Ridge Dr.
San Diego, CA 92121
619/552-0880
LIST PRICE: Headlines in a Cartridge $299, 25 Cartridges in One $399
Reader service no. 681

All-In-One Cartridge
A-to-Z HP-Compatible Multifont Cartridge
Everex
48431 Milmont Dr.
Fremont, CA 94538
800/821-0806
LIST PRICE: All-In-One $395, A-to-Z $695
Reader service no. 682

Fontware 3.0 Starter Kit
Fontware Typeface Collections
Fontware Typeface Packages
Bitstream Inc.
Athenaeum House
215 First St.
Cambridge, MA 02142
800/522-3668, 617/497-6222
LIST PRICE: Fontware 3.0 Starter Kit $95, Fontware Typeface Collections $295 each, Fontware Typeface Packages $195 each (promotional prices often available; call for details)
Reader service no. 683

How does...? What can...? Should I...? Send your PC questions to The Help Screen; for details see How to Contact PC World, page 4. ●



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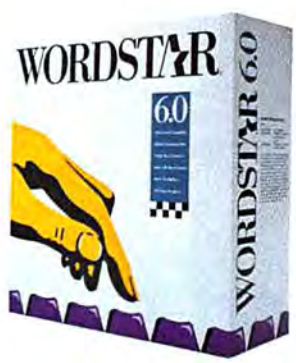

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Circle 311 on reader service card

FOR $1899, YOU CAN GET A LOT OF COMPUTERS.

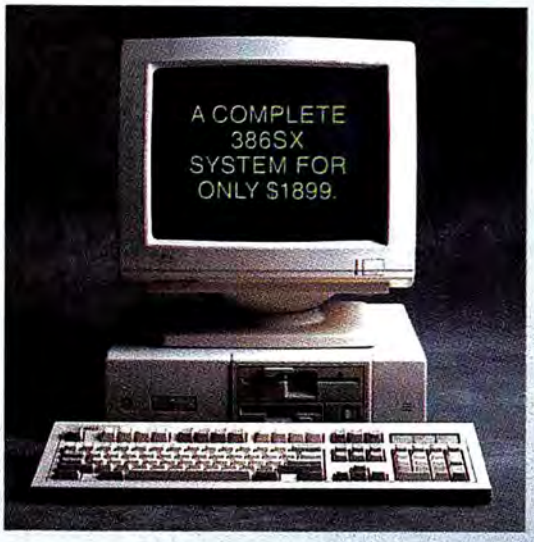
© 1989 Dell Computer Corporation. All rights reserved. System 316SX is shown with VGA Color Plus monitor and optional second floppy disk drive. Dell System is a registered trademark of Dell Computer Corporation. 386 is a trademark of Intel Corporation. Other trademarks and trade names are used in this advertisement to refer to the entities claiming the marks and names or their products. Dell Computer Corporation disclaims any proprietary interest in trademarks and trade names other than its own. For information and a copy of Dell's 30-day Total Satisfaction Guarantee and Limited Warranty, write to: Dell Computer Corporation, 9505 Arboretum Blvd., Austin, TX 78759. [A]On-site service may not be available in certain remote locations.

AD CODE 11DD0

OR A LOT OF COMPUTER.

OK. So you don't have the biggest budget in the world. But that doesn't mean you have to think small.

Introducing the Dell System® 316SX, 16 MHz 386™SX.



Now you can get into 32-bit computing with this complete 20 MB system. Including 512 KB of RAM, a VGA Monochrome monitor, and three 16-bit industry standard expansion slots. With a 5¼" or a 3½" diskette drive.

More important, it's built by Dell. The computer company rated number one for overall customer satisfaction in the last four *PC Week* polls of corporate volume buyers.

Over IBM. Over Compaq.

And every Dell System comes with a one-year warranty, toll-free technical support and next-day desk-side service provided by the Xerox Corporation.[Δ] So for $1899, you don't have to buy a cookie cutter clone and go it alone.

800-283-0088

FOR NETWORK OR UNIX INFORMATION, 800-678-UNIX.
For Dell in Canada, call 800-387-5752.

DELL
COMPUTER
CORPORATION

Circle 318 on reader service card

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.

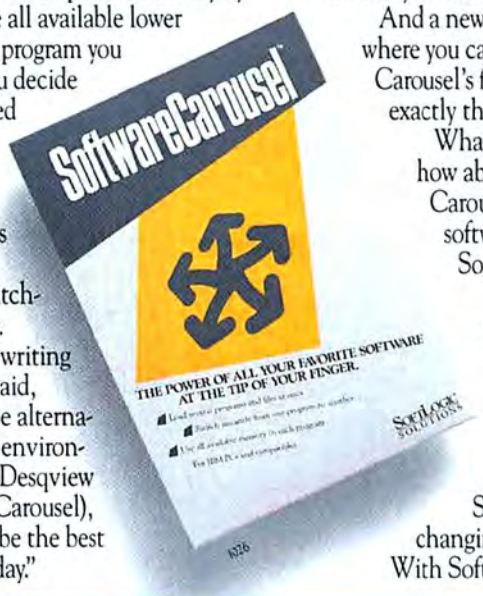
Why didn't someone do this before?

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."

New release 3.0—the best gets even better.

This is the third major release of Software Carousel, and we think you're going to like the improvements.

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

Like new menu options that free up even more memory to run your programs in.

A new automatic start-up that lets you get all your programs underway the minute you turn on your computer.

And a new customization menu where you can tailor all of Software Carousel's features and options exactly the way you want them.

What could be easier? Well how about the price? Software Carousel is just $89.95 at your software dealer, or direct from SoftLogic Solutions.

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."

So sit back, relax, and start changing programs the easy way. With Software Carousel.

Software Carousel $89.95

SoftLogic Solutions, Inc.
One Perimeter Road, Manchester, NH 03103

Available at software dealers everywhere.
Or, order direct by calling toll-free.
Call 800-272-9900
(603-627-9900 in NH)

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Circle 275 on reader service card

CONSUMER WATCH

Advice and information for the computer consumer

Shopping around for a dealer who can satisfy your networking needs both before and after the sale? Do a little detective work first, and you and your dealer can have a long and happy life together.

Roberta Furger

Getting What You Pay For

Time was when dealers eagerly bundled support and service with the sale of PC hardware. They were willing to throw in extras and take a cut in profits if it meant the difference between making a sale and seeing it go to the competition down the street. Not any longer.

Dealers are still eager to make the sale, but service and support have been "unbundled"; they're bought and paid for by the consumer. In theory, the result should be better service, but this isn't always the case. Dealers and vendors alike acknowledge that low profit margins on PC products often result in deficient support and service.

The gap between the support users expect and what they get can prove costly in any situation, but in the area of networking, where smooth operation of all components is crucial, quick and expert assistance becomes even more vital. The key, then, is to investigate the resources and expertise available from individual dealers (see **TABLE 1**). Shopping around for the right dealer isn't a luxury; it's a necessity.

Rating the Dealers

Until recently, vendors have been leery about recommending one dealer over another. Increasingly, however, they are willing to help ensure a good fit between a buyer's needs and a dealer's capabilities. Even if vendors will only provide the names of area dealers without offering any qualitative distinctions, a few questions can elicit valuable information.

It's not unusual for vendors to rate dealers on their so-called level of commitment to that company's products. Be aware, however, that this "commitment" can reflect anything from the quantity of merchandise sold, to the dealer's investment in hiring and training systems engineers. So just finding out a dealer's rating isn't enough; ask a company representative what a dealer must do to earn that distinction.

(continues)

TABLE 1

Getting the Lowdown on Dealers

A few phone calls to the right sources can generate a wealth of information about your local dealer.

From vendors
- Request the names of top area dealers
- Find out how long the dealers have been in business
- Ask about special ratings that will help you determine a dealer's level of expertise

From national dealer headquarters
- Request information on top area dealers
- Ask about any special accreditation or expertise the dealers may have
- Determine what corporate resources, such as technical support lines and systems engineers, are available to local dealers

From local dealers
- Tour the facility
- Determine the number of systems engineers on staff to handle maintenance and service
- Request references

ANTHONY RUSSO

RATE YOUR SATISFACTION: Spreadsheet Software

Lotus's *1-2-3* continues to dominate the spreadsheet market, with an installed base more than 20 times larger than that of its nearest competitor, according to this survey of 200 large organizations. Competing products fare better, however, in both user satisfaction and purchasing plans. *Microsoft Excel*'s graphical interface and high-quality graphics give it the highest rating in user satisfaction. Borland's *Quattro*, with one of the smallest installed bases, rates second in user satisfaction and a close third in future buying plans.

Source: International Data Corporation. From a survey conducted during the third quarter of 1989 of 200 large organizations, each with at least 50 PCs.

Novell, for example, has two levels of authorization. The baseline requirement is that the dealer simply attend training courses and stock demonstration equipment. A second level, called gold authorization, indicates that the dealer has completed additional training and, according to James C. Bills, executive vice president of sales at Novell, is capable of handling more complex networking solutions. Novell rewards gold-level dealers with more direct support, which in turn means better service for the customer when it comes to getting tricky or complicated problems resolved posthaste.

Obviously, these distinctions are useful only if you have access to the information, and Novell is committed, says Bills, "to making sure users know which dealers qualify at the different levels." The information is available through any of Novell's 23 field offices around the United States (for information about the office nearest you, call 800/526-5463).

Competitor 3Com divides its authorized dealers into two categories: Authorized Service Centers and Complete Network Centers. The latter rating denotes dealerships that have invested considerable resources in training what 3Com calls 3Wizards—systems engineers who are experts in 3Com hardware and software.

Carol Rahn, 3Com's services marketing manager, lays out the importance of the distinctions this way: "We offer support to resellers based on their commitment to 3Com. We invest in resellers who invest in service." What that boils down to is that resellers who invest in 3Wizard training receive additional and more timely support from 3Com.

PC manufacturers also claim to be investing heavily in helping dealers provide high-quality support and service. Compaq, for example, recently introduced a series of classes for dealers designed to address such emerging areas as client-server computing and new network operating systems, according to Ross Cooley, vice president of sales and service for the Houston, Texas, firm. Cooley acknowledges that some of Compaq's new products, such as the Systempro, will require a higher level of support and service because of the types of applications for which they will be used. "Those end users will expect their dealer of choice to be able to support higher-end, more sophisticated applications," says Cooley. Compaq is not requiring separate authorization before dealers can sell the Systempro, however, so buyers will have to quiz dealers regarding their level of expertise in dedicated PC servers.

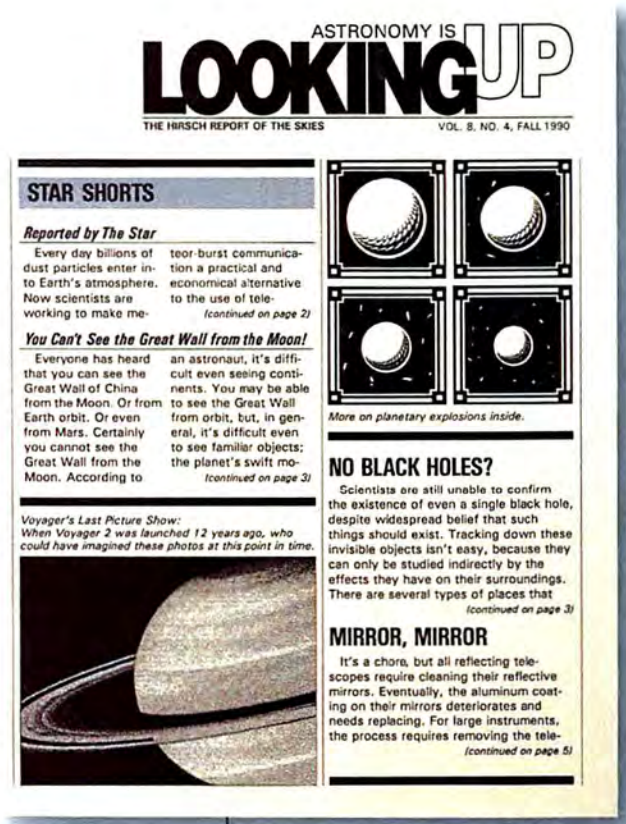
In addition to efforts by vendors, virtually all the national dealer chains offer a variety of technical and educational resources to individual dealers. Consumers can also often get help from the corporate staff of a national dealer chain when shopping around for a local dealer, since the chains are very familiar with the capabilities and resources of individual locations.

At ComputerLand, for example, franchise stores receive one of three ratings regarding networking, ranging from the most basic authorization to what ComputerLand calls its Network Centers of Excellence. To qualify as a Network Center of Excellence, a store must have at least

(continues)

Other laser printers play with one standard dot size.

HP makes it a



ASTRONOMY IS LOOKING UP

THE HIRSCH REPORT OF THE SKIES VOL. 8, NO. 4, FALL 1990

STAR SHORTS

Reported by The Star

Every day billions of dust particles enter into Earth's atmosphere. Now scientists are working to make meteor-burst communication a practical and economical alternative to the use of tele- *(continued on page 2)*

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

Everyone has heard that you can see the Great Wall of China from the Moon. Or from Earth orbit. Or even from Mars. Certainly you cannot see the Great Wall from the Moon. According to an astronaut, it's difficult even seeing continents. You may be able to see the Great Wall from orbit, but, in general, it's difficult even to see familiar objects; the planet's swift mo- *(continued on page 3)*

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

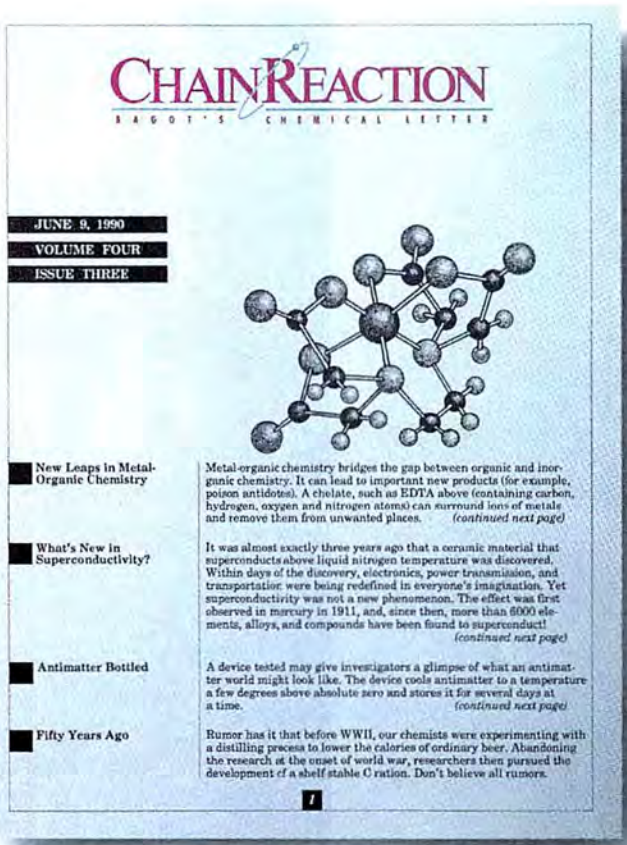
More on planetary explosions inside.

NO BLACK HOLES?

Scientists are still unable to confirm the existence of even a single black hole, despite widespread belief that such things should exist. Tracking down these invisible objects isn't easy, because they can only be studied indirectly by the effects they have on their surroundings. There are several types of places that *(continued on page 3)*

MIRROR, MIRROR

It's a chore, but all reflecting telescopes require cleaning their reflective mirrors. Eventually, the aluminum coating on their mirrors deteriorates and needs replacing. For large instruments, the process requires removing the tele- *(continued on page 5)*



CHAIN REACTION

BAGOT'S CHEMICAL LETTER

JUNE 9, 1990
VOLUME FOUR
ISSUE THREE

New Leaps in Metal-Organic Chemistry

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

What's New in Superconductivity?

It was almost exactly three years ago that a ceramic material that superconducts above liquid nitrogen temperature was discovered. Within days of the discovery, electronics, power transmission, and transportation were being redefined in everyone's imagination. Yet superconductivity was not a new phenomenon. The effect was first observed in mercury in 1911, and, since then, more than 6000 elements, alloys, and compounds have been found to superconduct! *(continued next page)*

Antimatter Bottled

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

Fifty Years Ago

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

1

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

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

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

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

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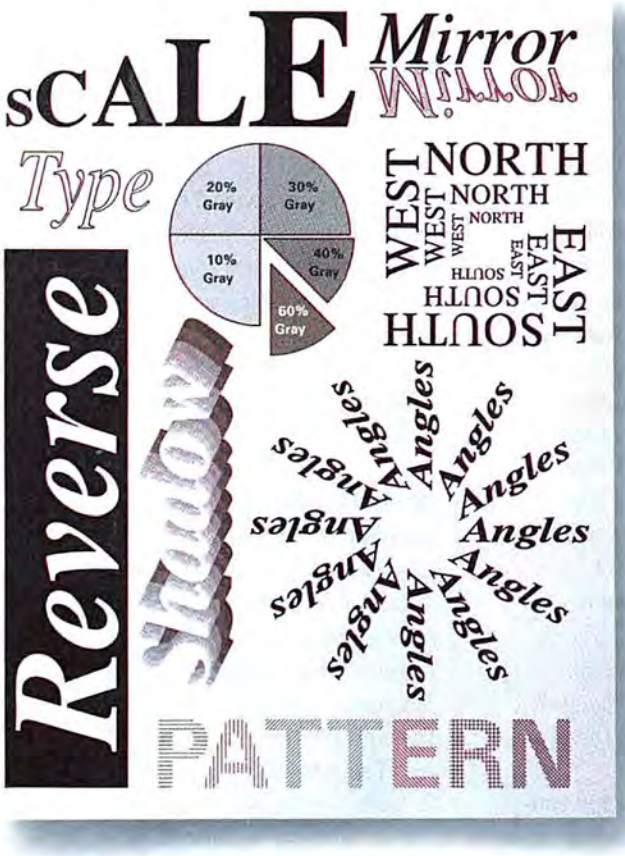
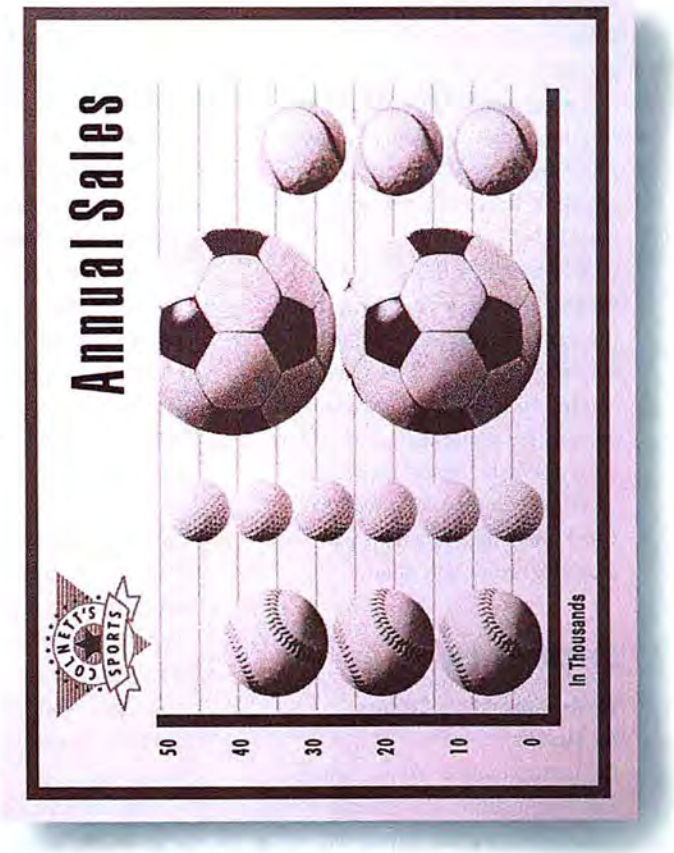
whole new ball game.





But there's more than better print quality. 14 bit-mapped fonts and 8 internal scalable typefaces provide thousands of options. And enhancements to our PCL5 printer language, including our HP-GL/2 graphics language, let you print portrait and landscape on the same page. Reverse and angled type. Spirals. Even shaded text. You can also plug in Adobe PostScript® software.

For all its new features, the $2,395* list price of the HP LaserJet III is a good deal less than the HP LaserJet

Series II printer it replaces. With the same hardware compatibility, wide range of applications, 8 ppm print speed, and software compatibility, including WordPerfect 5.1 and WordStar® 5.5. And the same reliability as the rest of the HP printer family.

So call **1-800-752-0900, Ext. 1007.** Ask for our booklet on Resolution Enhancement technology and where to find your nearest authorized HP dealer. We'll put you in a whole new league.

There is a better way.

HEWLETT PACKARD

*Suggested U.S. list price. WordStar is a U.S. registered trademark of MicroPro International Corporation. Adobe and PostScript are registered trademarks of Adobe Systems, Inc.

Circle 82 on reader service card

five networking specialists and a demonstrated ability to support networking solutions, from design to implementation to support, according to Bill Waas, vice president of service for ComputerLand.

Besides providing information on local dealers, national staff can clarify the corporate commitment to support and service. When you're selecting a dealer, determining the level of expertise available at the national level can mean the difference between resolving a problem quickly and having it drag on for weeks or months.

Whether installing a network for the first time or moving into the brave new world of client-server computing, users are coming to rely more and more on dealers for assistance, before and after the sale. Some homework up front will go a long way toward ensuring that help will be available when you need it.

SHOP TALK

Wells American Closes Its Doors

PC manufacturer Wells American Corporation has discontinued operations. Repeated calls to the Columbia, South Carolina, company have gone unanswered, but a recorded message says that manufacturing operations have been "drastically curtailed" and refers customers to Compuscience Incorporated of Lexington, South Carolina, for maintenance and repair services. Compuscience can be reached at 803/796-5760.

The South Carolina attorney general's office has received "several complaints" concerning Wells American and is reviewing them to determine if the office will take on the case, according to spokesperson Mark Dillard. Anyone with information that might assist the attorney general's office in its investigation should write to Consumer Fraud Section, Office of the South Carolina Attorney General, P.O. Box 11549, Columbia, South Carolina 29211.

Warranty Starts With Invoice

I purchased a Compaq Deskpro 386S Model 40 from RP Systems of Oak Brook, Illinois, last year. Recently the monitor began to smoke and sizzle. One year from the shipping date had barely passed, but I felt it should be under warranty if I had had actual possession for less than one year.

I called Compaq to learn that RP Systems was an unauthorized dealer and therefore the responsibility to support any warranty lay with them. RP Systems' policy, however, was that the warranty period began when the invoice was issued. What I thought was a gray area was black-and-white to them, and they would not provide even partial compensation for the broken monitor.

But the story has a happy ending. When Compaq learned of the vendor's uncooperative stance, they reviewed my complaint and replaced my monitor at no charge. I can't say enough about Compaq's handling of the matter. Shame on you, RP Systems.

Frank J. Sarno, Jr.
Stamford, Connecticut

Editor's note: Kudos to Compaq for coming through and providing Mr. Sarno with a replacement monitor. Mr. Sarno's experience, however, illustrates the need to fully investigate all warranties, whether offered by the manufacturer or a reseller. It also points out the value of checking with a manufacturer to ensure that the reseller is an authorized dealer who will have the full backing of the product manufacturer.

More Warranty Woes

Consumer Watch also received a letter from a disgruntled buyer who bought a SmarTeam 2400HC modem and expected its generous two-year warranty to cover parts and labor. When the modem needed to be repaired, however, he discovered the warranty covered only parts; the $30 labor cost was his responsibility. Limited warranties such as this are not uncommon, but scrutinizing warranties before purchasing a product can help you avoid hidden costs.

Great Monitor, Lackluster Service

I purchased a Zenith ZCM-1490-Z flat tension monitor, primarily because of the rave review it received in your magazine ["VGA Monitors—Cheap and Smart," December 1988] as well as in others. The reviews were accurate: It "puts out the best VGA image money can buy," but not for long. About six months after I got the monitor, the blue color quit, and the screen started to go alternately bright and dim.

I contacted Zenith, and they gave me the address of the closest Zenith Service Center—about 100 miles away. The staff there said repairs would take two weeks—a long time to be without a monitor. (The center doesn't provide loaners.)

Well, 47 days later my monitor still wasn't fixed. The repair cen-

(continues)

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The "ELITE EDITION"
Multi-User & Network Compatible

Turn Your Time Into Profits...

For Companies Who Bill Labor And Materials.

Professionals:
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- Architects
- Graphic Artists
- Consultants
- Engineers
- etc.

Trades:
- Electricians
- Contractors
- Mechanics
- Plumbers
- Printshops
- Maintenance
- etc.

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- etc.

And Others...

The Fastest, Easiest Way To Do Your Books.

All-In-One Solution
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- Job Estimating
- Job Costing
- Billing
- Accounts Receivable
- Accounts Payable
- Inventory
- General Ledger

Right From The Job
Transactions are posted to the Sales, Inventory and Ledger books directly from the Job Cards – automatically.

It's Real Easy
No account numbers to create. No codes to remember.

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ter didn't have the parts and couldn't get them from another division.

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Don't you think a company the size of Zenith—one that says, "The quality goes in before the name goes on"—should build a product that won't fail after six months, and that they can do more than just "look into it?"

William D. Pasquale
Yarmouth, Massachusetts

Zenith responds: On September 19, 1989, our customer service department received a letter from Mr. Pasquale, which was assigned to one of our customer service representatives. She contacted the Heath/Zenith Electronics Center in Wellesley, Massachusetts, to obtain information regarding the status of Mr. Pasquale's monitor. The Heath/Zenith dealer informed her they were waiting for a part. The part was expedited and shipped to the service center from our factory in St. Joseph, Michigan. The customer service representative followed up with a phone call to Mr. Pasquale and confirmed that the monitor was operating properly and everything was satisfactory. Part of the problem was caused by the fact that the particular part necessary to repair the monitor was on back order when the monitor was first taken to the service center for repair. This situation has since been rectified.

We are extremely sorry for any inconvenience Mr. Pasquale or any other ZCM-1490 customer may have experienced as a result of this situation.

Larry L. Liddle
Director, Technical and Customer Service
Zenith Data Systems

Take action! If you've got a complaint or 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.* ●

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Here's a quick way to specify a lengthy range when entering a *Microsoft Excel* range formula, assuming that all cells in the range contain data and that the cell just below the range is empty. Type in the formula, up to and including the open parenthesis, and then highlight the first value in the range. Now, instead of pressing the colon key and paging down to the last value, which takes a lot of time, simply press <Ctrl>-<Shift>-<Cursor Down>. *Excel* selects the entire range automatically; you only need to close the parenthesis to complete the formula. You can also use this technique to specify a range from the bottom up by highlighting the last value in the range and pressing <Ctrl>-<Shift>-<Cursor Up>.

Mike Gibbons
Stamford, Connecticut

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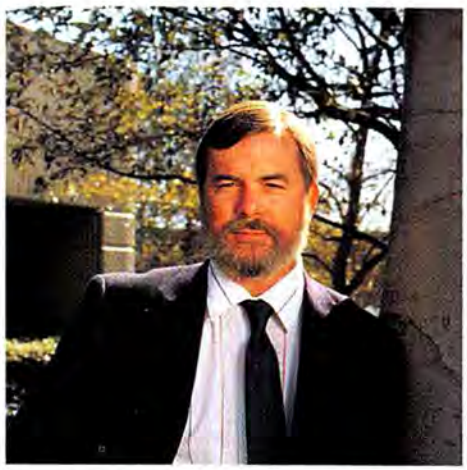
Circle 57 on reader service card

Edited by ERIC BENDER

Electronic Filing Goes Nationwide

Personal Tax Software a High-Stakes Game

MECA's TaxCut Aims to Topple Veteran Leader TurboTax



Like other vendors of tax preparation software, ChipSoft's Mike Chipman (left) and MECA's Dan Schley stress the ways their packages can help users with questions about tax returns.

JAMES ARKOWSKY (LEFT); GERRY GROPP (RIGHT)

ChipSoft's *TurboTax* has ruled the world of tax preparation software since it debuted in 1984. Although solid figures are unavailable, even competitors agree that the San Diego firm holds more than a 50 percent share of market.

But *TurboTax* faces stiff competition this tax season from *TaxCut*, the latest release from personal finance guru Andrew Tobias (of *Managing Your Money* fame). *TaxCut*, a merger of *Ask Dan About Your Taxes* and *PC/TaxCut*, has been heavily promoted by co-developer MECA Ventures in Westport, Connecticut; an arrangement has been made with IBM to bundle the program with low-end PS/2 systems through mid-March.

ChipSoft president Mike Chipman downplays this marketing blitz, saying that every year one of his competitors tries that approach. "This year it's MECA, last year it was J. K. Lasser," he says.

But observers say *TaxCut* may give *TurboTax* a run for its money. "The Andrew Tobias name is a big plus for *TaxCut*," says Mason Rutledge, spokesperson for Egghead Discount Software in Issaquah, Washington. Although the chain carries both packages, he says Egghead staff will probably recommend *TaxCut*.

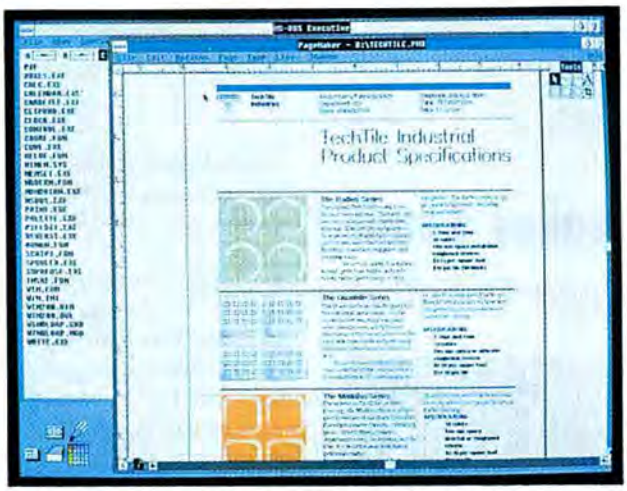
Unlike full-blown professional tax software, personal tax packages range from $70 to $100. These packages compete over how quickly each incorporates new tax legislation, the number of state returns supported (for an additional price), and the variety of forms and schedules. While these issues remain important, the current crop of packages raises the stakes—particularly by helping users with their tax questions.

TaxCut boasts a built-in expert system based on help from tax attorney Dan Caine. Both *TurboTax* and *Swiftax* from Timeworks in Deerfield, Illinois, include a copy of *The Price Waterhouse Personal Tax Adviser*. *J. K. Lasser's Your Income Tax* comes with its own tax guide. Softview of Oxnard, California, even hires tax experts to answer calls from users of its *MacInTax for Windows*.

Links to personal finance packages, which let users easily transfer their day-to-day data, have become a major selling point. Many packages will import files from popular personal finance programs, but *TaxCut* goes a step further by directly connecting to MECA's best-selling *Managing Your Money*.

Since 1989 is the first tax year for which individual users throughout the United States can file electronically (using an authorized service), developers rushed to incorporate that capability. Electronic filing costs about $30 and is available only if you're owed a refund; the promise of receiving a refund in about two weeks is boosting interest in tax packages. "For the first time, the retail channel seems to be pushing tax software," says Softview president Kathy Lane.

As sales increase, ChipSoft may have to change its strategy. "We haven't given much attention to marketing," says Chipman. "I'm not sure we're going to be able to continue doing that." But he remains confident of his package's position. With over 160,000 copies sold, *TurboTax* is more mature than competitors and "gives people a sense of confidence," he says. In early returns, *TurboTax* held its own, becoming in January the first tax program to hit Softsel's Hot List. —*Roberta Furger*



Higher-resolution displays will give users friendlier views of Windows and OS/2 graphical applications.

Post-VGA Graphics Emerge

But Can Market Support Two 1024 by 768 Display Standards?

As graphical environments become popular, broad ranks of users will want better-than-VGA displays, and "a 1024-by-768-pixel display with a graphics coprocessor will be the next standard," says Joan-Carol Brigham, director of International Data Corporation's (IDC's) graphics research. A blizzard of products will appear this spring, with some adapters priced below $600 on the street and some monitors $700 or below. Everything appears ready—except a single standard to rally behind.

IBM began offering such displays in 1987, but its 8514/A adapter and accompanying monitor cost almost $3000 and sold poorly, and developers bypassed the board's recommended software interface. Last April, Texas Instruments (TI) announced an alternate software environment for its 34010 graphics processor, backed by Compaq and many board vendors. Soon after, another major group of suppliers agreed upon a specification for 8514/A-compatible boards.

Both TI and 8514/A camps now are releasing products aggressively targeted at the mainstream. Low stickers partly reflect dropping memory costs. (On a 512K board that shows 16 colors, memory makes up one-third to one-half of the manufacturing cost.) They also reflect progress in silicon manufacturing and what Brigham calls "a premature price war."

On the monitor front, IBM chose an interlaced display (which first draws every other line down the screen, then returns and fills in the others). This approach is cheaper than noninterlaced, and it shows. Other adapters support noninterlaced monitors as well, and both varieties are arriving in force. Noninterlaced 14-inch displays sell for as little as $500; at the other extreme lie products like NEC Home Electronics' 20-inch, $3699 MultiSync 5d. Observers expect 16-inch models to be the most common. Because monitor technology has matured, price drops will be gradual, so the total bill will substantially exceed VGA costs for several years.

IDC sees good growth for both TI and 8514/A adapters, but "I'm not convinced there will be a dual standard," says Scott Huckaby, acting marketing manager for TI's 340 graphics coprocessors in Dallas. He expects TI to get an edge from $1000 boards built around the new 34020 chip (scheduled for March), which will be three times more powerful. But while suppliers debate benchmarks, other factors remain just as crucial.

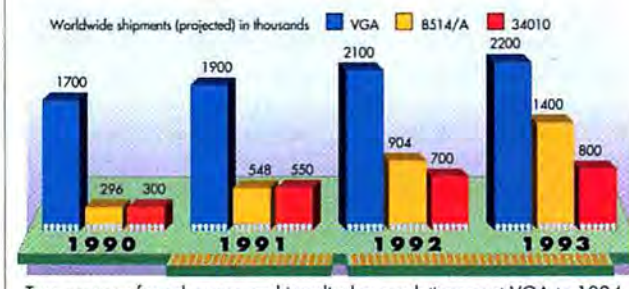
In particular, what's IBM's next move? The 8514/A chip set can move up to 1280 by 1024 resolution, but when IBM introduced such an adapter last year, it was aimed at niche jobs and given minimal publicity. "IBM's next step just might make the clones scurry around for the next two years," comments Andy Fischer, vice president for product management at Hercules in Berkeley, California.

IBM solved the standards problem for VGA by putting it on the motherboard, but making that scheme cost-effective for the 8514/A is hard—partly because the design assumes separate VGA hardware that can't share memory.

The big risks for customers lie in software support and compatibility. Each camp claims support from all major environments and applications, but developers receive wildly conflicting advice about how to tailor their software, and top performance still requires customization for specific hardware. The 8514/A group includes "at least five chip set clones, all reverse-engineered in their own way," notes Brigham. She recommends trying board, monitor, and software together before buying. —*E. B.*

GUY GILCHRIST

IBM, TI Go Beyond VGA



Two groups of vendors are pushing display resolutions past VGA to 1024 by 768 pixels. One camp is offering products compatible with IBM's 8514/A adapter, while the other is building products around Texas Instruments' 34010 graphics processor. International Data Corporation predicts that total sales of these high-end products should match sales of VGA boards by 1993. (These figures omit graphics hardware built into the PC itself, like VGA in IBM PS/2s.)

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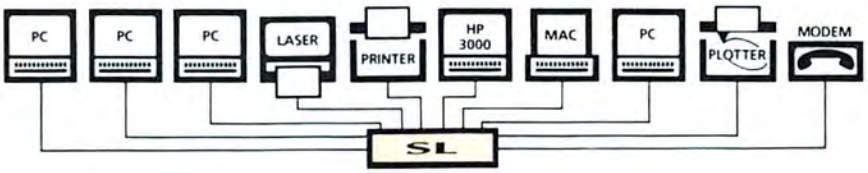

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Service and Support Hit New Heights

Policies Reflect Flagging Sales, Complex Products

Now providing round-the-clock technical support, Lotus seeks competitive advantage from service offerings.

PC customers are enjoying new options in support as vendors face slowing sales, more demanding users, and more complicated product configurations.

Most vendors expect a mere 10 percent revenue growth this year and are looking for new sources of income. Additionally, they're finding it "harder and harder to differentiate by product alone," remarks Lotus Development chairman Jim Manzi. Meanwhile, emphasis on networks and advanced applications spells increased complexity and incompatibilities in the nineties. Concerns about support, for example, led Lotus to insist on using its own direct sales force for the *Notes* groupware package.

IBM moved aggressively by selling large customers a 24-hour, seven-day-a-week "help desk." IBM will support not only its own PCs on this toll-free hot line, but also hardware and software from other vendors. Customers are promised unlimited phone help on multiproduct installation and troubleshooting, and IBM will coordinate with other manufacturers as necessary. Service options vary widely, but a site with 1000 PS/2s could get 8-hour-a-day service five days a week for $15,000 per month.

Dealers complain loudly about IBM scrapping its three-year-old dealer-only PC support policy and competing for the service business of their most lucrative accounts. But IBM's Allen Hu, director of software service, argues that IBM will service only "host-connected" setups too large for dealers to handle, thereby removing a "major inhibitor" of PC sales.

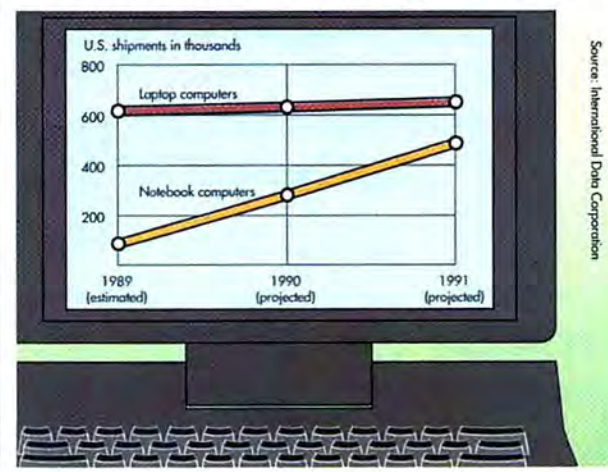
Three years ago, Ashton-Tate declared righteously that it was high time users paid for support. Today, the company has broadened its free support policy from 90 days to a lifetime of toll-call support per customer. "We were endeavoring to have customers understand and share in the cost of support," explains Chairman Ed Esber, Jr., "but it's clear that in this marketplace, the standard is free support."

Still, the company isn't overlooking those willing to pay for enhanced service. Ashton-Tate tripled the price of its Assist program to $150 a year, expanded it to 20 toll-free calls with toll-free access to its bulletin board, and lets subscribers go to the head of the phone queue. For $295, Pro Assist subscribers also get 30 calls to a senior technician and $116 worth of technical notes. The $595 Corporate Assist program permits unlimited calls from two designated contacts and includes the *Close-Up* remote-program-control utility.

John Archdeacon, Aldus's customer service director, comments that 90 days of free support is now standard, which is why Aldus doubled its former 45-day period. It, too, is bumping up prices and features of extended support. Level 1 includes unlimited toll-free phone support for $89 per product per year, plus a 25 percent discount on major upgrades. For $149 per year, subscribers get a 40 percent discount plus copies of drivers and in-house technical notes. The $1000 Corporate Service plan adds training discounts and a free copy of any Aldus product. An optional "900" number lets the user pay $15 for a call of unlimited length. But Aldus doesn't expect to make money on these services, says Archdeacon; it's happy if revenues cover costs. —*Mike Hogan*

SETH RESNICK

Notebook PCs' Bright Future



The introduction of several small, lightweight notebook computers has sparked a new market for laptops. The shipment of products in this category, which IDC defines as laptops no larger than 8½ by 11 inches and no heavier than 7 pounds, will more than double by the end of this year. Meanwhile, demand for traditional battery-powered laptops will continue to be high, with steady growth projected through 1991.

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Circle 210 on reader service card

Spin-Offs From Laptop Development

PCs: Aging Gracefully

Hard Disk Reliability Climbing

When today's PC completes its five-year depreciation period, will there be much life left in it?

"PC technology is changing pretty quickly, but a lot of applications won't change that much," says Rich Archuleta, director of advanced system development for Hewlett-Packard's personal computer group in Sunnyvale, California. So the issue becomes reliability, and the comments are positive: "You can easily look at a PC as something that works for you for ten years," Archuleta says. "The machine itself will be useful for ten years—no problem," agrees Dick McDermott, director of service product management at Bull HN Information Systems' Customer Services Organization in Newton, Massachusetts.

The hard disk is the component most likely to fail, notes Dan DeLucca, product manager in charge of micro product services at Sorbus in Frazer, Pennsylvania. Other culprits, in descending order, are the floppy drive, keyboard, power supply, and boards. PC designers have made steady progress on all of these in the eighties, which has been reflected in lower maintenance charges. (For instance, IBM's basic annual service costs $500 for an AT but $220 for a Model 50 Z.) Of course, greater dependability comes none too soon—especially in areas like network service, where any downtime is serious.

Driving for Improvement

In the mid-eighties, hard disks often offered around 10,000 hours of mean time between failure (MTBF). Today reliability has improved dramatically, particularly for high-end drives. "Development of hard disks has been pretty phenomenal—not just the capacity but the reliability," Archuleta says. "We're quoting 150,000 hours very conservatively" for HP's 310MB drives. With normal use, that translates into a lifetime exceeding 17 years.

With hard drives, as with other PC components, engineers have sought to reduce the number of parts. "We've designed out a lot of the mechanical components" and replaced them with digital circuitry, notes Howard Wing, marketing director of Conner Peripherals in San Jose, California. Conner, whose tiny hard disks appear in many laptops, quotes 50,000 hours MTBF on all products and insists that this figure is actually measured in practice.

Today's drives also can better withstand travel abuse. A few years back, drives for portables were often specified to withstand 2 g's acceleration when operating and 40 g's when shut off, but they're now more than twice as robust, notes Kevin Mankin, director of product development at Zenith Data Systems in Glenview, Illinois. "We've had some interesting letters from people who've left their computer on top of a cab," Mankin says. When the cab rounds a corner and the portable falls, "the case may crack, but the system still operates."

In floppy drives, 3½-inch models are much more reliable than 5¼-inch versions, largely because the media is better guarded from the environment, Archuleta points out. Additionally, recent floppy drives include fewer moving components and a change in some of the materials.

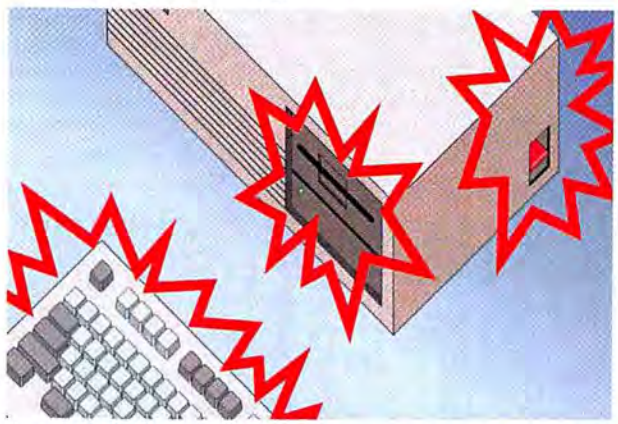
Less Is More

As silicon vendors steadily integrate more functions in each chip, that lessens the number of components in a PC and the connections between

(see PCs: Aging, p. 68)

"You can easily look at a PC as something that works for you for ten years," says HP's Rich Archuleta.

PC Trouble Spots



The longer that PC sits on your desk, the greater the chances that one part or another will begin to give you trouble. Hard drives are often the first component to malfunction, followed by floppy drives, keyboards, and power supplies, all of which generally suffer from abuse by users.

JOHN HARDING

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Circle 22 on reader service card

A PC is zapped by high voltages at HP's reliability lab, where components are tested until they break.

JOHN HARDING

PCs: Aging

(continued from p. 66)

them, greatly boosting reliability. (Intel now offers a chip set that allows you to build a motherboard with only four chips, plus RAM and ROM.) Memory reliability also has soared, with vendors now quoting figures 50 times higher than in the mid-eighties, says Scott Smith, IBM's system manager for PS/2 advanced systems.

A move toward surface-mounting components also helps in engineering more solid boards. And total system reliability is a fundamental goal for the new bus designs—IBM Micro Channel Architecture and the rival Extended Industry Standard Architecture.

Manufacturers now have years of experience in creating solid laptops, and service organizations say that the portable's problems have been successfully solved. Building high-density, low–power-draw portables has created spin-offs for desktops as well. "Laptops have been a tremendous platform for CMOS chip technology," says Zenith's Mankin. Low-power CMOS circuitry keeps the temperature down inside the PC, creating more benign conditions for all components.

Standard desktop monitors seem to last indefinitely. Early laptop screens did not, but they have improved substantially. In Zenith's case, the first backlit LCD displays faded to half-intensity in 2000 hours, but today's paper-white LCDs offer 10,000 hours MTBF.

Test of Breed

Most of these innovations are prompted by vendor's brutal but sophisticated tests, whose results are fed back into product design. The major vendors put PCs through drop, shake, temperature, voltage, and humidity endurance tests far worse than the real world inflicts. "We break them in lots of different ways," HP's Archuleta says cheerfully. "It causes a lot of extra work for us, and it drives the engineers nuts once in awhile."

Automated production lines also reflect more mature manufacturing philosophy and practice. "Testing is about 70 percent of the total effort involved in the factory operation," says Ed Juge, Tandy's director of market planning. "If we have a breakdown in a part, that computer ceases to exist"—the computer is stripped and all the parts are retested.

Business PCs now typically come with a warranty for one year rather than 90 days, as was common a few years back. However, since failures typically occur in the first 90 days, this "is not a reliability issue at all," Juge cautions. "The extra cost to us is nil."

While vendors all talk about quality, more of them are backing up their claims. "All the big guys really understand how important manufacturing quality is," says Bull's McDermott. "That's what will sort out the market in the next five years." At IBM, quality isn't just a corporate directive, "it's tied to my paycheck," remarks Smith.

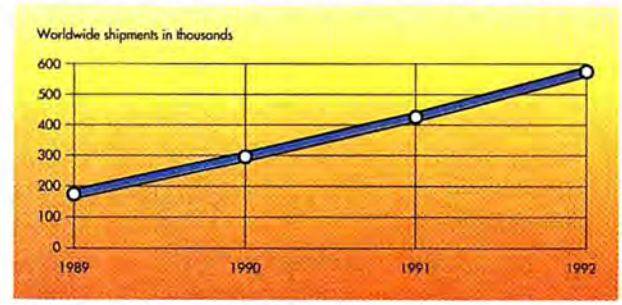
But other firms draw the line at more expensive components. While HP, for instance, mandates that surge suppression be built into its power supplies, low-cost clone vendors don't. Customers can easily spot some doubtful parts, like flimsy keyboards or shaky on/off switches. You can see the results of other engineering decisions, like the degree of silicon integration, only by taking off the cover.

As PCs last longer, will more customers swap in more powerful CPUs? Only a small percent of users do that now, and that's likely to remain the case. "Swapping out the processor is a great idea, and we're getting ready to do it in the 386 area, but the majority of the computer cost is in the board," so the economics are often not compelling, notes Juge.

For long PC life, vendors recommend that users follow documentation instructions, move desktops carefully, and regularly clean the box, keyboard, and floppy disk. If you do that, Juge jokes, "it'll last a lot longer than you want it to last."

—*E. B.* ●

Who Needs a CD ROM Drive?



"CD ROM can bring a world of information to your fingertips, but there aren't that many people who really need all that information yet," notes Jay Bretzman, analyst with International Data Corporation. IDC predicts that annual worldwide sales of CD ROM players will pass the half-million mark in 1992. Demand for the nonerasable optical storage devices "is never going to explode, but it will grow steadily," Bretzman says.

TWO-FISTED MANAGEMENT
THE THREE INEVITABLES: DEATH, TAXES, AND TAX SHELTERS
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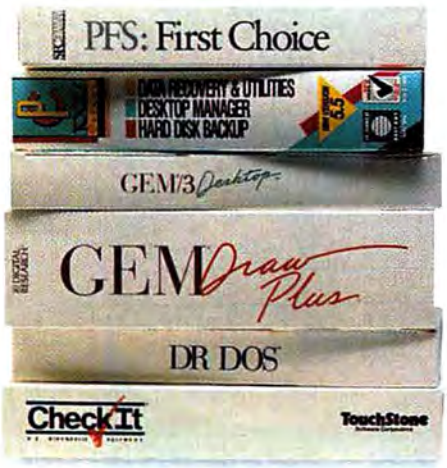
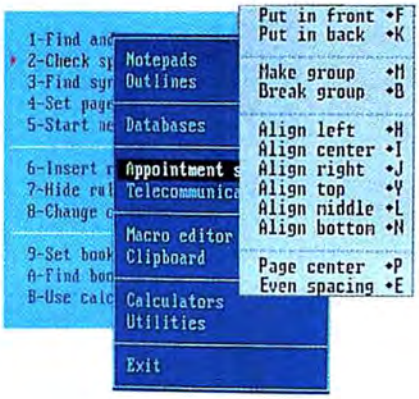
MAREK, 33
23:00, APRIL 14, FIFTEEN CUPS OF COFFEE LATER:
So, how do we stand, Peabody?
TIC TIC
Well, I've prepared Forms 1099J&K, Form 2060X, Form D, Form W, and the Preparation H Form...
What about tax credits? Any more ideas there?
Well, I've covered R&D Tax Credits...
...Disaster Fund Tax Credits, Retirement Fund Tax Credits, Solar Energy Tax Credits, Lunar Energy Tax Credits, Questionable Overseas Holdings Tax Credits...
PACE
We've established the Arnold Harris Continuing Education Tax Shelter Fund for CEOs; doubled our donation to the Arnold Harris Arthritic Programmers Charity Fund Drive...
Unfortunately, that leaves us with... let's see... a twelve-digit-plus tax liability.
TIC TIC
I just don't see what else I can do.
Hmm... what if you moved that decimal point over a bit?
Yeh, yeh... that would do it.
RUB

MARK MAREK

How on earth a reputation



Loads of software, pre-loaded on hard-disk



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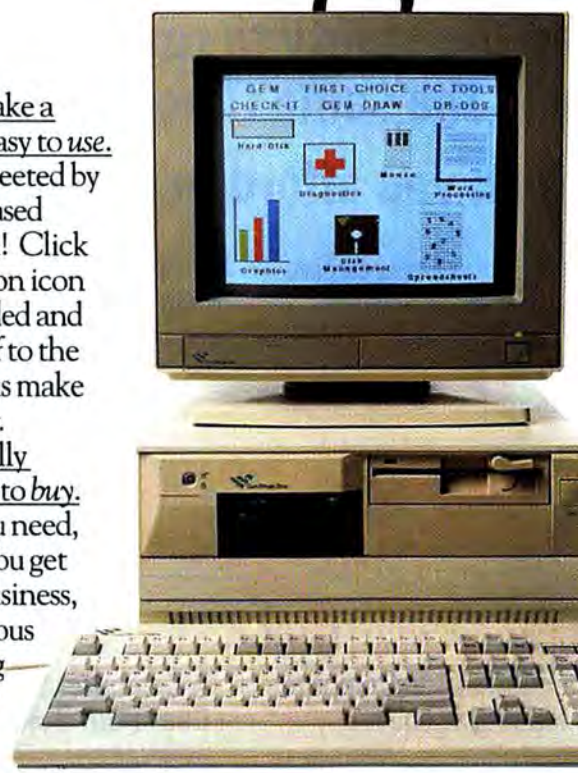

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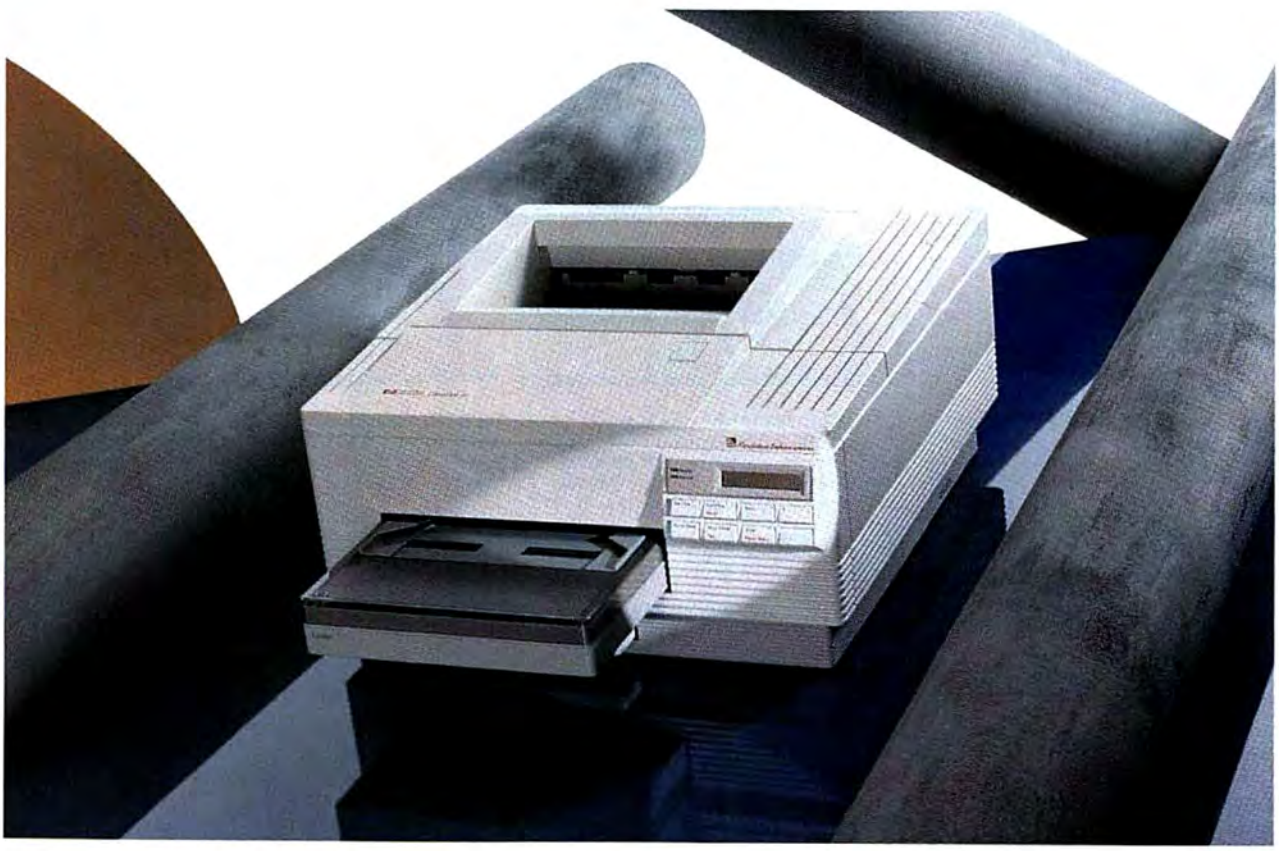
HP's Earthshaking, Ground-Breaking LaserJet III

All the font power of a PostScript printer—but at a full 8 pages per minute, and for $300 less than a LaserJet II. Amazing!

Michael Goodwin



PC World offers first impressions of prerelease hardware and software

Any company would be proud to offer a dramatically improved version of its biggest-selling laser printer at the same price as the original—but Hewlett-Packard's LaserJet III is much more than a spiffed-up replacement for the LaserJet II. Moreover, at $2395 it costs $300 less.

The ubiquitous II has long been the standard laser workhorse in offices around the world. Now comes the LaserJet III, a whole new breed. It combines the best features of the LaserJet with many capabilities of PostScript printing—plus a number of brave new innovations designed to deliver striking improvements in productivity, output quality, and ease of use.

On March 1, HP essentially stopped marketing the familiar LaserJet II. The LaserJet III, available on that same date, does everything the II did and more, in a package that's only slightly larger than its predecessor. In fact, the III is so jam-packed with new features, it's hard to know where to begin.

Font Fantasia

Once upon a time, laser printer buyers faced a very simple choice: Either you bought a fast, inexpensive HP LaserJet (or compatible) with three or four fixed-size typefaces built in, or you bought a pricey PostScript printer with 35 scalable fonts—type families that your word processor or desktop publishing package could print in any size.

The LaserJet III makes this choice unnecessary. While the new printer does not use Adobe's PostScript system, it delivers equivalent capabilities—scalable outline fonts that can be printed in any size from ¼-point to 999-point in ¼-point increments. Two scalable fonts (and two fixed-pitch fonts) are built-in. In June, 108 scalable fonts will be available on various disks ($199 each) and cartridges ($399 each). Eventually HP will offer 300 such fonts; third-party font suppliers also will offer wares. Alternatively, you can buy nonscalable font disks now for $99 and cartridges for $99 to $199—and of course any nonscalable fonts that worked with the LaserJet II will work with the LaserJet III. For those (primarily Macintosh users) who want it, Adobe PostScript emulation will be available for $695 within one month of the printer's release date.

Scalable fonts are just the beginning. Until now, while straight text could be printed at full engine speed (8 ppm in the LaserJet II), complex pages involving graphics, multiple typefaces, or special effects took much longer. The LaserJet III delivers radically faster printing (up to 46 percent faster, according to HP) on complex pages, thanks to a faster processor, a better buffering algorithm, and the new PCL 5 printer control language (which includes the HP-GL/2 vector graphics language to support many existing graphics applications) in ROM.

The revamped languages provide astonishingly flexible manipulation of fonts and graphics. Text can be rotated to any angle, landscape and portrait printing can be placed on the same page, and special effects like shadowing, ruling, shading, and mirroring can be added quickly and easily—all using ROM-based routines that execute at full 8-ppm speed.

Jettison the Jaggies

Better yet, print quality—everything from the edges of letters to curved lines—is noticeably sharper and smoother, thanks to the LaserJet III's modified Canon

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On Finances

Shadow Seismic & Geophysics International

Earnings Reach Record High

Market Shows Favorable Improvement

UPDATE

Fiscal 1989 was an unusually profitable year for Shadow Seismic & Geophysics International. Sales and earnings reached a record high. However, our total growth rate was impacted negatively by the low rate of growth in the overall seismic analysis area, caused primarily by a softening in the low end of the scientific consulting business. We are in the middle of a significant transition to more channels of distribution in the multi-channel seismic market, which clearly shows favorable improvement. This change in the mix of our business is exemplified by a 3 percent sales growth in the retail segment and a growth in excess of 50 percent in our other businesses.

Aside from the general retailing environment, growth in the retail segments of our business during fiscal 1990 will be dependent on several factors: enhancing demand in the low end of our multi-channel business, augmenting sales and profits in our governmental branch through implementation of our new, highly sophisticated point-of-sale system, and resuming new division additions in our Name Brand Group.

A major advertising campaign has been initiated to highlight the significantly greater use of our seismic analysis software and our custom plotter interface. This campaign is being supported by the introduction of new OptiPlot Fourier programs, including several written specifically for the new Cray platform. Currently, over 100 software developers have licensed OptiPlot as the user interface for their analytic engines. We believe that our market penetration clearly demonstrates that Shadow represents "The Accessible Plotter in the Fourier Crowd," and that our ease-of-use differentiation has the potential of significantly broadening the market.

Installation of our POS system began in April 1989, and was completed in October. It should improve promotional planning, merchandising effectiveness, acquisition control, and ultimately inventory turnover. The environment for scientific electronics and control software, while generally considered to be soft, will not impact our merchandising program. There is clear potential for profits beyond our expected $370 million investment in the POS (continues)

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Sales and Marketing 2

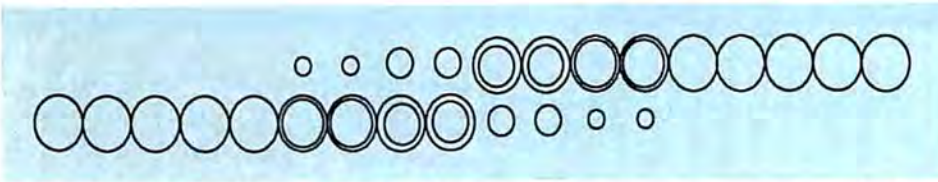
Technology and Systems 3

Finance 5

HP's latest LaserJet lets users do tricks once possible only on a PostScript printer. This newsletter page includes rotated text, shading, curved lines, and an assortment of scalable fonts—all printed at full engine speed.

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

FREE MAGAZINE



Using variable-sized dots and patented Resolution Enhancement techniques, the LaserJet III can produce characters and curved lines free of ugly jaggies.

LBP-SX print engine and HP's patented Resolution Enhancement technique. While the printer maintains the familiar 300-dpi standard, dots are printed in 16 different sizes and can be placed anywhere within their coordinate "box," providing resolution that HP describes as roughly equivalent to 4800 dpi. Even without a magnifying glass, you'll note the enhanced output quality of characters and curved lines: no more jaggies.

Variable-size dots are achieved by a process HP calls "pulse width laser beam modulation"—that is, precisely timed laser burns. While the III is not the first printer to use variable dot size, it is the first popularly priced device to do so. HP says that knowing when to modulate is the real trick. The algorithm that uses variable dot size to solve concrete printer problems is proprietary to HP, patent pending.

HP has also capitalized on its prominence in the industry to assure broad software support for the new printer. The company has promised simultaneous releases from leading vendors in every important application category by the printer's March 1 release date. If all goes according to plan, most major word processor, desktop publishing, and presentation graphics vendors will be ready with software that exploits at least part of the III's feature set.

The printer measures 8.5 by 18 by 24.5 inches (almost exactly the same as the II) and weighs 50 pounds. It comes with 1MB of RAM as a standard complement, of which 720K can be allocated as a print buffer. That's a lot more usable RAM than the LaserJet II's 395K. You can expand RAM up to 5MB.

Looking Forward—and Backward

Of course, the LaserJet III is fully backward compatible. It uses the same handy toner cartridges you've been using in your II, and it works perfectly with HP-compatible font cartridges, soft fonts, and software drivers—although you won't be able to access the new features from old software.

In June, HP will ship a Formatter kit that upgrades the LaserJet II so it has the LaserJet III's PCL 5 and resolution enhancement. The upgrade, probably best done by a dealer, will cost around $1100.

The LaserJet III is a product of major significance, both for users and for Hewlett-Packard—and it crowns a remarkable year for HP, whose recent product development and positioning seem impeccable. Between its low-priced 4-ppm IIP, its high-end IID (whose price now drops from $4295 to $3495), and the amazing LaserJet III, HP has left very little room for rival laser printers at any speed under 16 ppm. ●

Michael Goodwin is an associate editor for PC World.

SNAPSHOT

HP LaserJet III

This replacement for the industry-standard LaserJet II provides scalable fonts, higher print speed for complex pages, enhanced print quality, and full backward compatibility—at a lower price.

KEY FEATURES

- **Scalable fonts**
- **Complex pages and special effects print at full 8-ppm engine speed**
- **Landscape and portrait orientation on the same page**
- **Resolution enhancement for sharper character edges and smoother curves**
- **More usable standard RAM**
- **Uses familiar toner cartridge**

AVAILABILITY

March 1

PRICING

$2395

Hewlett-Packard
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900

Reader service no. 660

POWER TIP NO. 98

1-2-3 Release 3—Text à la Mode

When installed for EGA or VGA, 1-2-3 release 3 runs only in graphics mode, slowing screen refresh and causing compatibility problems with TSRs. To get release 3 into text mode, reinstall it for CGA: In the INSTALL program, select Color Graphics Adapter as your first display and either Enhanced Graphics Adapter or Video Graphics Adapter as your second. (Remember to save your DCF file.) You will then be able to switch back and forth between text and graphics easily with the Worksheet Window Display command. A pair of macros can automate this task further.

Evelyn Morrison
Menlo Park, California

NEW Slot Card Systemizer SC!

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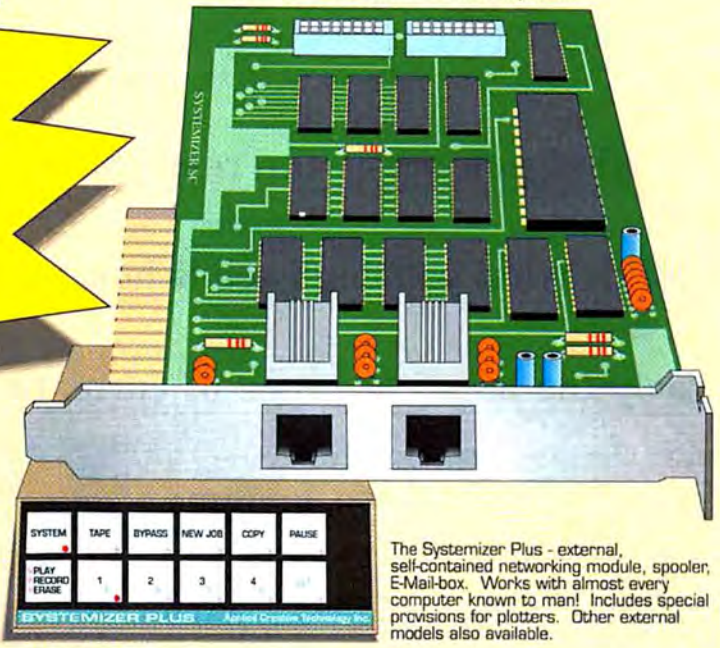
The truly universal LAN alternative...

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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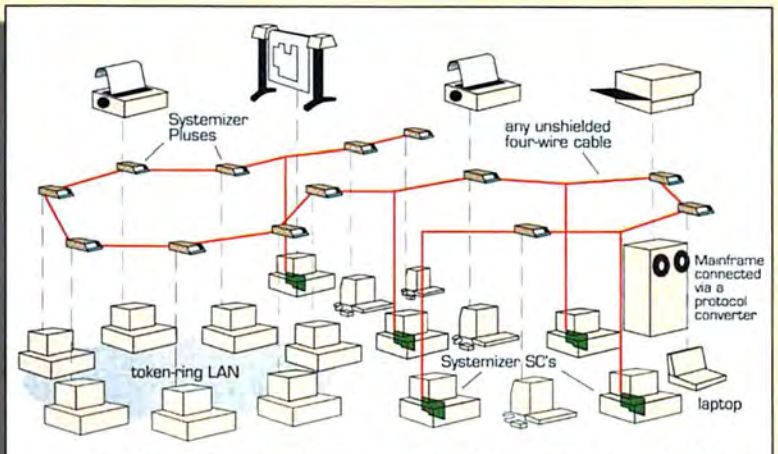

Example: 17 micros, of various brands, *plus* a mainframe, all sharing printers, data and E-Mail via Systemizing. Note how some PC's on a token-ring LAN are also part of the Systemizer LAN.

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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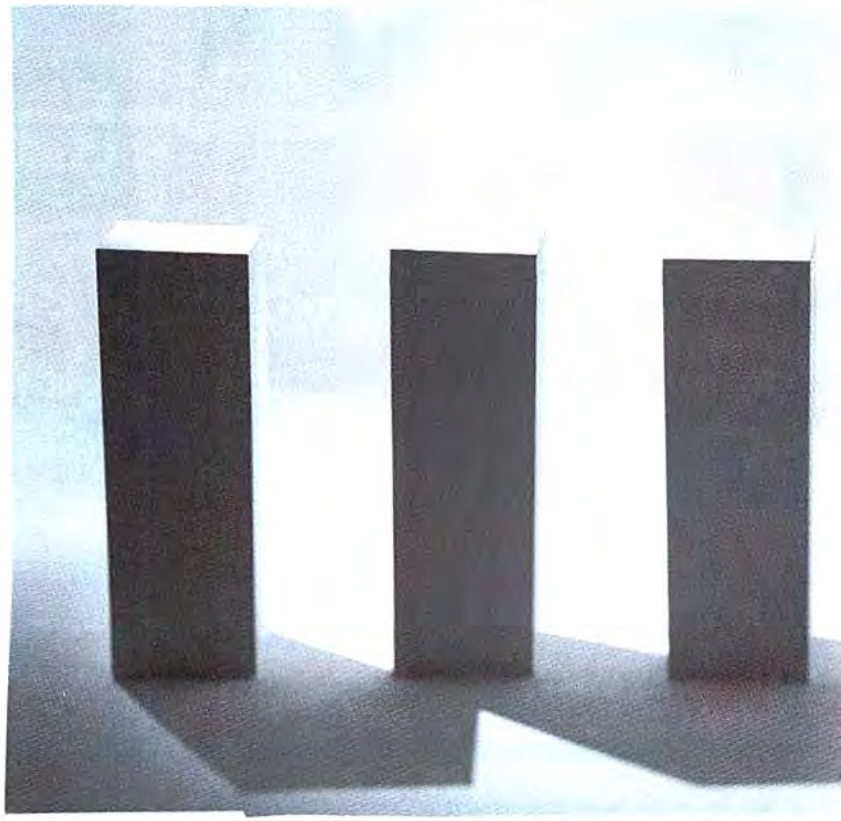
Circle 77 on reader service card

All the monitors you'll need for

What you see is the remarkable MultiSync® 3D color monitor from NEC. What you don't see is how this one monitor can accommodate not only the broadest range of current mainstream standards, but also the next standard to become mainstream—8514/A, with its brilliant color resolution of 1024 x 768.



Built around our award-winning multiple frequency technology, this one monitor automatically adjusts to frequencies from CGA all the way up to 8514/A. Which means even if you haven't moved up to 8514/A yet, you have the opportunity to purchase a monitor through foresight, rather than hindsight.

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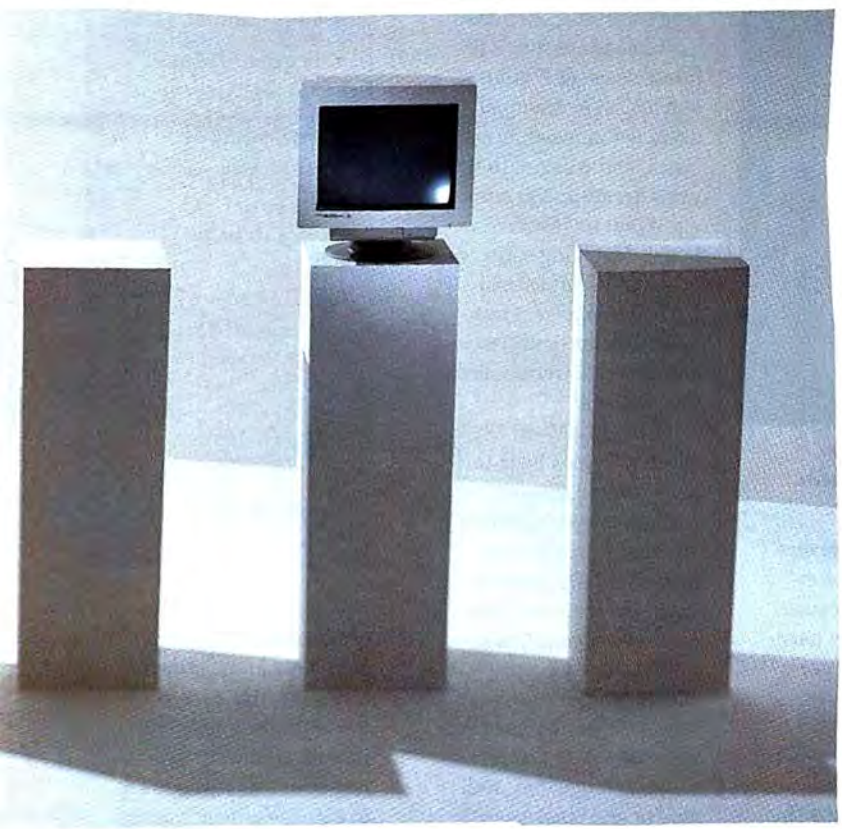
all the resolutions you'll need.

Especially since the MultiSync 3D also has a microprocessor-based digital control system that provides automatic screen configuration, lets you select the ideal resolution for your software, and even has a



memory that recalls your preferred screen settings. And it's also compatible with the IBM PC/XT/AT, PS/2 and the Macintosh computer systems.

Now, since NEC is ready to accommodate even the newest graphics standard to emerge, maybe the real question is: Are you?

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Macintosh compatibility includes Macintosh II, IIx, IIcx and SE/30

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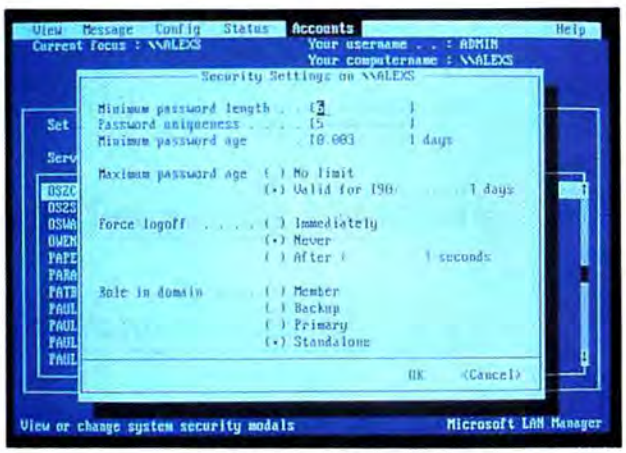
NEC

Circle 187 on reader service card

LAN Manager Gets Its Second Wind

Microsoft's latest upgrade offers some impressive improvements, including a badly needed speed boost.

Robert Lauriston



For extra security, LAN Manager 2.0 lets administrators impose many new restrictions involving users' passwords.

Early users of *LAN Manager* had a lot to gripe about. They complained that the network operating system (NOS) was slow and RAM hungry and that many features were available only to OS/2 workstations. Administrators said the program was hard to install and awkward to manage, and the security conscious discovered disturbing chinks in its armor. Apparently Microsoft has been listening: *LAN Manager 2.0* squarely addresses those complaints. In addition, Microsoft is making a valiant effort to beat NetWare 386 in both features and performance.

Unfortunately, not everyone can play, because *LAN Manager 2.0*'s hardware requirements are steep. Most of the new features require a 386 server, and while the NOS will run on a 5MB PC, you'll need at least another 4MB of cache memory for acceptable performance. That's quite a bit of RAM compared with NetWare's 2MB requirement, but as RAM prices drop, this will become less of a consideration. *PC World* will pit *LAN Manager 2.0* against NetWare 386 in an upcoming issue. Meanwhile, here's a quick rundown of what *LAN Manager 2.0* has to offer.

Something for Everyone

The *LAN Manager* upgrade bestows only a few advantages on users, but they're impressive. For one thing, both DOS and OS/2 applications should get a major speed boost, particularly on systems that are linked to 386 and 486 servers. For another, DOS workstation software will use 60K to 75K less RAM, leaving enough to run even memory-hogging applications like *Ventura Publisher.* Microsoft has announced that a future release of *Windows* will let *LAN Manager* users log in, send messages, and connect to network drives and printers via *Windows*' Control Panel. Matching software hooks in *Windows* and *LAN Manager 2.0* may mean fancier multiuser and client-server applications as well.

Unlike NetWare 386, which provides peer-to-peer printer sharing, *LAN Manager* won't let you share printers attached to DOS workstations. On the other hand, *LAN Manager*'s OS/2 workstation software includes full peer-to-peer server capability that lets you make your printers, disks, and modems available to one other user. To share with more than one user at a time, you must install server software on the workstation.

Follow the Leader

Many of *LAN Manager 2.0*'s most impressive improvements will be seen only by administrators, and most of these follow NetWare 386's lead. Installation has been simplified and no longer requires manual editing of confusing INI files. Supervisors can delegate limited administrative rights to users who need to manage a print queue or keep a department's user accounts up-to-date.

Still emulating Novell, *2.0* provides extra data protection with fault-tolerant features like hot fix, disk mirroring and duplexing, and serial-port UPS monitoring. For added security, log-in passwords are encrypted before being sent over the network bus, supervisors can restrict users' log-in times and disk space, and

SNAPSHOT

LAN Manager 2.0

This major upgrade of Microsoft's networking flagship addresses users' most serious complaints, promises a major speed increase, and closes in on NetWare's lead in features.

KEY FEATURES

- **More usable RAM on DOS workstations**
- **Increased speed**
- **Easier network access via future versions of Windows**
- **Peer-to-peer features for OS/2 workstations**
- **Replication service**

AVAILABILITY

Second quarter 1990

PRICING

Unavailable at press time

Microsoft Corp.
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206/882-8661

Reader service no. 690

Six reasons your business should upgrade to the new Lotus Symphony 2.2

People like you in corporations throughout the world have chosen Lotus® Symphony® for its advanced spreadsheet, fully integrated modules, windowing facility and powerful command language, not to mention unparalleled service and support. And now the new Symphony 2.2 brings you a host of advanced features that let you perform more sophisticated analysis, build bigger applications and present your ideas with more impact. Here are six reasons why you should upgrade right away:

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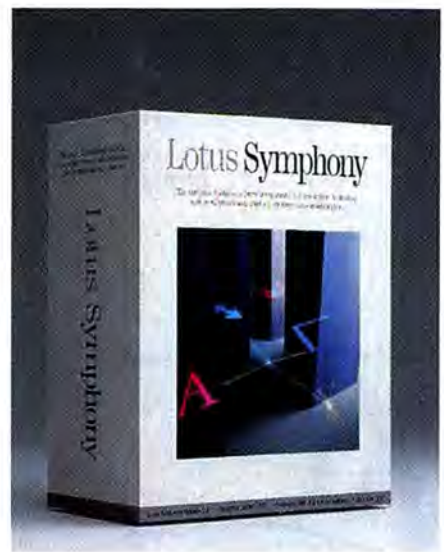

2 View any file on disk before you retrieve it.

Symphony 2.2 includes technology from Lotus Magellan® — our utility software that lets you find, view and use information stored on your PC's hard disk. So now you can easily locate and preview the contents of any file — without exiting Symphony. This allows faster and easier retrieval of the file you're searching for, and makes file linking a simple "point and shoot" operation.

3 Widely expanded database capabilities.

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4 Presentation-quality output has never been easier.

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5 Advanced support for expanded memory.

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6 Upgrade today and save $30.

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Lotus Symphony 2.2

System Requirements: Minimum 512K RAM. 640K for use with large add-ins. DOS level 2.0 or higher. Symphony runs on IBM XT, AT, PS/2 Models, COMPAQ computers, plus Lotus-certified compatibles. Hard disk required.

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users can no longer access disk data that's stored past the end of a file. (Workstations not running OS/2 can also automatically encrypt user passwords with a 1K TSR.) Even if would-be data thieves succeed in booting the server from a floppy, they will find server files inaccessible. All administrative utilities can now be run from DOS workstations, crucial if few or none of your workstations run OS/2.

But not all of *LAN Manager 2.0*'s new features are mere catch-ups. *LAN Manager 2.0* is the first NOS to let diskless workstations boot OS/2. In addition, its unique "replication service" enables supervisors to update a single master copy of an application or data base, which is then copied automatically to designated servers around the net.

LAN Manager's own user accounts data base can also be replicated. Supervisors will be able to update the master data base and replicate it for all the servers on the net, allowing users to log on even when their own server is down. But this scheme isn't as convenient for large LANs as Banyan Vines' distributed name service is, since moving a user from one *LAN Manager domain* (a named group of linked servers) to another still requires supervisors to delete the user's old account and create a new one manually.

Microsoft May Sell Directly

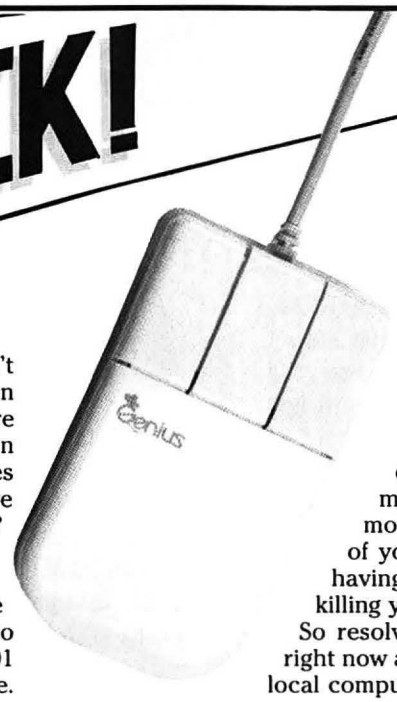
The rumor persists that Microsoft plans to sell *LAN Manager 2.0* directly to end users. This strategy would be a major departure, since the company has never sold *any* operating system software under its own label. Adding credibility to the rumor is the fact that 3Com is downplaying its role as the largest *LAN Manager* reseller and increasing its Novell support.

Versions of *LAN Manager 2.0* from DCA, Ungermann-Bass, Olivetti, NCR, Okidata, and Apricot are expected to ship in the first half of 1990. Since 3Com, Compaq, and Torus need additional time to add in special features, they aren't likely to ship products until the third quarter. IBM plans to ship its *LAN Server 1.2*, which will include some (but not all) of *LAN Manager 2.0*'s features, on March 30.

This upgrade seems sure to please *LAN Manager* users. If Microsoft delivers on its performance promises, *LAN Manager 2.0* should also prove a sound alternative to NetWare. ●

Robert Lauriston is an associate editor for PC World.

EEEEEK!



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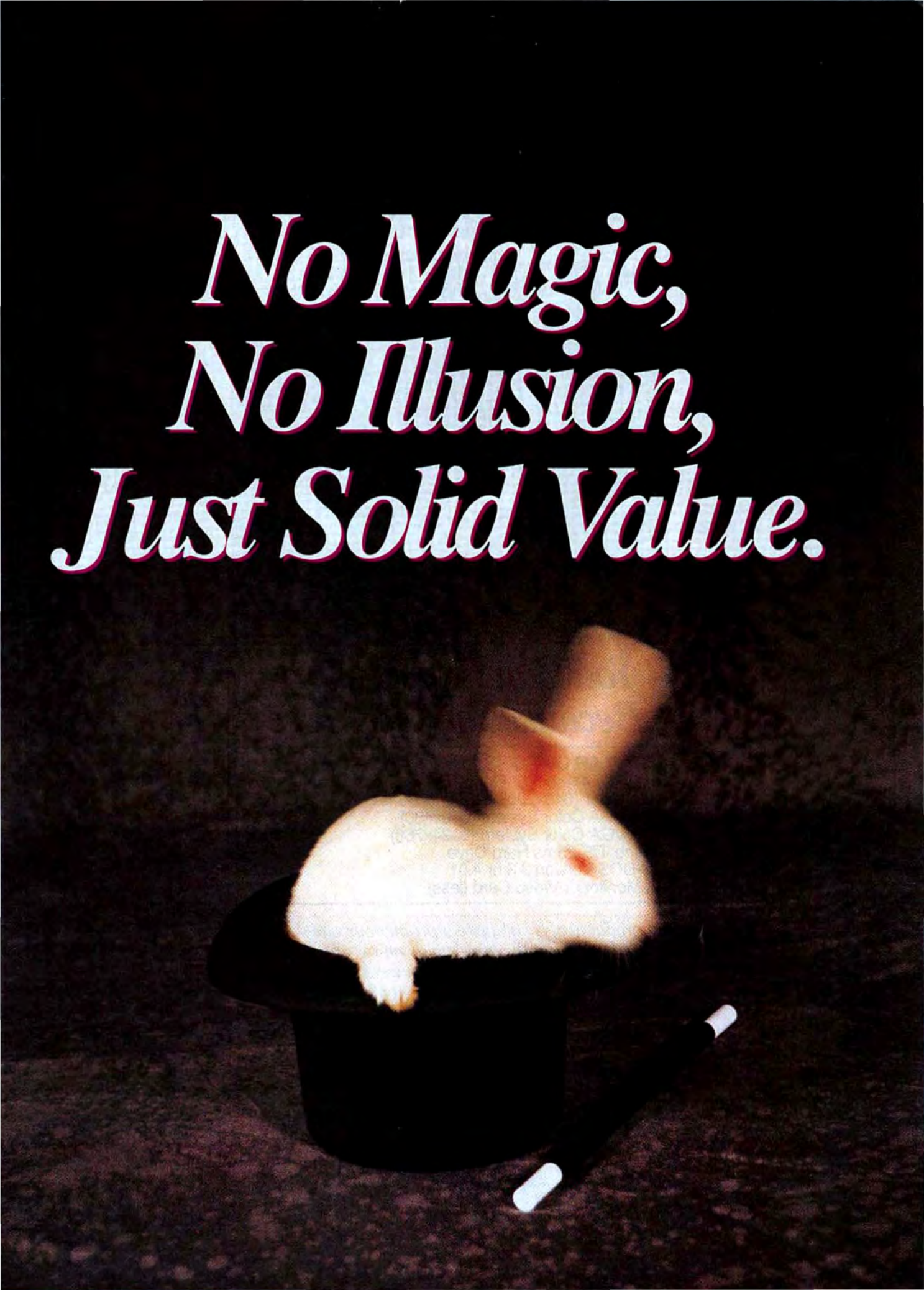

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R:base Loosens Up

Easy querying and pulldown menus bring R:base release 3.0 face-to-face with Paradox.

Ed Bott

With R:base 3.0, developers get a greatly expanded set of tools for building data entry forms, including customizable pop-up windows that can be used with any field.

The graybeard of PC data managers, Microrim's *R:base* has always earned mixed notices. Loyal developers have long admired its speed, relational prowess, and development tools, but many casual users have balked at its command-driven interface. Meanwhile, in the battle of non-dBASE data managers, Borland's *Paradox* has taken the lead, thanks to its comfortable Lotus-style menus and an easy-to-use query by example (QBE). With *R:base* release 3.0, Microrim takes dead aim at *Paradox*, providing an intuitive interface and a powerful QBE. And developers can sink their teeth into a full, ANSI Level 2–compatible Structured Query Language (SQL) command set.

The new interface will be an eye-opener for *R:base* stalwarts—the bare R> prompt is replaced with a series of well-organized pulldown menus, and you can select most options with a mouse or an <Alt>-*key* shortcut. Tellingly, the new *R:base* mimics *Paradox*'s use of <F2> for "Do It" and <F6> to check off fields for QBE. Old-timers, however, can stick with the old command line or the Prompt by Example menu.

A whole new bag of tricks is available for designing data entry forms, including auto-numbering fields, a SKIP option that moves to another field if a specified condition is met, and customizable pop-up windows that can be used to display and choose data from any table. For each field, you can set up custom entry and exit routines that could, for example, branch to another field and fill in a value. You can choose a generic "quick form," a custom form, or a variable form (which is not tied to a specific table).

R:base's QBE facility is unmatched. You can select rows from any table, then sort the resulting output or change its layout. Unlike *Paradox*, *R:base* lets you add new rows and edit the results of a single-table query. You can't edit multi-table queries, but you can save them as named views. As always, *R:base*'s extensive set of relational tools lets you append, create, and combine tables based on common fields.

For anyone who ever struggled with *R:base*'s old Reports Express, the upgraded, band-oriented report writer is a dream. One of the most glaring flaws of previous versions—the complete absence of printer support—has been rectified. The new release ships with drivers for upwards of 100 printers. And refining re-

SNAPSHOT

R:base 3.0

The powerful relational data base adds an easier interface, full SQL support, and a QBE facility that outdoes *Paradox*.

KEY FEATURES

- **Pulldown menus**
- **Mouse support**
- **Query by example**
- **ANSI Level 2 SQL**
- **Band-oriented report writer**

AVAILABILITY

March 1990

PRICING

$725, upgrades $175 (free upgrade if purchased between January 15, 1990, and ship date)

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Reader service no. 725

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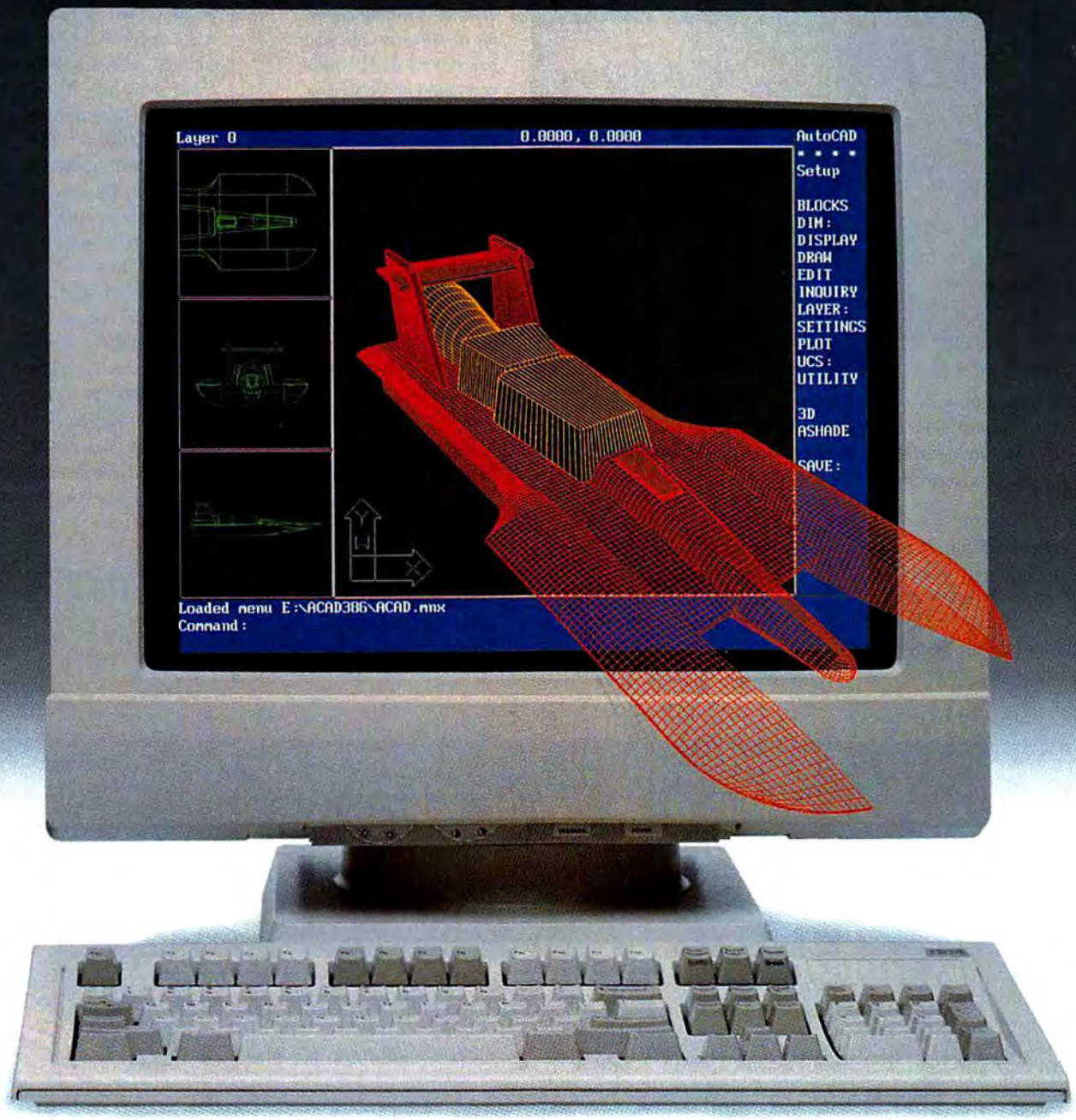

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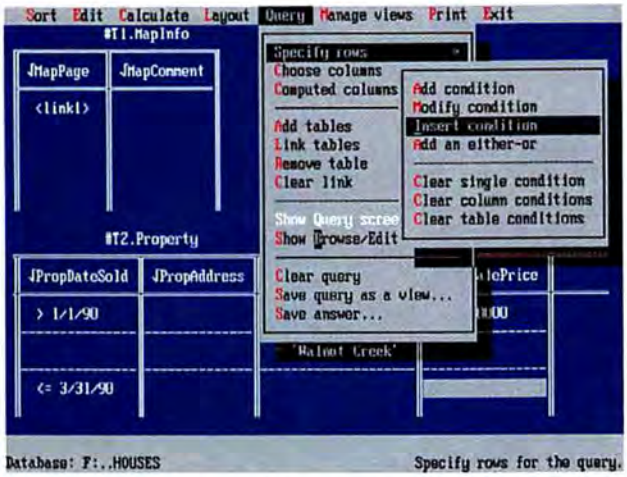

R:base 3.0's spiffy mouse-driven interface simplifies data base operations. Query by example lets you set up on-the-fly links between tables by checking the desired fields and specifying conditions.

port variables is much easier; you can pluck date and time stamps, page numbers, breakpoints, and the like from menus without defining expressions.

R:base's menu-driven Applications Express has always earned high marks, and the latest release breaks little new ground. The big news for developers: Microrim has rewritten *R:base*'s command structure to conform to SQL. Unlike with *dBASE IV*, the code is integral to the data base, so there's no need to pass requests through a time-consuming interpreter. The next release of *R:base* will extend front-end support to numerous SQL data base servers, including Microrim's own as-yet-unreleased *Vanguard*.

Unfortunately, with the new SQL commands, some developers may be in for tedious recoding. Microrim provides conversion utilities that will translate most applications, but the company admits that some types of custom code will need to be converted by hand. Also, users will have to contend with a larger RAM demand—520K, up from the current 460K. Other complaints: The editor is still limited to small files, and since release 3.0 is incompatible with the *R:base Compiler*, users will have to wait for a new version of the debugger and compiler.

Despite these thorns, *R:base 3.0* looks impressive. It appears to have closed the gap on *Paradox* in the ease-of-use derby without losing its edge as the developer's choice. ●

Ed Bott is the managing editor of PC World.

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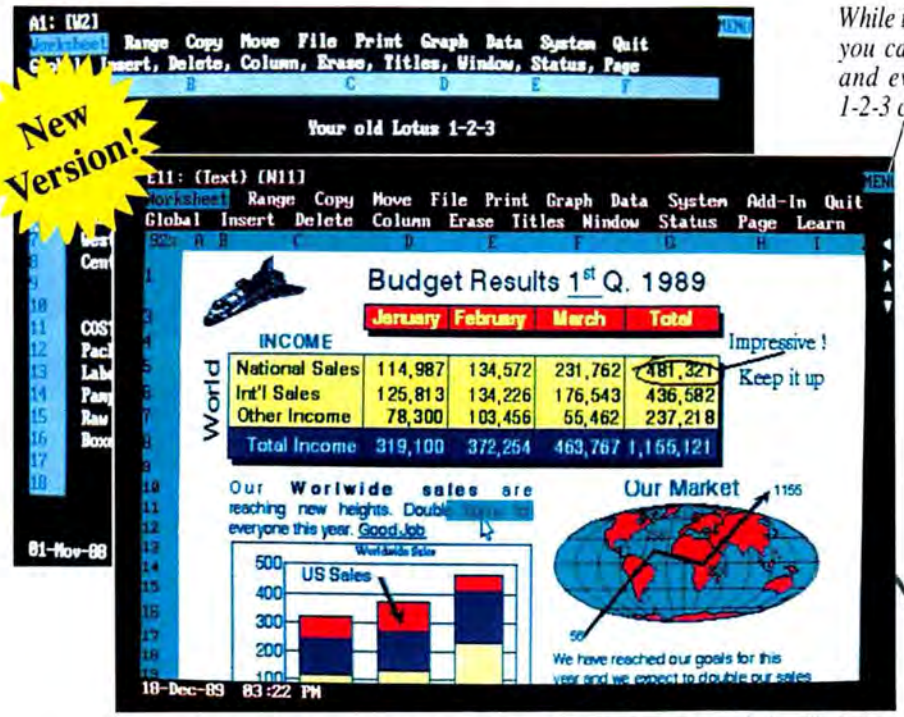
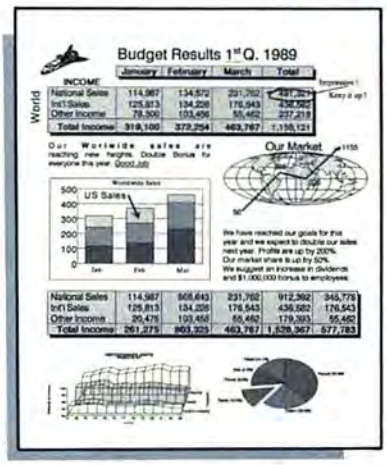


Lotus 1-2-3 stays fully active in graphics mode with IMPRESS. 1-2-3 works just like before, only now you have your own customized 1-2-3 screen display and reports.



What you see on your new 1-2-3 screen is what you get on paper.

When your 1-2-3 Worksheet looks IMPRESSive so do You

IMPRESS from PC Publishing gives 1-2-3 true desktop publishing features that enable you to create eye-catching and persuasive worksheets.

1-2-3 Stays Fully Active

While in IMPRESS you can call all 1-2-3 commands and menus. You can also edit cells. (Unlike Allways you never need to revert back to text mode for editing cells.)

Drawing Tool Box with an Optional Mouse Support

IMPRESS brings a true graphic interface to Lotus 1-2-3. Full mouse support to call menus or open windows. Even a drawing tool box that allows you to draw any image in 1-2-3. Get a professional look quickly and easily without ever leaving 1-2-3.

Compress or Enlarge Worksheets

You can customize your 1-2-3 screen display with drawings, colors, grids and new exciting fonts. You can also zoom in and out to compress worksheets or enlarge them. See twice as many rows and columns of your worksheets on screen. No more scrolling around.

Mix Numbers, Text and Graphics

Create a professional report with numbers, graphs, images and text all on one page. Your graphs are customized. Your text automatically word wraps and is justified. You have a choice of different type styles and sizes with different fonts (3 pts. to 72 pts.). Many Bitstream Fonts included. Your images are created with the drawing tool box or imported from Freelance.

Also Prints Sideways

Print sideways with all printers from dot matrix to laser and desk jets. Print exciting colorful reports with color printers. IMPRESS can also compress worksheets automatically so they fit any page size you want.

Customize Graphs or Forms

Graphs can be real time synchronized with your worksheet. You can also include .PIC files or Freelance files. Customize your 1-2-3 graphs with arrows, explanations, fancy titles and drawings. Draw lines, boxes, grids or even freehand to create any form or invoice from inside 1-2-3. Then fill up your forms on screen and simply print them.

Easy to Use

If you know how to use 1-2-3, you already know how to use IMPRESS, it's fast and easy. There is no learning period. IMPRESS uses 1-2-3 like menus that you are already familiar with.

Allways and 1-2-3 Rel 2.0, 2.01, & 2.2 Compatibility

If you have Allways IMPRESS imports Allways files automatically. So you can improve them, print them sideways, or simply work on them without having to toggle to text mode. IMPRESS works with 1-2-3 Rel 2.0, 2.01, & 2.2.

Technical Requirements

IMPRESS works with: *1-2-3 release 2.0, 2.01 or 2.2, DOS 2.0 or later, CGA, EGA, VGA or Hercules (No color in CGA). Supports all graphics printers that work with 1-2-3: including Dot Matrix, Desk Jet, Laser printers (Hewlett Packard, Postscript, etc. . .). Color printers. IMPRESS occupies 93k RAM above 1-2-3 (uses EMS if available). Many Bitstream Fonts included with package. 1-2-3 is a registered trademark of Lotus Development Corp. Allways is a registered trademark of Funk Software.*

	Allways	IMPRESS
1-2-3 stays fully functional & interactive	No	Yes
Enhance & customize 1-2-3 screen display	No	Yes
Print sideways on all printers	No	Yes
Synchronized live graphs	No	Yes
See and work with more rows & columns on screen	No	Yes
Drawing tool box	No	Yes
Import Freelance images or graphs	No	Yes
Word processing capabilities	No	Yes
Customize graphs with arrows, frames, drawings	No	Yes
Full mouse support	No	Yes

"Which is better? . . . IMPRESS is the clear winner. It boasts nearly every additional feature I wished for when I reviewed Allways."
5/16/89 — PC Magazine

"IMPRESS . . . a clear leader worthy of an excellent score. If you like Allways, you'll love IMPRESS."
9/4/89 — Infoworld

"Works magic . . . the tremendous improvement over 1-2-3's screens and reports is obvious."
3/89 — Lotus Magazine

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"I am most impressed thus far with my new Gateway 2000 20 Mhz, 80386 computer. I am also impressed with your company. Your people are knowledgeable and friendly. Your prices are the best I have seen for a quality product line."

Hobart K. McDowell III

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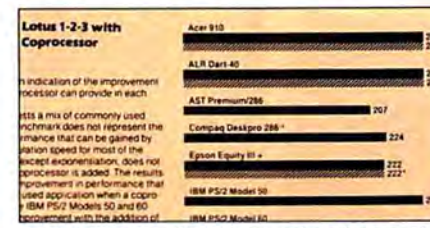

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go to test equipment?

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Performance tests are *applications-based.* We test machines with popular software such as the major spreadsheet and database programs. In contrast, many magazine reviews use misleading "raw processing" benchmarks that bear little relation to real-world business tasks. And the loose-leaf data services, despite their imposing appearance, perform *no* testing at all.

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ACCELERATOR BOARD FEATURES	Breakthru 286	Pacemaker 286	Inboard 386	Mach 10	PCturbo 386e-10	Rercord 286	SpeedPac
Speeds up IBM PC-1	Y	Y	N	Y	Y	YR	Y	N
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N	N
Microprocessor	80286	80286	80386	8066	80286	80286	80286	80
Memory Cache	16K	8K	64K	8K	N	8K	8K	12
On-board memory	N	N	OP1	N	1024K	N	N	N
Computer processor retained	N	Y	N	N	Y	N	N	N
Change Speed	YS	YS	YS	YE	YS	YJ	YJ	Y
Change speed without rebooting	YS	N	YS	YE	YS	N	N	Y
Change speed within application	N	YK	YK	N	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N	Y
RAM disk included	N	Y	N	N	Y	N	N	Y
Print spooler included	N	Y	N	N	Y	N	N	Y
Local hard card	SH	SH				SH	SH	

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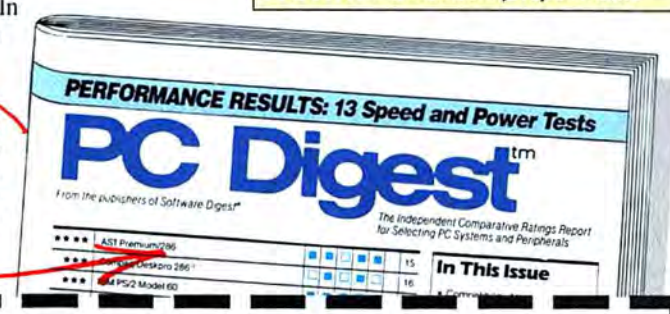

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PRODUCT OUTLOOK

INSIDE PRODUCT OUTLOOK

95 **V-series Ultra Smartmodem 9600**
Hayes gets a jump on the competition—its new V.42bis modem may be the fastest around.

95 **Toshiba T3100SX**
A VGA gas plasma display gives Toshiba's 386SX-based laptop a working life away from the outlet.

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Speed up work-group operations with this 20-page-per-minute laser printer from ALPS America.

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With a resolution of 1 million dots per square inch, the LM1000 laser printer rivals a phototypesetting machine in quality—and fits your budget, too.

102 **Step Server, FileMaster**
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104 **MaynStream 1300-DAT, DATaVault**
Two backup systems use digital audio tape technology to store gigabytes—ideal for LAN users.

UPDATE

104 **TOPS 3.0**
The leading Mac-PC-UNIX LAN operating system cuts its RAM appetite dramatically.

106 **BestChoice3**
Decision-making software now handles more elements, adds windowing and other features.

106 **SPSS OS/2, SPSS/PC+ V3.1**
The mainframe stalwart brings heavyweight data analysis to DOS and PM users.

108 **Alpha Four 1.1**
A popular data base manager adds speed, color, a run-time version, and instant preview.

108 **MCI Fax Dispatch**
Simple send-only service for PC-generated faxes drops prices, adds letterhead graphics, and more.

108 **Hot Line 2.2**
Auto-dialing and note taking combine to turn your phone into a versatile telemarketing tool.

The V-series Ultra Smartmodem 9600 incorporates MNP-5 error correction/data compression and speedy V.32 modulation techniques and is the first high-speed modem to add V.42bis data compression, which triples the nominal 9600-bps throughput.

V-series Ultra Smartmodem 9600

Hayes Is First and Fast—With V.42bis High-Speed Modem

In recent years, Hayes Microcomputer modems have been known for dependability rather than innovation. But the company has roared back of late with price cutting, aggressive marketing, new technology, and an uncharacteristic willingness to comply with de facto standards.

A good example is the V-series Ultra Smartmodem 9600, which may be the fastest and most compatible modem around. Unlike previous V-series products, which shunned popular standards in favor of proprietary protocols, the $1199 Ultra 96 incorporates MNP-5 error correction/data compression as well as speedy V.32 modulation techniques. It will be compatible with all previous Smartmodems.

The Ultra 96 is also the first high-speed modem to add V.42bis data compression. This is no fly-by-night proprietary protocol. It has wide support, with modem vendors from Microcom to Multi-Tech planning V.42bis versions in the coming months.

Use of the V.42bis protocol should triple the Ultra 96's nominal 9600-bps throughput speed, compared to a doubling of throughput with MNP-5 alone. Hayes claims that users may be able to squeeze speeds of up to 38,400 bps out of the modem.

With the Ultra 96 on the high end, Hayes has dropped prices on other products. The V-series Smartmodem 9600 V.42, which also incorporates V.42bis and MNP-5 but lacks the Ultra 96's speedy V.32 modulation, sells for $999. Hayes's 2400-bps V-series models cost $649 (see "Nine MNP Modems for Corporate Communications" in this issue). Hayes Microcomputer Products Inc., P.O. Box 105203, Atlanta, GA 30348; 404/449-8791, 404/441-1617 for information. *—Eric Brown*

Reader service no. 606

Toshiba T3100SX

A Light, Bright VGA Laptop

Toshiba's new T3100SX is a battery-powered version of its T3100e, with an even brighter VGA gas plasma display that shines for 3½ hours on two rechargeable nickel-cadmium batteries at 640 by 400 resolution.

After years of producing high-end AC-powered laptops, Toshiba has come up with a variation of its popular T3100e that works wherever you work—even if you're beyond the reach of a wall plug.

Lowering incidental pixel lighting for a blacker background, Toshiba has given its new T3100SX a VGA gas plasma display that is supposed to shine brighter for 3½ hours on two removable, rechargeable nickel-cadmium batteries. Toshiba claims the screen's 640 by 400 resolution and 100-to-1 contrast ratio make it even more readable than the display on the company's AC-powered T3100e.

The two laptops share most other features, including the same 12-by-14-by-3-inch dimensions and 15-pound weight. Like its cousin, the 80386SX-based T3100SX can go into sleep mode to save on power, and it turns off altogether after a user-definable lull. Two expansion slots let you install modem and networking cards without having to resort to a bulky docking station. And although the slots are nonstandard, numerous sources sell modems as well as networking and other cards to fit.

For $5999 you get 1MB of memory, a 1.44MB floppy, and a 25ms 40MB hard disk (compared to $4299 for a T3100e with only an EGA screen). A parallel port accepts a second floppy, and two serial ports let you hook up mouse, plotter, or what have you. A port for an external VGA monitor is also included, and you can run both the gas plasma screen and an external monitor simultaneously.

Memory expands to 13MB on the system board with 4MB chips, and the generous software bundle includes DOS 4.1 with expanded memory drivers, Quarterdeck's *QEMM* memory manager, and utilities for disk caching, print spooling, and other jobs. Toshiba America Information Systems, Inc., 9740 Irvine Blvd., Irvine, CA 92718; 800-334-3445. *—Mark Henricks*

Reader service no. 705

ALPS LPX 2020

A Laser Printer Built to Keep Up With the Work Group

If you're lucky enough to have one of the new, low-speed personal lasers at your workstation, you may not mind the occasional trip to the coffeepot while you wait for your printer to do its thing. But if like most people you must park your laser printing jobs behind those of co-workers—well, you just can't drink that much coffee every day.

For print-happy work groups, ALPS America offers its LPX 2020, a high-speed, high-volume workhorse. Built around an LED rather than a laser, the printer achieves high throughput for both text and graphics by coupling ALPS's own 20-ppm engine with a controller powered by National Semiconductor's 15-MIPS 32GX32 processor. The unit has backed a standard 2MB of memory, upgradable in 2MB increments to 8MB.

Built for the long haul (35,000 pages per drum, 2 million pages per engine), this 300-dpi LaserJet Series II–compatible is subject to fewer interruptions than HP's entry, thanks to its ability to accommodate two 5000-page toner cartridges simultaneously. You can easily replace the $440 drum yourself, and $195 buys you four tubes of toner. ALPS estimates supply costs at 2.3 cents per page.

The LPX employs a flat paper path to reduce jamups, and its two 500-sheet paper trays keep both legal- and letter-size stock flowing. Paper management options include a $995 ten-bin sorter that collates individual or paginated sets of up to 75 pages per bin. For an additional $495, you can get a 1000-sheet jogger that offsets and stacks documents too big for the sorter.

Built around an LED rather than a laser, the LPX 2020 printer achieves high throughput for both text and graphics by coupling ALPS's own 20-ppm engine with a controller powered by National Semiconductor's 15-MIPS 32GX32 processor and backed by up to 8MB of memory.

An optional $749 serial card lets you link up to eight computers or workstations to the LPX 2020. Easily installed in a drawer that also holds the controller card, the eight-user serial card has 256K of memory and will accept a 2MB daughterboard on which you can store each operator's printer default settings. An optional 20MB SCSI hard disk lets you store fonts right in the printer, essentially giving you a resident font library that doesn't need to be downloaded. The unit comes with 17 portrait and 17 landscape fonts, including Times Roman, Helvetica, and Courier.

Prices are $7495 for the base unit, $1395 for a PostScript emulation by Microsoft, $895 for each 2MB memory module, and $795 for the 20MB SCSI hard disk. ALPS America, 3553 N. First St., San Jose, CA 95134; 800/825-2577 (sales), 408/432-6000.
—Glenn Grant

Reader service no. 701

MegaMate 2.8, Model U4

Doubling Up on 3½-Inch Floppies

The floppy drive has long been overlooked in the race to make the PC better and faster, but the tortoise is catching up. High-capacity floppy drives, offering from 2.8MB to 20MB, are coming on the market. Among the first to arrive, Teac-based drives from Micro Solutions and Pacific Rim should find jobs backing up data or transferring data from a laptop to a desktop's 5¼-inch drive.

Both drives can boot PC, XT, AT, 386, and 486 ISA machines and can accept special 3½-inch barrium-ferrite floppies, which they format to a capacity of 2.8MB. Both units are also much faster than the standard 3½-inch drive: Micro Solutions' $449 MegaMate 2.8 runs at 79ms and Pacific Rim's $499 Model U4 at 94ms.

The drives come with their own ISA-bus controllers and will read and write standard disks that have been formatted at 720K and 1.44MB. Getting 2.8MB of storage, however, means turning to the new Extended Density disks from Toshiba, which cost $9.95 each and are available from both Micro Solutions and Pacific Rim.

You may find that these drives are strange terrain to your favorite floppy backup program. On the other hand, Pacific Rim claims it has tested its drive and found it compatible with a few backup software programs, including *Sitback*, *Backit*, *Intelligent Backup*, and the utility in *PC Tools*.
—Susan Lusty

MegaMate, Micro Solutions, Inc., 132 W. Lincoln Hwy., De Kalb, IL 60115; 815/756-3411.

Reader service no. 708

Model U4, Pacific Rim Systems, Inc., 2570 Barrington Ct., Hayward, CA 94545; 415/782-1013.

Reader service no. 709

I write pretty well.

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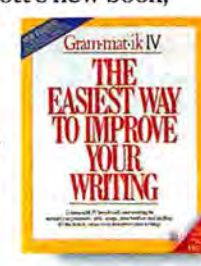


ANSWERS: Sentence 2–"problem have" (Verb Agreement: The singular noun *problem* may be used incorrectly with the plural form of the verb *have*.) Sentence 2–"too" (Homonym: Unless you mean also or overly for *too*, you probably mean *to* or *two*.) Sentence 3–"each one" (Long-winded or wordy) Sentence 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.*

Circle 282 on reader service card

Graphics Station Card, 8514/A Plus Combo Card

New Graphics Wave Crests—But How Smooth Is the Ride?

These days, most new video hardware is at least compatible with VGA, and plenty of 386 and 486 buyers are moving on to even finer displays. But if you want higher resolution and more colors, get ready for uncharted territory.

The Western Digital's 8514/A Plus Combo Card and Hercules' Graphics Station Card are two notable examples of a new wave of graphics boards with a maximum resolution of 1024 by 768—more than 2½ times the VGA standard. Both bring razor-sharp images to monitors 16 inches and larger—the ideal screen size for multitasking environments where you want to see multiple applications in their entirety rather than as postage stamps.

Unfortunately, this display resolution lacks a unified standard, and software written for one product won't run on the other. The 8514/A Plus Combo Card is a clone of IBM's three-year-old 8514/A graphics board, while the Graphics Station Card uses Texas Instruments' 34010 graphics coprocessor wrapped in the Texas Instruments Graphics Adapter (TIGA) interface. To complicate life further, IBM recommends that application developers write not to the 8514/A hardware (as most developers are currently doing) but to a software standard called the Adapter Interface. Neither of these approaches has generated enough mainstream business software support to nail down a standard, and speculation runs rampant about new IBM initiatives in both hardware and software.

In the meantime, unlike many of their rivals, both the 8514/A Plus Combo Card and the Graphics Station Card maintain backward compatibility with the venerable VGA. Hercules also covers its bets by targeting a vertical market—graphic arts professionals. With a $1499, 2MB RAM upgrade (and at a proprietary resolution of 512 by 480), the Graphics Station can do 24-bit, continuous-tone color, which gives artists a palette of millions of colors and permits subtle shading for photo retouching, illustrations, animation, fine art, and the like. For $3995, Hercules offers a special bundle with *Lumena*, a professional graphic arts package from Time Arts.

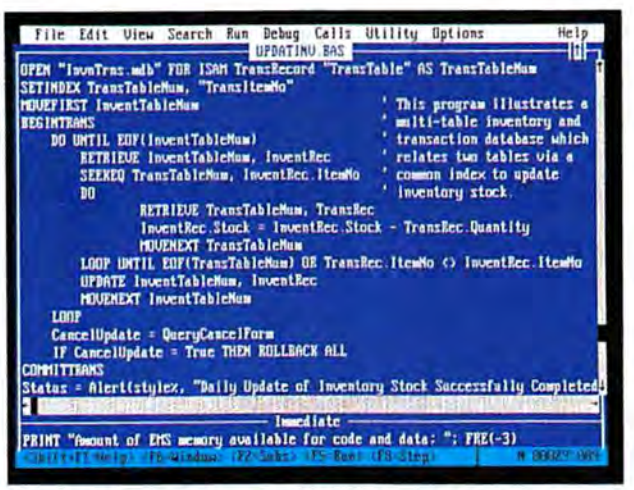
At a base price of $1024, the Graphics Station costs almost $300 less than the $1299 8514/A Plus Combo Card, and it does 256 colors at 1024 by 768 right out of the box. Western Digital's board can produce only 16 colors at that resolution, unless you buy a 512K daughterboard. *—Eric Knorr*

Western Digital Imaging, 800 E. Middlefield Rd., Mountain View, CA 94043; 415/960-3360.
Reader service no. 703

Hercules Computer Technology, 921 Parker St., Berkeley, CA 94710; 415/540-6000.
Reader service no. 704

Microsoft BASIC Professional Development System

Not So BASIC—It's for Professionals



Not so basic these days, Microsoft's BASIC Professional Development System has been enhanced with an indexed sequential access method tool for creating relational data base applications, toolboxes for creating interfaces, and faster compilation.

To most programmers, the name *BASIC Professional* is an oxymoron. BASIC has a reputation as a language for hobbyists and novices—although that characterization may be more valid for the freely distributed BASICA interpreter than for commercially sold compilers. But Microsoft is gambling that BASIC's very ubiquitousness—even among professional programmers—will breed interest for its *BASIC Professional Development System*.

Microsoft has enhanced the language in several ways. Among the more interesting is an indexed sequential access method (ISAM) tool for creating relational data base applications. Microsoft's ISAM has its own data engine, which can take the form of either a linkable library or a separate, royalty-free TSR. Oriented to single-user applications, the ISAM contains no tools for network-based data bases.

Other new features include static arrays in records, local error handling, and extra DOS file-control commands. Toolboxes are included to speed the creation of user interfaces, presentation graphics, and matrix math. The code for three new libraries—numeric formatting, date/time operations, and financial functions—was taken directly from *Excel* and should behave just like the spreadsheet tools.
(see BASIC, p. 100)

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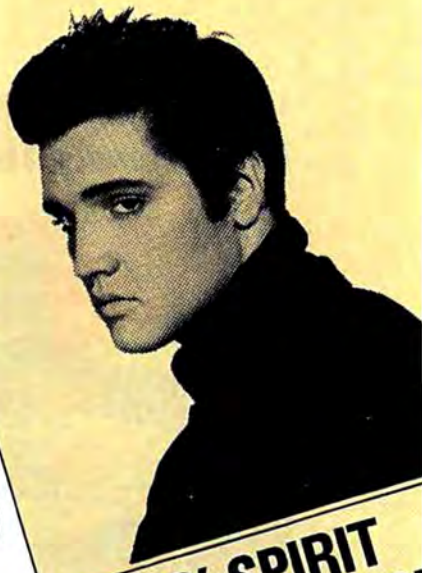

ELVIS' SPIRIT TRAPPED INS MICROCHIP

Incredible proof of reincarnation

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.

PC MAGAZINE EDITORS' CHOICE August 1989

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Circle 71 on reader service card

Acer 1100/SX, AST Premium 386SX/16

Architecturally, These SXs Have Something Extra

Acer's 1100/SX (left) and AST's Premium 386SX/16 (right) provide 386 power at near-286 prices. The 1100/SX puts both hard disk and floppy controllers, two serial ports, a parallel port, and VGA graphics on the motherboard, while AST's entry employs an upgradable CPU card for processor and memory.

Bargain hunters look to Intel's 386SX processor to provide 386 power at near-286 prices. But the muscular SXs are much more than just fast AT clones. Acer's 1100/SX and AST's Premium 386SX/16 demonstrate new levels of integration and versatility.

Acer's nominee for entry-level stardom aims for maximum integration in a compact 16.2-by-14.2-by-5-inch footprint—about the size of an IBM PS/2 Model 55 SX. Both hard disk and floppy controllers, two serial ports, a parallel port, and VGA graphics are integrated into the motherboard, leaving four 16-bit expansion slots free. You also get a PS/2-style mouse port and a keyboard socket near the front of the system, a nice ergonomic touch.

The $2195 price includes an Acer mouse as well as a 1.2MB floppy drive, 1MB of memory, DOS 3.3, and *Windows/386*. Up to 8MB of memory can be installed on the motherboard, making the 1100/SX a realistic OS/2 option. Two hard-disk alternatives—40MB and 100MB internal units, each with an average access time of less than 28ms—are available for $600 and $1055, respectively. A VGA 7004 monochrome monitor is another $169, or you can choose a 7015 multiscan color monitor for $560.

Meanwhile, AST is betting that computer shoppers will fall in love with its Completely Universal Processor, I/O Design—or CUPID—architecture. Despite the frivolous acronym, AST expects you to take its upgrade option seriously. The processor and memory are located on their own board; when you outgrow the system, you can swap in a processor board with a 25- or 33-MHz 386, or even a 25-MHz 486.

The full-sized system box (19.25 by 16.5 by 6.25 inches) leaves plenty of room for expansion, with four free 16-bit slots, one 8-bit slot, and room for five half-height devices. The $2695 base configuration includes a 16-bit AST VGA adapter, 1MB of memory, and a 3½- or 5¼-inch floppy drive. The lone hard disk option, a 28ms 40MB unit, doesn't come cheap at $700. And with a 4MB ceiling on the motherboard (with a maximum of 16MB system-wide), the Premium 386SX/16 is a less than ideal OS/2 unit. —*Ed Bott*

Acer America Corp., 401 Charcot Ave., San Jose, CA 95131; 800/538-1542, 800/782-1155 (California), 408/922-0333.
Reader service no. 706

AST Research, Inc., 16215 Alton Pkwy., P.O. Box 19658, Irvine, CA 92718-9658; 714/863-1333.
Reader service no. 707

BASIC

(continued from p. 98)

As in *QuickBASIC*, *BASIC Professional*'s editor partially compiles your code into pseudocode as you write it: While you program, you're working not on a text file but on the actual running program. That feature increases compilation speed considerably (according to Microsoft, up to 150,000 lines per minute on an 8-MHz AT). The editor can load and save straight ASCII files, so you can easily go back and forth between this editor and your own favorite.

BASIC Professional runs under both DOS and OS/2, although some features are available only under DOS. It creates programs for either operating system; both the compiler and DOS programs it creates can tap expanded memory. Microsoft claims that *BASIC Professional*'s EXE files are as small and as fast as those from any other professional language.

BASIC Professional comes with Microsoft's CodeView debugger and a utility for building large, multiple-module applications. It lists for $495 and is available to registered *Microsoft BASIC Compiler 6.0* users for $195. It requires either DOS 3.0 (with 640K of RAM, and EMS 4.0 memory recommended) or OS/2 1.1 and a hard disk. Microsoft Corp., 1 Microsoft Way, Redmond, WA 98052-6399; 800/426-9400. —*Lincoln Spector*
Reader service no. 702

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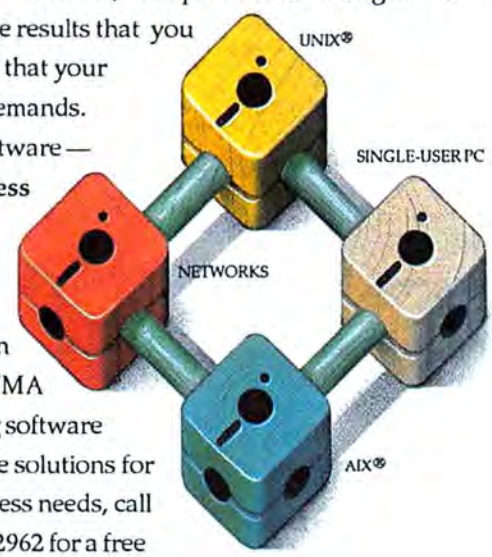

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Circle 54 on reader service card

LaserMaster 1000

Desktop Typeset

Three factors have always separated phototypesetting machines from desktop laser printers—price, size, and resolution. Now you can strike resolution from the list. The LaserMaster 1000 Plain-Paper Typesetter has typesetter-quality 1000-by-1000-dpi resolution, fits comfortably on a desk, and costs below five figures.

The LM 1000 isn't much larger than a Hewlett-Packard LaserJet Series II, and it uses the same Canon SX laser engine and a toner cartridge common on 400-dpi printers. The biggest difference is a special TurboRes controller card that fits in an 8-bit slot in your PC. The card packs a proprietary processor and 6MB of memory, enabling its on-board logic to control the speed at which the laser blinks on and off and the height of individual pixels.

This technology lets the printer cram the equivalent of 1 million dots into a square inch. A 300-dpi printer would fit 90,000 into the same space, so it's easy to see why jagged lines will be smoother and halftones will look more than half right. Printing is snappy, thanks to the controller's use of its high-speed video port to send graphics calls directly to the laser without file translation.

You may have been using a laser printer to make proofs before sending them out for typesetting. Now you can fit the equivalent of a medium-grade typesetter in that same corner of your office. You can also fit it into your budget if you have $7495 for an AT-bus version LaserMaster 1000 or $7995 for the Micro Channel variety. A $995 option lets everyone on your network use this printer.

The LaserMaster 1000 Plain-Paper Typesetter brings you typesetter-quality, 1000-by-1000-dpi resolution in a box not much larger than a Hewlett-Packard LaserJet Series II, thanks to a special TurboRes controller card with a proprietary processor and 6MB of memory.

The price includes card, printer, toner, and a ream of high-grade paper. You get drivers for *Windows, GEM, Microsoft Word, WordPerfect, AutoCAD,* and HPGL formats, plus 35 font outlines, all scalable and rotatable. Because LaserMaster deems the desktop publishing standard too sluggish, the fonts aren't PostScript compatible. But a bundled driver will handle PostScript files, LaserMaster says. LaserMaster Corp., 7156 Shady Oak Rd., Eden Prairie, MN 55344; 612/944-9330.
—Mark Henricks

Reader service no. 710

Step Server, FileMaster

Express Bus Speeds Up File Servers

For LAN file servers, a major bottleneck is the 8-MHz AT bus, which can't move data as quickly as the fastest hard disks. To get around this limitation, lots of companies are working on EISA- or MCA-bus servers. Everex Systems and Storage Dimensions take a different approach: They've sped the old AT bus up to 16.5 MHz. But for that detail, the Everex Step Server, also distributed as the Storage Dimensions FileMaster, is much like any other 33-MHz 386.

Despite the faster bus, which you would expect to be incompatible with existing boards, many popular network interface adapters will work without modification. Everex and Storage Dimensions have certified Ethernet and Arcnet boards from 3Com, Novell, Standard Microsystems, and others to work reliably with the Step Server. Storage Dimensions builds a special SCSI adapter, and Everex produces a multifunction board including Hercules-compatible monochrome graphics, two parallel ports, and two serial ports.

The systems also include one or two high-capacity SCSI drives, one 1.2MB floppy drive, a monochrome monitor, and an extended keyboard, but no Ethernet or Arcnet board. If you need additional disk space, you can daisy-chain external SCSI expansion cabinets that hold up to four full-height drives each. WORM and erasable-optical drives are also available.

The base system, which costs $11,599, includes 150MB of disk storage, 4MB of RAM, and a 64K high-speed memory cache; the same configuration but with a 320MB drive costs $12,999. A server with a 320MB hard disk, 8MB of RAM, and a 128K memory cache costs $14,999; substitute a 650MB disk, and it's $17,999. The top-of-the-line server with 16MB RAM, a 256K memory cache, and two 650MB drives costs $28,000.
—Robert Lauriston

Step Server, Everex Systems, Inc., 48431 Milmont Dr., Fremont, CA 94538; 800/334-4552, 415/498-1111.

Reader service no. 711

FileMaster, Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

Reader service no. 712

The New Hercules Graphics Station Card

Introducing the Hercules Graphics Station Card. With more features than any card in its class. And more power. The company that took the monotony out of monochrome now puts more zip into analog monitors.

Fast Graphics

In today's competitive business world, time is more precious then ever. But Windows applications like PageMaker, Excel, and Corel Draw can make you wait while they work. Not with the Hercules Graphics Station Card—it'll run Windows up to five times faster than a regular VGA card. At higher resolutions, too.

The secret is the on-board Texas Instruments 34010 graphics processor. It frees the CPU from the drudgery of graphics functions and screen memory control so you won't have to wait for your screen to catch up with you.

From VGA on UP

A whole megabyte of video memory lets the Hercules Graphics Station Card offer a full range of modes—from VGA up to 1024 x 768 resolution with 256 colors, and plenty in between. So it will run all your software—from general business to complex design programs. And as your software needs become even more sophisticated, you won't need to shop for a new video card.

Life-like Images

Computer images can look realistic when software can access more colors. The 16- and 24- bit color modes on the Hercules Graphics Station Card allow any standard analog monitor to display up to 16.7 million colors for high quality photo-realistic images.

And best of all, you can have all these features for less than you'd think. Call us at **800 532-0600, ext. 188** (U.S.) or **800 323-0601, ext. 189** (Canada) for the quickest way to your Hercules dealer.

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Hercules

Takes the wait out of Windows!

Circle 83 on reader service card

MaynStream 1300-DAT, DATaVault

DAT Drives Handle Gigabyte Backups

It's getting harder and harder to keep pace with the fast-growing network brigade, so makers of backup systems are resorting to exotic new technology—including digital audio tape (DAT).

Maynard's $5000 MaynStream 1300-DAT can squeeze 1.3 gigabytes (GB) of formatted data onto a 4mm DAT cassette at an average rate of 10.98MB per minute. Alternatively, the DATaVault made by Wangtek and distributed by Tecmar can back up 1.3GB at 10MB per minute and packs up to 2.6GB of data on a 4mm tape.

Maynard's *MaynStream* and Tecmar's *QTOS* software let you back up by drive, subdirectory, and file, and *MaynStream* offers password protection. Both require at least 2 hours to do file-by-file or image backups for 1.3GB of data. Both restore at a rate of 5MB per minute for file-by-file backups and 10.9MB per minute for image backups.

Each also lets you append new backups to the same media without overwriting previous backups, and you can create macros to back up multiple drives after-hours.

Compatible with DOS and UNIX (although untested on OS/2), the *MaynStream* can read and write to any cassette in DDS format. Tecmar's *QTOS* works with DOS and OS/2 and has optional drivers for UNIX.

The $5000 MaynStream 1300-DAT is compatible with PCs, XTs, ATs, and 386s. Both internal and external versions come with their own controller. The $4995 DATaVault is compatible only with ATs and 386s, and you have to pay $500 to $700 extra for the controller. —*Susan Lusty*

Maynard Electronics, DAT Product Division, 460 E. Semoran Blvd., Casselberry, FL 32707; 407/263-3500.
Reader service no. 713

Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139-3377; 800/624-8560, 216/349-0600.
Reader service no. 714

MaynStream and DATaVault (above) squeeze 1.3GB onto a DAT cassette.

UPDATE

TOPS 3.0

"New Beginning" For Mac-to-PC LAN

Business users with "mixed environment" work groups (PCs, Macs, and Sun workstations) have long had a love-hate relationship with TOPS, a low-cost network operating system (NOS) that provides easy Mac-PC-UNIX connectivity plus menu-driven file and printer sharing. TOPS's big problems have been software incompatibilities and a RAM-hungry nature that often left users scrounging for enough workstation RAM to run common business applications.

The TOPS company calls version 3.0, just out, "a new beginning"—and well it might. Version 3.0 purports to solve all the serious problems that bedeviled earlier versions. It can be loaded with full client/server functionality in only 65K of base RAM; in fact, if 80386 users install a product like Quarterdeck's *QEMM* memory manager, TOPS will load enough of its modules into high memory to leave a full 537K of usable workstation RAM—more than enough to run memory-hogging applications like *Ventura Publisher*.

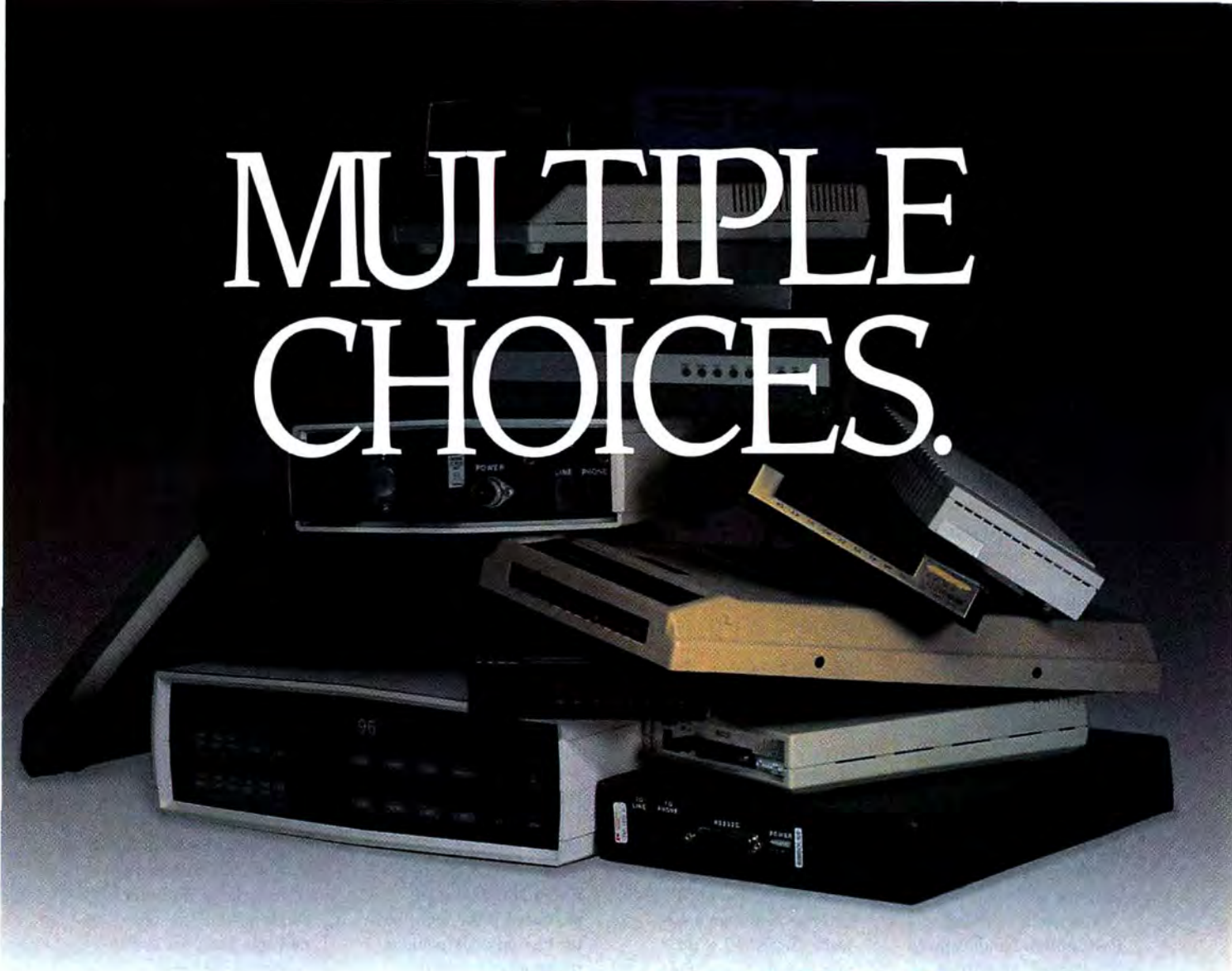
TOPS's justly popular user interface is better than ever; its point-and-shoot setup menu allows users to select only those functions they need (Mac connectivity, printer sharing, and so on). Moreover, the company claims that "all known compatibility problems have been solved," including those with *Foxbase*.

Pricing of the TOPS 3.0 Network Bundle for DOS (with a free copy of the newly upgraded *InBox* E-mail package) is surprisingly low. Current TOPS users (the company claims 600,000) can upgrade for $125 to $185 per site (up to 100 users). New users can get the TOPS 10-Pack (the full Bundle for 10 users) for $995 list. Single copies of the Bundle list for $249; street prices may be lower.

For some time, *PC World* has pointed out that the traditional view of peer-to-peer networking as an underpowered little brother of server-based LANs is badly outdated. In fact, powerful, low-cost peer-to-peer LANs (which let users exchange files directly without routing them through a file server) represent the future of networking. While some high-security, transaction-oriented applications need to run on a server-based NOS like NetWare, most networking needs can be best served by a peer-to-peer LAN.

TOPS 3.0 is positioned perfectly to give NetWare and 3+Share a run for their money. TOPS Division, 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-8700. —*Michael Goodwin*
Reader service no. 715

MULTIPLE CHOICES.



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Circle 185 on reader service card

BestChoice3

Make the Right Choice, Right Away

Making big purchase decisions or achieving consensus among work-group members can be an agonizing chore. Sterling Castle's $99 *BestChoice3* aims to make the process both easier and a lot more reliable.

BestChoice3 lets you build a decision-making model with three elements: choices, criteria, and the "experts" (participants in the decision) you wish to consult. The program produces random pairs of choices for each criterion, and you select one choice from each pair. When all the experts have made their selections, *BestChoice3* evaluates the data and ranks the choices in order of preference.

The newly updated *BestChoice3* handles up to 255 choices, 56 criteria, and 54 experts for each decision model—almost ten times as many as its predecessor. The new version also adds a windowing interface and lets you assign different weights to experts and criteria in order to temper individual biases and perform "what if" analyses.

A handy Snapshot feature displays your decision model at a glance, and you can print your final results, interim reports, or blank worksheets for experts to fill in manually. However, *BestChoice3* offers no file-locking or multiple-access features, making it a poor choice for use on a LAN.

BestChoice3 requires DOS 2.0 or later plus 256K of memory, and it comes with a 90-day money-back guarantee. Upgrades from the original program are $25. Sterling Castle, 702 Washington St. #174, Marina del Rey, CA 90292-5598; 800/722-7853, 800/323-6406 (California). *—Daniel Tynan*

Reader service no. 719

BestChoice3 lets you build a decision-making model that helps you weigh your options (for, say, purchasing a new car) against your criteria, taking into account other participants' input.

SPSS/PC + V3.1, SPSS for OS/2

Mainframe-Strength Software Makes Sense of Statistics

SPSS has taken two more steps to extend the reach of its enterprise-wide statistical data analysis software with new DOS and Presentation Manager versions of *SPSS/PC +*.

A PC version of SPSS's veteran mainframe software, *SPSS/PC + V3.1* provides data- and file-handling routines, some 40 basic statistical functions, and full report writing and plotting. You can enhance these functions with one or more of ten optional modules.

In *V3.1*, SPSS adds support for Ashton-Tate's *Applause II* to its current support for *Harvard Graphics*. Network support has been expanded from IBM PC LAN 1.3 and Sun PC-NFS to include Novell, 3Com, and IBM Token-Ring offerings.

Other updates include the addition of logistical regression to the $395 *SPSS Advanced Statistics* option, letting you identify relationships between a dependent variable and a set of independent variables in order to improve performance predictions (for example, predicting which employee characteristics are most likely to result in long-term employment).

The $395 *SPSS Data Entry II* option gains password protection, better virtual disk memory management, and programmable pop-up help for inexperienced data-entry personnel.

SPSS/PC + V3.1, which lists for $795, requires DOS version 2.0, 640K of memory, and a 20MB hard disk. Options are $395 each.

Meanwhile, the OS/2 version adds a Presentation Manager environment with context-sensitive help and a statistical glossary to the command-driven interface of *SPSS/PC + for DOS*. This version has the full functionality of SPSS's mainframe software, including more extensive data and file management facilities, report writing, and a full programming language with which you can create customized routines or macros.

Capable of addressing a full 16MB of memory, *SPSS for OS/2* lets you work with an unlimited number of variables in extremely large files and conduct simultaneous multiple analyses in Presentation Manager windows.

Initially, *SPSS for OS/2* add-ons will include *SPSS Advanced Statistics*, *SPSS Tables* for publishing reporting tables, and *SPSS Trends* for forecasting and time-series analysis—for $495 each.

SPSS for OS/2, which costs $995, requires at least a 286 PC platform with 4MB of memory and a 20MB hard disk. A mouse and a math coprocessor are recommended. Both *SPSS for OS/2* and *SPSS/PC + V3.1* support file import from *1-2-3*, *dBASE*, and other popular spreadsheet and data base programs. SPSS Inc., 444 N. Michigan Ave., Chicago, IL 60611; 312/329-2400. *—Mike Hogan*

Reader service no. 720

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:

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- **Cross sectioning**
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- **Shaded output to printers and plotters**

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DesignCAD 3D offers **ALL** the listed features plus many more!

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DesignCAD 3D sells for $399. We left out the comma. We didn't think you would mind!

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DesignCAD 3D, the latest feature-packed, low-cost CADD package from American Small Business Computers, delivers more bang per buck than any of its low-cost competitors and threatens programs costing ten times as much. For a low-cost, self-contained 3D package... DesignCAD's range of features steals the show."

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Mega Model	$995.00	MegaDraw $195, List $295, MegaShade $395
MicroStation PC 3.0	$3,300.00	Customer Support Libraries $1,000.00
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Source: Byte Magazine

BYTE MAGAZINE SAYS...

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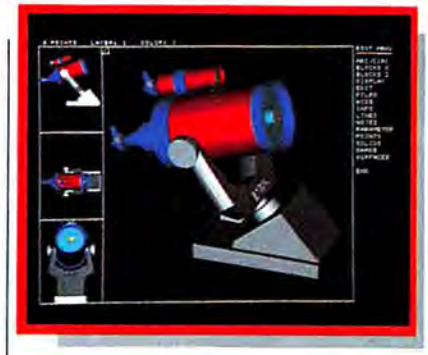

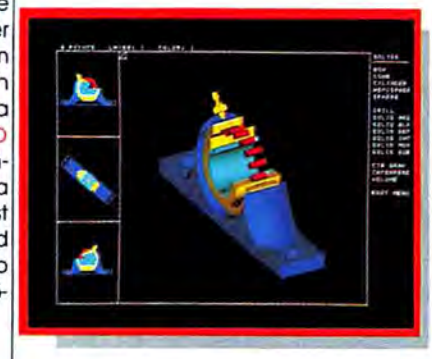

HOW DO I GET ONE?

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

Alpha Four 1.1

Data Bases With Style

Alpha Four's outline-driven menu builder made it easy for nonprogrammers to create a custom data base application that looked like the product of hours of hand coding. *Alpha Four 1.1* goes a step further by letting you add colors, as well as draw and paint backgrounds for your custom creations.

With a new run-time version of *Alpha Four 1.1*, you can distribute your applications to workgroup members. You can index a data base in as little as a tenth of the time its predecessor took. And you can globally update as many as 20 fields simultaneously instead of working on just one at a time.

An instant preview capability fixes a cumbersome hang-up that plagued the old version, and you can scroll horizontally to see a report more than 80 characters wide, or backward to see portions that have scrolled off screen.

Version 1.1 of Alpha Four not only adds color and a menu-building utility but also lets you scroll backward or horizontally to preview reports that extend off screen.

The $549 *Alpha Four 1.1* requires DOS 2.0 or later, 512K of memory, and a hard disk. Upgrades for registered *1.0* users are $24.95. The run-time version of *Alpha Four 1.1*, including an unlimited distribution license, is $995. Alpha Software Corp., 1 North Ave., Burlington, MA 01803; 800/451-1018.

—Mark Henricks

Reader service no. 716

MCI Fax Dispatch

E-Mail Fax Option Looks Sharper

MCI Mail has lowered prices and added enhancements to its Fax Dispatch service. If you're looking for a quick, clean way to fax PC-generated documents and can live with send-only service, Fax Dispatch will let you forget expensive PC fax boards and desktop fax machines. Fax Dispatch now transmits a screenful of text (28 lines of 80 characters) to any Group 3 fax in the United States for 50 cents; each additional half page costs 30 cents.

To send a fax message, simply add (*fax*) at the MCI Mail To: prompt, and the system walks you through all the required addressing information. Recent Fax Dispatch enhancements include an alternate-delivery option. When the line's busy, MCI automatically reroutes your message to a second fax, telex terminal, MCI mailbox, or postal address.

A prompted-addressing setup collects information to be printed (at no extra cost) on a cover page. And on-line error checking validates area codes and checks phone numbers for extraneous digits. Cancellation and receipt confirmation notices are automatically placed in the sender's MCI mailbox. Letterhead and signature graphics, previously available only for MCI's hard-copy delivery option, enable MCI users to personalize their fax messages.

Fax Dispatch rates to the United Kingdom, Hong Kong, and Japan have been lowered. UK pricing, formerly $1.95 for the first page and 95 cents for each subsequent half page, is now $1.50 and 45 cents, respectively. MCI Mail, 1150 17th St. NW #800, Washington, DC 20036; 202/872-1600.

—George Beinhorn

Reader service no. 718

Hot Line 2.2

Dialing Demon

General Information has added an automatic note-taking feature to its *Hot Line* phone utility that transforms it from an auto-dialer into a true telemarketing tool.

Hot Line 2.2's Post-It–like notepad can be hot keyed or configured to pop up whenever you make or take a call. You can load a note with up to 500K of pertinent information and then pull it off the pad and attach it to the call record. Notes are stacked in chronological order and can be saved to disk or printed out, giving you rough transcripts.

Hot Line has redesigned the utility's interface, making it easier to customize: You can now sort calls by name, number, date, city, and so on. If you're a hard-driving telemarketer, you can create a list of all the sales prospects you contact each day, then export the list to your word processor and fire off thank-you letters.

The $99 *Hot Line 2.2* is bigger than its predecessors, requiring 100K of conventional memory; you'll also need a hard disk to run any of its handy InfoPack phone directories. General Information Inc., 11715 N. Creek Pkwy. #106, Bothell, WA 98011; 800/722-3244, 206/483-4555.

—Mark Henricks

Reader service no. 717

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

PerFORM. IT TAKES THE "H" WORD OUT OF FORMS.

Forms may make it easier to keep your business under control. But, ah, the "H" word. Doesn't everybody *hate* getting the *forms* under control? That's why PerFORM Designer & Filler is the most important software since your word processor.

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■ Who doesn't hate scrapping a typewriter-filled form because a wrong "something" is filled in? PerFORM blocks goofs with preset data validation requirements. And prevents you producing or saving incomplete forms.

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■ Don't you hate forms that look like amateur night? With PerFORM, you can import logos and graphics, size them up and down, design in black and eight shades of gray. Or scan the best-looking form you use and trace over it electronically. Every form PerFORM prints looks professional.

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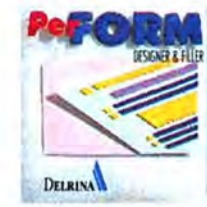

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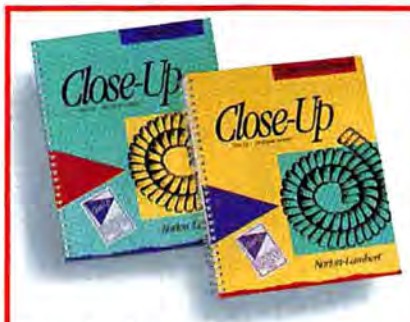

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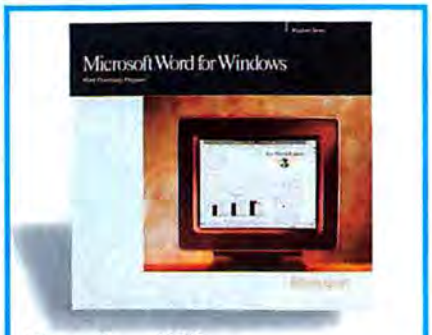

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Sierra On-Line ... CP

6023 ◙Leisure Suit Larry III ..... 39.

5695 ◙Manhunter: San Francisco. ..... 33.

4456 ◙Police Quest II ..... 39.

5106 ◙Space Quest III ..... 39.

6022 ◙Colonel's Bequest ..... 39.

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.

5231 ◙Phonics Plus ..... 22.

Sublogic ... NCP

6190 ☐Air Transport Pilot. ..... 33.

True BASIC, Inc. ... NCP

◘Kemeny/Kurtz Math Series:
10 titles ..... *each* 45.

Intel ... 5 years

Connection CoProcessor–Award winning fax-modem includes a free copy of Fax-it software from Intel. Send and receive information in the background from within many popular applications. New low price ..... **$529.**

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.

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 ..... 1799.

5788 HL-8Ps PostScript Laser Printer . 2949.

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.

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)* . 519.

1917 LQ-1050 *(136 col., 264 cps, 24 pin)* 725.

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

2307 Smartmodem 2400 ..... 349.

2308 Smartmodem 2400B *(w/Smartcom II)* 249.

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Intel ... 5 years
2400EX MNP Modem–The newest member of Intel's modem family. MNP/Level 5 provides error-correction for reliable communications, as well as data compression for faster data throughout ..... $229.

Hercules ... 2 years
2318 Graphics Card Plus ..... 189.
Hewlett-Packard ... 1 year
6583 Laserjet II *(w/toner)* ..... 1739.
6582 Laserjet IIP *(w/toner)* ..... 1039.
6581 Deskjet Plus *(w/ink cartridge)* .... 719.
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 Arni)* 579.
4266 Above Board Plus 512k ..... 419.
4267 Above Board Plus I/O 512k ..... 449.
5336 Above Board Plus 8 2 Meg ..... 599.
5342 Above Board Plus 8 I/O 2 Meg ... 629.
4272 Above Board 2 Plus 512k ..... 469.
5396 Above Board MC 32 0k ..... 359.
4275 Connection CoProcessor *(w/Fax-it)*. 529.
4857 Visual Edge *(graphics enhancement for the HP LaserJet II)* ..... 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
6005 Ascend 4 Meg Brd. for Compaq 386 699.
6013 Beyond Mem. Brd. for Model 50 *(512k)* 359.

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 year
REPLACEMENT POWER SUPPLIES
3202 Turbo Cool 150 *(25° - 40° cooler)* 129.
3200 Silencer 150 *(84% noise reduction)* 115.

Hilgraeve ... NCP
HyperACCESS/5 1.0–Blasts data through your modem faster than any other program. Potent, agile, civilized. An automation breakthrough ... it learns your work! Contains versions for DOS and OS/2. ..... $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.
Safe Power Systems ... 2 years
4561 Safe 250W *(standby power bkup)* 249.
4562 Safe 425W *(standby power bkup)* 369.
SOTA Technology ... 2 years
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.

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TheComplete PC ... 2 years
TheComplete Communicator–It's a 9600 bps fax. It's a 2400 bps modem. It's a sophisticated voice messaging and processing system. It's a scanner port. It's TheComplete solution! ..... $559.

TheComplete PC ... 2 years
5598 TheComplete Half Pg. Scanner 400 189.
5140 TheComplete Page Scanner..... 549.
4887 TheComplete Fax 9600 ..... 429.
5828 TheComplete Communicator ..... 559.
Toshiba ... 1 year
3684 T1000 Laptop *(80C88, 6.4 lbs.)* ... 669.
6332 T1000SE Notebook Laptop *(5.9 lbs.)*. 1269.
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.

Targus ... lifetime
Premier Leather Carrying Case–Establishes a new standard of quality for business related luggage. This dual purpose case combines a luxurious, feature rich, leather briefcase together with a functional laptop carrying case ..... $199.

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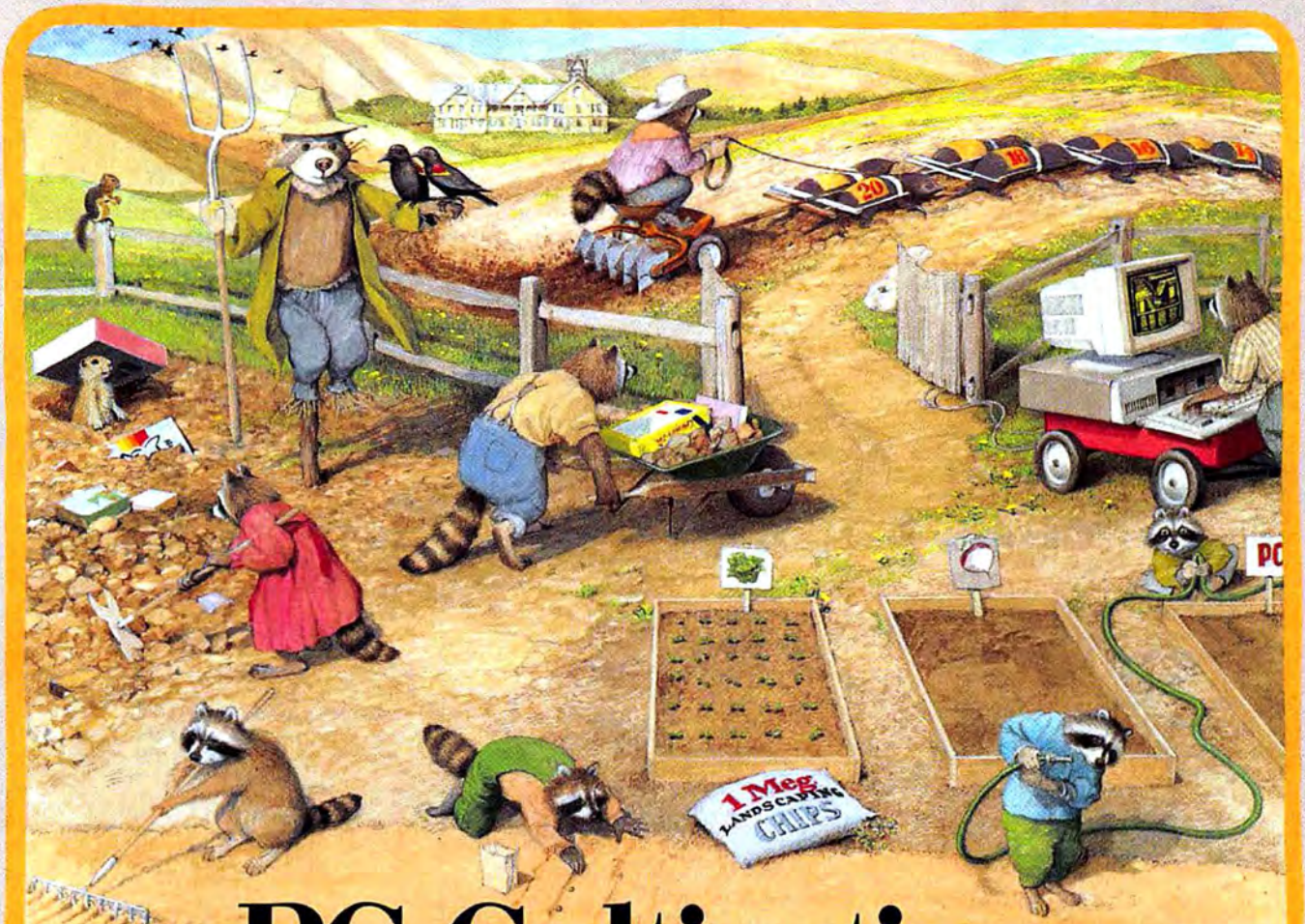

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(Or, how we mind our Peas & Cukes.)

Way up north in the fertile crescent of Marlow, NH (pop. 562), we know how to dig down deep. Which is pretty difficult (even for our celebrated 20 mole team) since the bedrock's just inches below the surface and the growing season's shorter than the day is long. But, with the winds of change blowing non-stop through the micro fields, you can't just scatter your seed any which way. You have to put down roots! We ought to know—we were the first company to sell peripherals and software exclusively for IBM personal computers. So when customers call us for product specs, prices, or technical assistance, they're dealing with a company that has its paws (and peas) planted firmly in the ground.

A window-based system you can grow with.

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Don't get fooled again.

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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.

Mountain Computer ... 1 year

2917 40-60 Meg Internal Tape Drive. . . . 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 *(for PS/2's)* . . . . . 215.
6602 1.44 External *(for PC/XT/AT)* . . . . . 239.

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)* . . 275.
2286 30 Meg Internal Hard Drive ST238 *(w/controller and cables, 65 ms)* . . 289.

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.**

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)* . . 419.
4624 80 Meg Int. HD ST4096 (28 ms) . . 619.

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.

XTREE ... NCP

☐ *XTreePro 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.**

Intel ... 5 years

Inboard 386/PC–Brings advanced computing power to your PC/XT system. Includes 16Mhz 80386 processor and 1Mb RAM. Flexible 32-bit memory expansion options are also available . . . . . **$579.**

5¼" DS/HD Disks *(1.2 Meg)*

3292 Sony *(10 disks per box)* . . . . . 19.
2790 Maxell MD2-HD *(10 disks per box)* . 19.

3½" DS/DD Diskettes *(720k)*

3297 Sony *(10 disks per box)* . . . . . 14.
2792 Maxell *(10 disks per box)* . . . . . 15.

3½" DS/HD Diskettes *(1.44 Meg)*

3298 Sony *(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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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax.
- All U.S. shipments insured; no additional charge.
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- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
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- 120 day limited warranty on all products.*
- To order, call us Monday through Friday 9:00 AM to 1:00 AM, or Saturday 9:00 AM to 5:30 PM. You can call our business offices at 603/446-3383 Monday through Friday 9:00 AM to 5:30 PM.

WordPerfect Corp. ... NCP

☐ *WordPerfect 5.1*–Mix both text and graphics with this "high-end" word processor/publisher. Multiple new features including "hot links" to 1-2-3, Excel, and PlanPerfect along with networking–all built in . **$265.**

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For heavy hardware items such as printers, monitors, Bernoulli Boxes, etc. pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoulli Boxes, computers, hard drives, and power backups, actual UPS Blue charge will be added. For all other items, add $3 per order.

Alaska and outside Continental US:

- Call 603/446-3383 for information.

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Seven Sensible Spreadsheets

You don't need megabucks—or megabytes of RAM—to tap the full analytical power of a spreadsheet.

Our survey turns up one exceptional value and several distinguished runners-up.

Richard Scoville

Now that *1-2-3* release 3 has redefined the spreadsheet, it's finally time for *1-2-3 2.01* holdouts to decide what to buy next. Spreadsheet mavens with hefty hardware budgets who need true three-dimensional and relational data base capabilities will upgrade to *1-2-3* release 3. Users who want great-looking graphs and superior ease of use—and who have the necessary hardware to run *Windows*—will turn to *Excel*, a previous Best Buy (see "Power Spreadsheets: A New Standard?" October 1989).

But how about the rest of us? If you recoil at the thought of dropping megabucks into a system that's quick and capacious enough to support *1-2-3* release 3 or *Excel*, you have a lot of company—and, fortunately, a lot of options. The seven spreadsheets reviewed in this article, *Lucid 3-D 2.2*, *1-2-3 2.2*, *PlanPerfect 5.0*, *Quattro Pro 1.0*, *SmartWareII Spreadsheet 1.01*, *SuperCalc5*, and *Twin Level III 3.07*, all run acceptably on an 8-MHz AT with 640K of RAM, and some offer sophisticated features that surpass the *1-2-3 2.01* standard.

Not 3-D, More and Less Than 1-2-3

Keep in mind that none of the reviewed products lets you call on a built-in relational data manager, create true 3-D ranges, or (with the exception of *SuperCalc5*) build a worksheet with multiple pages. In spite of the marketing hype about 3-D powers, most of these programs merely offer linking—the ability to reference cells in your worksheet to cells in other spreadsheets in memory or on disk.

SuperCalc5, for example, lets you reference linked external cells in formulas. *SmartWareII* and *Twin Level III* do too—but you must load each of the linked files in memory to forge a link or update them. Other operations with the reviewed products—chaining worksheets together with links,

BRIAN CRONIN

linking ranges, and so on—are possible, but the process can be tortuous and error checking a pain. In short, if you really need multidimensional modeling, get a 3-D spreadsheet.

However, if you simply need to handle huge worksheets, don't touch that dial. Almost all these programs automatically stuff worksheets, macros, formulas, and whatnot into available expanded memory—although most support EMS 3.2, not 4.0, so you're limited to 8MB of RAM. Better still, *Lucid 3-D*, *PlanPerfect*, and *SmartWareII Spreadsheet* incorporate virtual memory schemes that can swap portions of worksheet data to disk, allowing for massive worksheets limited only by disk capacity. Just remember that virtual memory systems turn your PC Porsche into a Volkswagen.

If compatibility with the *1-2-3* standard is vital—from interface to macros to file formats—tread carefully. Chances are you'll have to rewrite your *1-2-3* macros and kiss off the templates you've invested in. For example, all the reviewed programs can read and write WK1 files, but *SmartWareII*, *Plan-*

FEATURES EVALUATION

Quattro Pro Tops 1-2-3 in Every Critical Category

All the spreadsheets reviewed offer more than 1-2-3 release 2.01, but Quattro Pro earns our Best Buy because of its superb interface, well-chosen features, and speedy performance.

● Yes
○ No
◒ Deficient
△ Limited only by available RAM

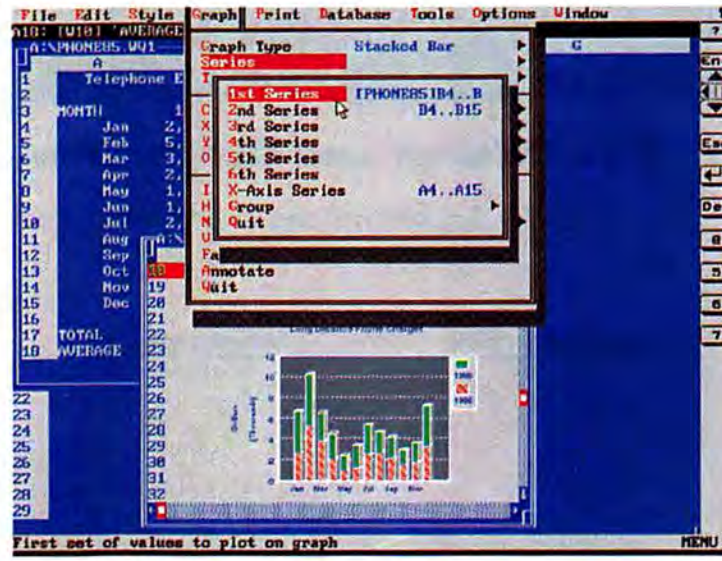
	Lucid 3-D 2.2	1-2-3 release 2.01	1-2-3 release 2.2	PlanPerfect 5.0	Quattro Pro 1.0	SmartWare II 1.01	SuperCalc5 revision C	Twin Level III 3.07
Spreadsheet								
Windows per screen	9	2	2	2	32	50	6	3
Number of open files	1	1	1	2	64	50	255	△
Dynamically links to disk files	●	○	●	●	●	○	●	●
Multipage worksheets	○	○	○	○	○	○	●	○
Saves multifile work space	○	○	○	○	●	○	○	●
Pastes range names in formulas	●	○	●	●	●	●	◒[1]	●
3-D ranges	○	○	○	○	○	●	◒[2]	○
Undo command	○	○	●	◒[3]	◒[4]	○	●	○
Traces formula references	●	◒[5]	◒[5]	◒[5]	○	●	●	◒[5]
Cell noting	●	○	○	●	●	○	○	○
Solves simultaneous equations	○	○	○	○	●	●	●	○
Command-level password protection	○	○	○	○	○	●	○	○
Background recalculation	○	○	○	●	●	●	○	●
Supports mouse	●	○	○	○	●	○	○	●
Data base								
Concurrent sort keys	2	2	2	10	5	16	3	256
Column sort	●	○	○	●	○	●	●	○
Joins two data base tables	n/a	○	○	○	○	◒[6]	◒[7]	○
Provides data input form	n/a	○	○	●	○	◒[6]	◒[7]	●
Queries external data bases	n/a	○	○	○	●	◒[6]	◒[7]	○
Reads/writes DBF files directly	●	○	○	○	●	○	●	○
Reporting and graphs								
Print preview	○	●[8]	●[8]	●	◒[9]	○	●	○
Multiline headers and footers	○	○	○	○	○	●	●	○
Saves named report format	○	○	○	○	○	●	○	○
Fonts per worksheet	1	8[8]	8[8]	◒[10]	8	◒[10]	8	1
Prints in color	◒[11]	○	●[8]	○	●	●	◒[11]	○
Prints text and graphs on same page	○	○	●	○	●	○	○	○
Prints multiple ranges per page	○	○	◒[12]	○	◒[12]	○	◒[12]	●
Reads/writes Lotus PIC files directly	○	●	●	○	◒[13]	○	○	○
Macros								
Macro keystroke recorder	●	○	●	●	●	●	●	●
User-defined functions	●	○	○	●	○	●	○	●
Step mode/trace cells option	●	●	●	●	●	●	●	●
DOS access from macro procedure	●	○	●	○	○	●	●	●

[1] Current worksheet page only.
[2] Does not support all operations, such as formatting, across multiple worksheets.
[3] Undoes deletions, not commands.
[4] Does not undo all operations; maintains log that can be replayed.
[5] Circular references only.
[6] Only via separate SmartWare II data base module.
[7] Only via $149 Silverado add-in.
[8] With Allways add-in, included with release 2.2.
[9] Does not show installed printer fonts.
[10] Limited to installed printer fonts.
[11] Only prints graphs in color.
[12] Not on laser printers.
[13] Only writes PIC files.

Perfect, and *Lucid 3-D* can't run or generate *1-2-3* macros, and *SuperCalc5* and *Twin* offer only partial macro compatibility. Informal tests run with a sophisticated 200-line *1-2-3 2.01* macro managed to stall or crash every non-Lotus spreadsheet we examined, except *Quattro Pro*.

The conservative choice in terms of compatibility, of course, would be *1-2-3 2.2*. But the alternatives are just too good to pass by. Looking for everything *Excel* offers (without *Windows'* overhead), plus full *1-2-3* compatibility? Look no further than our Best Buy, *Quattro Pro*. Need superior data analysis, multipage worksheets, and multiple chart styles? *SuperCalc5* is the answer. For people with more specialized requirements, there's *PlanPerfect* for *WordPerfect* users new to spreadsheets; the memory-resident *Lucid 3-D* for casual users who need a capable pop-up spreadsheet; and *SmartWareII Spreadsheet*, a powerful stand-alone spreadsheet that can be tightly integrated into the *SmartWareII* system.

If your applications require heavy-duty number crunching, performance will be critical. Speed trials conducted by NSTL reveal that *Quattro Pro* and *SmartWareII* were the quickest overall, with *PlanPerfect* and *Twin* slowest in most tasks.



Quattro Pro, our Best Buy, has Excel-quality graphics and a Windows-like interface that's sleek and fast. In this screen, the graph draws data from two worksheet files that it is dynamically linked to.

Quattro Pro 1.0

The new $495 *Quattro Pro 1.0* is determined to do *1-2-3 2.2* better in every critical area, and it achieves that goal in spades. Its well-implemented user interface, blazing speed, superb graphics, and *1-2-3* compatibility make it our Best Buy.

Quattro Pro's mouse-driven interface runs in graphic or character mode and comes complete with layered pulldown menus, dialog boxes, scroll bars, and a click-to-edit formula bar. You can move and size windows with your mouse, much as with *Excel*. For Lotus vets, *1-2-3*–style menus are also available.

It's easy to build linked formulas, and you can copy and move cell entries between sheets, pull data into a worksheet from an external data base, and build graphs that call values from multiple sheets. But there's no true 3-D capability: Ranges are two-dimensional structures limited to a single sheet.

Quattro Pro faithfully duplicates *1-2-3 2.01*'s flat-file data base, with one important addition: You can link directly to *Paradox*, *Reflex*, and *dBASE* files and extract data from them. No special drivers are required as with *1-2-3* release 3, so setup is simple.

The report writer is flexible and offers well-organized font and color control. It also includes a print preview option (with zoom)

EXECUTIVE SUMMARY

Quattro Pro 1.0

Spreadsheet

BEST BUY

A screamer: *Quattro Pro* has the reliability and features of 1-2-3 2.2 combined with a friendlier interface, superior speed, and outstanding graphics, earning our Best Buy.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet				●
Data base			●	
Reporting and graphs				●
Macros				●
Performance				●
Overall value				●

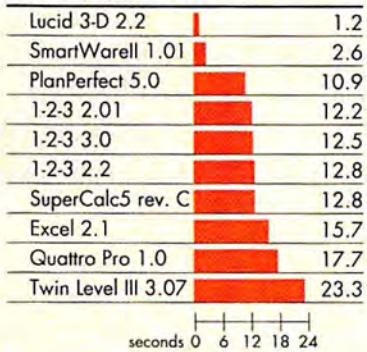
Reader service no. 648

NSTL TEST REPORT

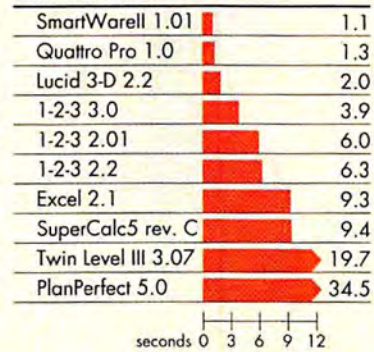
SmartWareII and Quattro Pro Have Speed to Spare

SmartWareII and Quattro beat the competition consistently. For day-to-day worksheet manipulation, Twin and PlanPerfect just can't keep up.

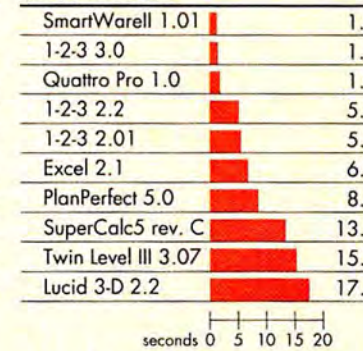
Load a worksheet



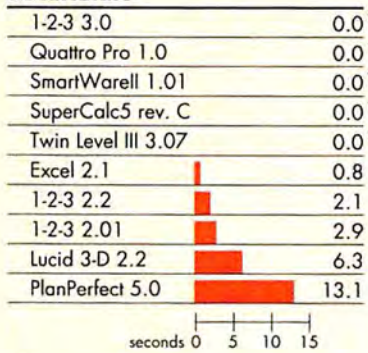
Insert a row



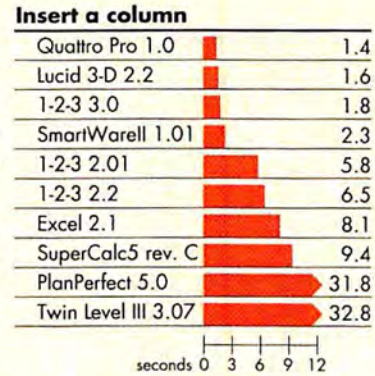
Move a block



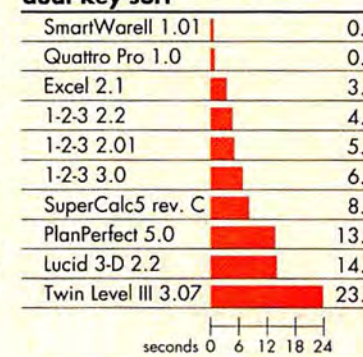
Recalculate



Insert a column

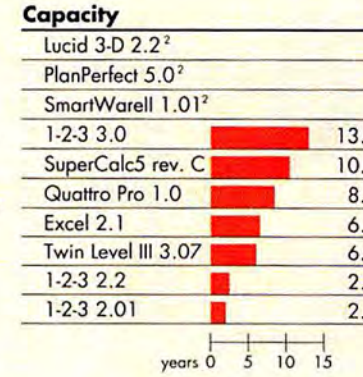


Ascending/descending dual-key sort



[1] Time was too fast to record.
[2] Capacity is limited only by disk space.

Capacity



Methodology
A 16-MHz Compaq Deskpro 386S with 5MB of RAM (4MB configured as expanded memory using CEMM.EXE) and a 40MB hard disk was used for benchmarks. Tests were performed using a worksheet containing a three-year cash-flow model, a balance statement, an inventory, amortization schedules for the present year, a data table, and a personnel file consisting of sales, commissions, and projections. Modules were interrelated with interdependent formulas, the majority being arithmetic functions and combinations of functions. The calculation mode was set to automatic to take advantage of background and minimal recalculation schemes.

Load a worksheet
This test measured how long it took to load the test worksheet.

Recalculate
This test measured the elapsed time between entering a value in the worksheet and the return of cursor control to the user. Products with minimal recalculation capabilities scored best on this test.

Insert a row
This test measured the time it took to complete insertion of a row at the 33rd row position of the test worksheet.

Insert a column
This test measured the time it took to complete insertion of a column at the second column position of the test worksheet.

Move a block
This test measured the time it took to move the block C1 to AR93 one column to the left on the test worksheet.

Ascending/descending dual-key sort
A block of 19 rows and 86 columns containing a list of names, commissions, and associated data was sorted according to commission rates in descending order and by name in ascending order.

Capacity
This test measured worksheet capacity by counting how many additional years' worth of data could be added to the worksheet. If an entire year could not be added, an attempt was made to add six months.

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

that accurately simulates what the final printout will look like, even though it doesn't display printer fonts.

Quattro Pro's graphics are truly spectacular. You get a full range of formats, including area, horizontal bar, and text charts. There's also a *Micrografx Draw*–like package that's perfect for adding text, arrows, and other flourishes to your charts. You can insert a graph into a range in your worksheet, display it in graphics or print preview mode, and print out the graph beside the worksheet. Unlike in *1-2-3 2.2*, the embedded graphs are dynamic; change the data and you see the graph recalculate on screen.

Quattro Pro's dual modes, *Excel*-quality graphics, print preview, multifile operations, external data base links, large file capacity, and extras like advanced math functions make it an outstanding choice for general spreadsheet applications. If you're not wedded to *Windows* and don't need the true 3-D or relational data base and querying capabilities of *1-2-3* release 3, *Quattro Pro* is your Best Buy.

EXECUTIVE SUMMARY

SuperCalc5 Revision C

Spreadsheet

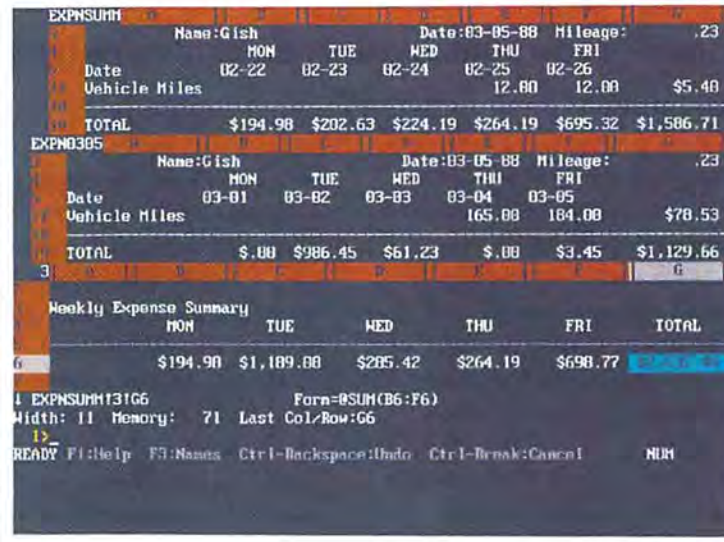
This is the fastest *SuperCalc* yet, but it's still slower than the leaders. However, its advanced features, extensive linking capability, and great graphs make it a strong competitor in this group.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet				●
Data base			●	
Reporting and graphs				●
Macros				●
Performance			●	
Overall value				●

Reader service no. 650

SuperCalc5 Revision C

SuperCalc was outclassed by *Excel* and *1-2-3* release 3 in an earlier *PC World* roundup. One critical factor was its sluggishness. This revision improves performance substantially,



With SuperCalc5's multipage worksheets, you can build formulas that combine data from several worksheet pages. The formula at the bottom of this screen averages data from ranges on three worksheet pages.

but it still falls behind the two market leaders, and it definitely trails the speed champs in this roundup, *SmartWareII* and *Quattro Pro*.

When it comes to features and flexibility, however, *SuperCalc* remains a top-flight competitor. It's strong on 3-D functions, auditing features, and advanced statistical and financial functions, and it can solve simultaneous equations. It also comes with an impressive list of no-cost extras: Funk Software's *SideWays*, Computer Associates' own *Spreadsheet Auditor*, and their file encryption utility, *Privacy Plus*. Data management features are limited, however, unless you pony up $149 for the company's *Silverado* add-in.

SuperCalc's menu system is similar to *1-2-3*'s but offers more options at every step.

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.

LOOKING FOR SPREADSHEET BARGAINS IN INTEGRATED SOFTWARE

Evelyn Morrison

Integrated software packages offer a sweet deal: For little more than the price of a stand-alone spreadsheet, they give you spreadsheet, word processing, data base management, and communications capabilities—sometimes more. And in today's best packages, quality doesn't take a backseat to quantity.

PC World compared the spreadsheet modules of five popular integrated packages. The spreadsheets in *Alpha Works* ($195) and *Microsoft Works* ($149) proved adequate for beginners and those with modest spreadsheet needs. *Framework III*, *Enable/OA*, and *Symphony* (all $695) are aimed at power users, but their spreadsheets may not meet professional demands. One major caveat: Although all five spreadsheets read and write WK1 files, not even Lotus's *Symphony* can run unmodified 1-2-3 macros.

Alpha Works 2.0: Behind the Pack

Alpha Works is inexpensive and easy to use, but its spreadsheet isn't its strongest point: The graphing capability and @ functions are roughly equivalent to 1-2-3 2.01's. But there's no macro language—imported 1-2-3 macros are filtered out—and no *Allways*-quality output. The recent 2.0 upgrade adds only a few minor features like math coprocessor support and shorthand text entry.

You can load up to nine spreadsheets simultaneously, though you get to see only two at a time in fixed-height horizontal windows. The menus can be configured as horizontal or pulldown, and you can use a mouse to navigate and to define ranges. For common operations, numerous keyboard shortcuts let you bypass the menus. But there's no cell linking and, worse, no easy way to copy between worksheets; you must use the File Extract command and an intermediate scratch file. Though you can't load active files into expanded memory, *Alpha Works* will swap data in inactive modules to expanded or extended memory, or even to your hard disk when you need the RAM.

Alpha Works' other modules, particularly its DBF-compatible data base, may tip the balance in its favor—but for the best spreadsheet in an entry-level package, look to *Microsoft Works*.

Enable/OA 3.0: Powerful but Hard to Use

Enable/OA's spreadsheet is as powerful as the most advanced stand-alone products. It has multiple-worksheet files, sophisticated number-crunching and auditing capabilities, and background printing. But the program won't let you use a mouse, the various modules are poorly integrated, and it's hard to learn and use.

Each *Enable/OA* worksheet can have up to 32 "pages," giving you 3-D capability similar to that of 1-2-3 release 3 and *SuperCalc5*. You can open up to eight worksheets simultaneously, but since there's no mouse support, you must move and resize windows via the keyboard. In addition to the basic 1-2-3 set, *Enable/OA* has quite a few handy @ functions all its own, including several that link spreadsheets together. You can choose between standard and minimal recalculation. Extensive auditing features include map mode and selective highlighting of dependent cells, referenced cells, and copies of a specific formula. Although you can't run 1-2-3 macros directly, a translation utility is provided.

Enable/OA's charting capability is equivalent to 1-2-3 2.01's. But the program comes with a copy of *Perspective II*, an impressive 3-D graphics package. *Enable/OA* includes a menu command that automatically imports selected spreadsheet data into *Perspective*.

Explanations of many of *Enable/OA*'s advanced features are missing from the main manuals and can be found only in a printed supplement and in on-line help. Worse, in marked contrast with the other integrated apps reviewed, its spreadsheet is poorly linked to the other modules—they don't even share a common interface. So while *Enable/OA*'s spreadsheet is in many ways the most powerful of the bunch, it's hard to recommend it.

Framework III 1.1: Flexible but Quirky

Framework III's spreadsheet is tightly integrated with the package's other modules and includes some advanced features. Functions, formulas, and graph options are roughly equivalent to what you get in 1-2-3 2.2, but modifying a graph is tricky. The spreadsheet has a powerful macro language but can't run or even translate 1-2-3 macros. There's no background or minimal recalculation. A *Framework* spreadsheet can have as many as 32,000 rows and columns, assuming you have enough memory. If you don't, data is automatically spooled out to disk, but performance turns glacial.

Framework's interface is odd—for instance, you use the <Insert> key to execute a command—but once you learn its peculiarities, the program is fast and efficient, especially with a mouse. *Framework III*'s "frames," or windows, can be moved, resized, and even nested. You can work with multiple spreadsheets in separate frames and forge permanent links between sheets and graphs. A unique feature is the ability to reference cells by row and column titles. For instance, if row 5 is labeled "Expenses" and column D is labeled "May," you can reference cell D5

as "May. Expenses." *Framework III* includes FRED, a procedural language that ties the modules together and lets you create sophisticated applications. For simpler macros, you can record and play back keystroke sequences.

Generating a simple graph is easy, but modifying an existing one is tough. When you create a graph, *Framework* automatically generates a corresponding formula. You make changes to the graph by editing that formula, not by choosing menu options. Graphs are contained in separate frames and can be printed along with your data.

Framework III's FRED language lets you create fancy applications that would be difficult or impossible with other programs. But the spreadsheet's lack of fancy print formatting nixes it for professionals, and it's too complicated for novices.

Microsoft Works' resizable windows and multiple-file capability make it surprisingly powerful for an inexpensive program.

Microsoft Works 2.0: Entry-Level Champ

The spreadsheet in *Microsoft Works* is reminiscent of *Microsoft Excel* but is clearly intended for less demanding tasks. It offers a great mouse interface, background recalculation, expanded-memory support, good graphing capability, and superb context-sensitive help that includes interactive tutorials. On the downside, there's no macro language, *1-2-3* compatibility is limited, you can't link files, and you can't view data and graphs simultaneously. Nevertheless, you really get your money's worth.

Works lets you open up to eight worksheets at once, and you can split each window into two or four panes. You can switch between text mode and graphics display at any time; VGA users can work with up to 60 legible lines. Unlike in *Excel*, you can't mix fonts in a spreadsheet, but you can make selected cells bold, underlined, and italic. There's also a handy page preview mode that will eliminate surprises at print time.

Works reads WK1 files and writes WKS files. Be warned, however, that string functions are not supported, and *1-2-3* macros are simply ignored. The program's own macros are limited: You can record and play back keystrokes but not mouse movements. There's no macro language or editor. Although you can copy cells and ranges between spreadsheets, you cannot create permanent links between spreadsheets or between spreadsheets and other *Works* modules.

Works' graphing capabilities are comprehensive, and you can specify mixed bar and line charts as well as dual–y-axis graphs. To print a graph along with your spreadsheet data, you must copy the data to a word processing window and insert a named chart.

Works' spreadsheet is not up to the standard set by *1-2-3*. But its rock-bottom price, slick interface, and graphing power make it an extremely attractive product for the beginning and intermediate users it was designed to please.

Symphony 2.0 Plus: Déjà Vu

Unlike the other packages examined here, all of *Symphony*'s modules are based on the spreadsheet metaphor. The spreadsheet itself is functionally identical to *1-2-3 2.01* and shares its limitations: For instance, there's no minimal or background recalculation, it lacks linking capability, and you can open only one spreadsheet at a time. An extensive tutorial is included, and a context-sensitive on-line help system will get you past any rough spots.

You can open multiple windows in a single worksheet and have graphs appear in separate windows. There's no mouse support, so you have to move

(continues)

Lotus upgraders can choose a strict *1-2-3* menu system that allows the program to run *simple 1-2-3* macros—but that's all.

SuperCalc's reporting is extremely flexible, offering font control over individual ranges, multiple print ranges, and multiline headers and footers. However, you can't print a graph and worksheet on the same page. *SuperCalc*'s print preview is character-based, so proportional fonts aren't rendered accurately, making it difficult to prepare elaborately formatted reports.

SuperCalc offers the greatest range of graph styles and options in the crowd. It doesn't have *Quattro Pro*'s drawing skills, but *SuperCalc*'s settings sheets make it easy to set up and modify your graphs because all the options are in one place.

Of all the products in this roundup, *SuperCalc* offers the best approximation of *1-2-3 3*'s 3-D spreadsheet. In addition to linking formulas to open or disk-resident files, you can create multipage worksheets with formulas that sum ranges in each page and copy cells from one page to another.

Although *SuperCalc* is not recommended

LOOKING FOR SPREADSHEET BARGAINS IN INTEGRATED SOFTWARE

(continued)
and resize windows from the keyboard. *Symphony* can read WK1 files, but you must use Lotus's Translate utility to save worksheets in WK1 format. Though *Symphony* shares *1-2-3*'s macro language, it has different menus, so *1-2-3* macros must be tweaked before they will run properly, and anyone accustomed to whipping off *1-2-3* command keystrokes without thinking may be in for a surprise.

Some of *Symphony*'s shortcomings can be overcome by the many popular *1-2-3* add-in programs available in special *Symphony* versions. It even comes bundled with *Allways*, giving it the widest printing options of any integrated package here. Version 2.2, slated for release in March 1990, is expected to add linking and improve memory management. But if you aren't satisfied with *1-2-3 2.01*, you won't be any happier with *Symphony*.

For Beginners Only

Microsoft Works 2.0's spreadsheet is the most appealing for entry-level users. While not up to the *1-2-3 2.01* standard, it's adequate for those with simple graphing and number-crunching needs.

But none of the integrated apps puts it all together for the heavy-duty business spreadsheet user. *Symphony*'s spreadsheet is no better than *1-2-3 2.01*. *Framework III*'s spreadsheet is a close match for *1-2-3 2.2*, and *Enable/OA* is in *SuperCalc*'s league—but neither has the snazzy output *Allways* users expect. Serious spreadsheet jockeys will do better with one of the top stand-alones.

Evelyn Morrison is a marketing manager for a retail clothing chain headquartered in the San Francisco Bay Area.

For more information about all products mentioned in this sidebar, circle reader service no. 910.

WHERE TO BUY

Alpha Works 2.0
Alpha Software
1 North Ave.
Burlington, MA 01803
617/229-2924
LIST PRICE: $195
REQUIREMENTS: 512K (640K recommended), DOS 2.0 or later version, two disk drives
TECHNICAL SUPPORT: toll number, M–F 9:15–5
OTHER SUPPORT: BBS
Reader service no. 655

Enable/OA 3.0
Enable Software
Northway Ten Executive Park
Ballston Lake, NY 12019
518/877-8600
LIST PRICE: $695
REQUIREMENTS: 512K (640K recommended), DOS 2.0 or OS/2 1.0 or later version, two disk drives
TECHNICAL SUPPORT: toll number, M–F 9–7
OTHER SUPPORT: newsletter, BBS
Reader service no. 656

Framework III 1.1
Ashton-Tate Corp.
20101 Hamilton Ave.
Torrance, CA 90502
213/329-8000
LIST PRICE: $695
REQUIREMENTS: 640K, DOS 2.0 or later version, two disk drives
TECHNICAL SUPPORT: toll number, M–F 6–4:30
OTHER SUPPORT: BBS, CompuServe, training
Reader service no. 657

Microsoft Works 2.0
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
206/882-8080
LIST PRICE: $149
REQUIREMENTS: 512K, DOS 2.0 or later version, hard disk
TECHNICAL SUPPORT: toll number, M–F 6–6
OTHER SUPPORT: GEnie
Reader service no. 658

Symphony 2.0 Plus
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500
LIST PRICE: $695
REQUIREMENTS: 384K (512K with spelling checker), DOS 2.0 or later version, two disk drives
TECHNICAL SUPPORT: toll-free number, 7 days, 24 hours
OTHER SUPPORT: none
Reader service no. 659

as an alternative to *1-2-3* release 3 or *Excel*, it's a very good choice for hardware-shy users who want a lot of powerful features—advanced statistics, auditing, encryption, near–3-D capabilities—and who don't mind leisurely performance.

1-2-3 Release 2.2

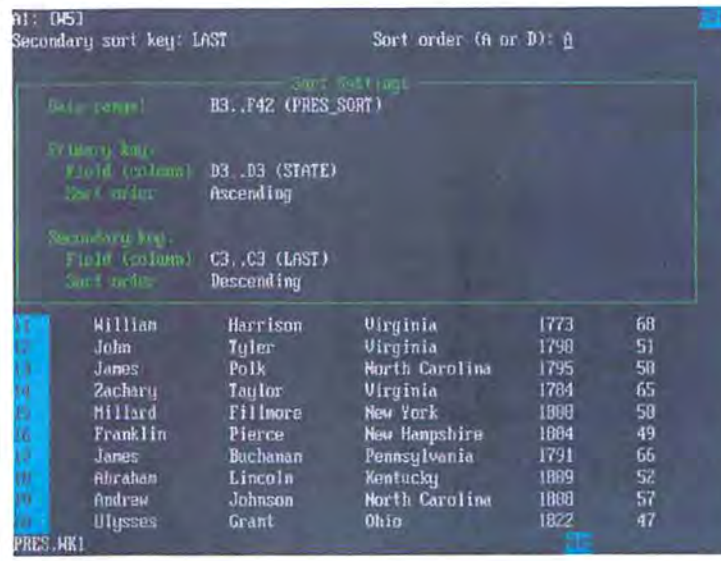
Lotus's successor to its ubiquitous *1-2-3 2.01* makes a few much-needed improvements, but it's a tune-up, not a major overhaul. While users will appreciate the new features—which include an undo command, search and replace, settings sheets, single-cell file linking, on-screen print preview and presentation-quality reports with *Allways*, a macro recorder, and a worksheet-independent macro library—most of the products in this roundup already offer such fare. And in NSTL tests, *1-2-3 2.2* was sluggish. Compared with *Quattro Pro*, *1-2-3 2.2* is pretty bland stuff.

A few enhancements improve spreadsheet handling. To provide perspective on its labyrinthine menus, *1-2-3 2.2*, like *SuperCalc*, provides settings sheets that summarize menu choices for reports, graphs, and data management. You can now press <F3> to paste range names into formulas, change the width of several columns at once, or define multiple graph ranges in a single step.

1-2-3 2.2 offers rather basic single-cell linking, on a functional par with *Lucid 3-D*'s or *PlanPerfect*'s, but it's not terribly convenient. Because you can see only one worksheet on screen at a time, you must remember the cell address or range name of the source cell.

Ironically, the most significant new feature isn't from Lotus at all—it's the superb add-in report writer from Funk Software, *Allways*, which provides an accurate print preview of your worksheet, font control, lines and shading, and drivers for PostScript printers.

Compared with *Quattro Pro* and *SuperCalc*, *1-2-3 2.2*'s graphs are pretty Spartan. There are a few minor improvements, such as automatic graph layout and the ability to specify a range of cells as the source of legends. Likewise, macro enhancements—commands for better control of graphs, a keystroke recorder, and an add-in macro library that lets you store macros for use in any worksheet—are well chosen but not innovative.



1-2-3 release 2.2 is an evolutionary upgrade. One important addition is settings sheets, like this one for the Data Sort command.

1-2-3 2.2 is reliable and familiar, but Lotus should have provided this upgrade years ago. *Quattro Pro* demonstrates that the competition has done more than just play catch-up.

EXECUTIVE SUMMARY

1-2-3 2.2

Spreadsheet

With improved reporting and rudimentary file linking, 1-2-3 2.2 takes a small step beyond the 2.01 standard. But because of its lack of new power features and its pedestrian performance, it's not the top choice in this group.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet				●
Data base				●
Reporting and graphs				●
Macros				●
Performance			●	
Overall value				●

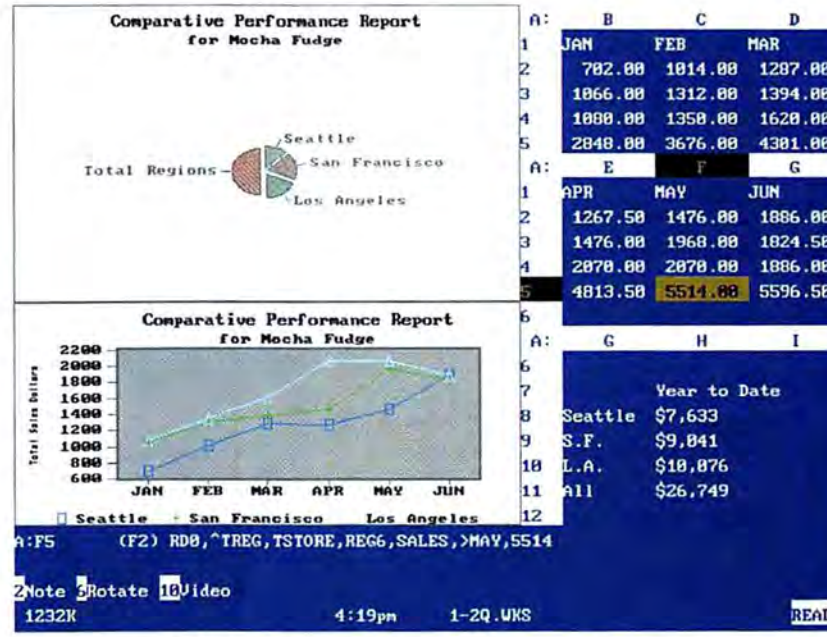
Reader service no. 646

3-D ON A BUDGET: CAN VP-PLANNER 3D DELIVER ON ITS PROMISE?

Robert Lauriston

VP-Planner 3D, Paperback Software's major upgrade to *VP-Planner Plus*, distinguishes itself from other professional spreadsheets with its exceptional 3-D features, $295 price tag, and claim of full 1-2-3 compatibility. It also matches 1-2-3 2.2 feature for feature and adds pulldown menus (though no mouse support), a relational data base, superior auditing tools, and extra release 3–like @ functions, graph types, and macro commands. Yet despite its big feature set, the program will run on a 384K, dual-floppy PC.

Several of the programs reviewed in this roundup offer impressive file linking capabilities, and *SuperCalc5* even builds multipage worksheets. But based on our examination of a prerelease copy, only *VP-Planner 3D* equals (and perhaps exceeds) 1-2-3 release 3's 3-D features. *3D* has easy-to-navigate multipage worksheets and true 3-D ranges, so commands and formulas can address blocks of cells that span multiple pages. And *3D* surpasses release 3.0 by letting you graph and print 3-D ranges, globally reformat selected worksheet pages, and even rotate your view of a worksheet through three dimensions.



VP-Planner 3D can load only one file at once, but it can display several views simultaneously. Here, it displays two graphs with different views of the same data, plus three segments of the worksheet.

Great Graphs, No Fonts

3D gives you lots of options for viewing data and makes graphing a selected block a one-keystroke task. Although you can load only one file into memory at a time, you can open up to six windows and display up to 24 hot-linked graphs at a time. For extra pizzazz, you can call on area, radar, and high/low/close/open graphs; mix types; rotate bars; and add "depth" to chart elements. You can also print sideways and combine graphs and worksheets on the same page. Two big omissions: You can't dress up worksheets with fonts or attributes, and there's no print preview.

Paperback claims *3D* is fully file, macro, and keystroke compatible with 1-2-3 2.2 and earlier versions. But until *3D* passes the *PC World* torture test in a review of the released product, be skeptical.

Easy Data Base Access

Another plus is *3D*'s ability to easily open DBF files and display the data in a table or a handy data-entry form. You can browse, edit, and sort the records; cross-tabulate related files; and even create a new data base from scratch—but you can't update *dBASE* indexes. Like Lotus, Paperback will help third-party developers design drivers and add-ins that will let you get at data from *Paradox*, SQL packages, and other sources.

Like *VP-Planner Plus*, *3D* has a built-in relational data base that lets you massage data in many ways. But numerous improvements in *3D* ease the task of creating and manipulating data bases. *3D* will also include extensive auditing tools, such as cell noting, map view, and macro debugging commands—but only limited formula tracing.

VP-Planner 3D could be an attractive alternative for potential 1-2-3 release 3 and *Excel* customers. And it will be a steal for *VP-Planner Plus* customers, since the upgrade will be $125 or less.

Robert Lauriston is an associate editor for PC World.

WHERE TO BUY

VP-Planner 3D
Paperback Software Int'l
2830 Ninth St.
Berkeley, CA 94710
415/644-2116
Reader service no. 685

PlanPerfect 5.0

The new *PlanPerfect* is the spreadsheet that *WordPerfect* lovers have been waiting for. Its interface dutifully imitates the word processor's, and it even includes *WordPerfect*'s superlative file manager, which eases the all-important job of staying organized.

PlanPerfect is run via *WordPerfect*-style function keys, but you can also install pull-down menus or a *1-2-3*–style interface. Even so, *1-2-3* users should be prepared for different conventions. To load a file, for example, you press <F5>, select a file, and press 1 instead of typing /FR. Note, too, that *PlanPerfect* can't run even the simplest *1-2-3* macros.

File linking is disk-based, much as with *Lucid 3-D*, and rather crude. You can open two files and view them together on screen, but you must save the source files before updating values in a target sheet. You can also link ranges, but data is transferred laboriously cell by cell.

PlanPerfect combines a traditional *1-2-3*–style flat-file data base with data entry forms. But compared with *Twin*'s or *Excel*'s, *PlanPerfect*'s forms are difficult to set up and use. In addition, you must enter selection criteria at a command prompt, not in a cell, so storing and reusing multiple queries means writing a macro to reproduce the criteria.

Not surprisingly, *PlanPerfect*'s text formatting controls are the most sophisticated in this roundup, and *PlanPerfect* sports a zoomable print preview identical to *WordPerfect 5.0*'s. (WordPerfect Corporation will also offer a coupon good for *Publisher's Powerpak*, which gives *Plan Perfect* a variety of fully scalable fonts.) The charting function, however, is merely adequate. You can't print graphs and spreadsheets on the same report, and you can't include printer fonts in graphs.

PlanPerfect offers two macro systems: a powerful language similar to *WordPerfect 5.0*'s and an alternative "cell" system that ties macros to a specific worksheet. Neither is compatible with *1-2-3*.

More disappointing for *WordPerfect* users is the lack of integration between the two products. You can't hot-link data between the two products as you can between *Excel* and *Word 5.0*. However, *WordPerfect* will suck up *PlanPerfect* worksheets or WK1 files and neatly format them, even inserting the proper tabs and such.

PlanPerfect's audience is clear: *WordPerfect* users who want a spreadsheet with a familiar interface. Given its mildly frustrating learning curve for experienced *1-2-3* users, sluggish performance in NSTL tests, and lack of outstanding features, it's not recommended for general spreadsheet users.

EXECUTIVE SUMMARY

PlanPerfect 5.0

Spreadsheet

This companion to *WordPerfect 5.0* delivers great reports, text control, and file linking. But its sluggish performance limits it to *WordPerfect* users.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet			●	
Data base			●	
Reporting and graphs				●
Macros			●	
Performance		●		
Overall value			●	

Reader service no. 647

SmartWareII Spreadsheet 1.01

As a stand-alone program, *SmartWareII Spreadsheet* offers speed and exceptional programmability. With its powerful macro-cum-programming language, for example, you can take user input via a custom data entry screen, pass it to the data base, select and sort needed records, and produce spreadsheet graphs and form letters.

Unfortunately, *1-2-3* users will find *SmartWareII*'s interface bewildering, its inability to read or write *1-2-3* macros a pain, and its minimal data base functions a major inconvenience. To get the most out of the package, you need to fold it into the *SmartWareII* integrated family, which includes communications, word processing, and data base modules. But few users will take that step.

SmartWareII's command sequences are obsessively fussy and force you to enter re-

PlanPerfect 5.0 is the spreadsheet that WordPerfect lovers have been waiting for.

EXECUTIVE SUMMARY

SmartWareII Spreadsheet 1.01

Spreadsheet

This spreadsheet module of Informix's integrated *SmartWareII* package is fast and powerful. In conjunction with *Smart*'s data base, word processor, and programming language, it can handle complex integrated applications. But its interface is unwieldy, especially for former 1-2-3 users.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet				●
Data base n/a				
Reporting and graphs				●
Macros				●
Performance				●
Overall value				●

Reader service no. 649

The $99 bargain Lucid 3-D is the only spreadsheet reviewed that's memory resident.

dundant keystroke sequences when a settings sheet or full-screen menu would have been simpler. For example, opening a *1-2-3* worksheet requires at least 15 keystrokes.

SmartWareII sports such power features as heavy-duty matrix and regression features, protected formulas that execute but don't display, and an editor for constructing and debugging complex formulas. The program's macro language is not compatible with *1-2-3*'s, but it's a full-blown procedural language that can integrate the actions of the other *SmartWareII* modules.

But there are almost no *1-2-3*–style data base functions. Users are expected to load *SmartWareII*'s data base module, import and manipulate data there, and then export the results back to the spreadsheet.

SmartWareII doesn't provide a print preview, but otherwise its report and graphics capabilities are first-class. It's the only program reviewed that permits true three-axis graphs, and you can choose from available printer fonts or compile downloadable laser printer fonts supplied by the company.

Getting the most out of *SmartWareII Spreadsheet* means making a major commitment to the *SmartWareII* system. If you need an integrated powerhouse, check it out. Otherwise, keep looking.

Lucid 3-D 2.2

Lucid 3-D is the only reviewed spreadsheet that's memory resident. That makes it convenient, but it's also slow and underpowered for complex models. But this $99 bargain is perfect if you need a capable, albeit limited, spreadsheet at your fingertips. An excellent auditing feature graphically shows linked worksheets and formula references; you can also append extensive notes. Creating serviceable graphs is a snap—just don't expect to do anything fancy, like graphing discontinuous ranges, adding data labels, or suppressing legends.

In spite of its name, *Lucid 3-D* is not a 3-D spreadsheet like *1-2-3* release 3. As with *1-2-3*, you can only do single-cell linking. But you can display nine linked worksheets in separate windows for better visibility.

Lucid was fastest at loading and saving files but dismal at recalculation, spreadsheet manipulation, and other tasks. Worse, run any two of the separate graphics, WK1 file translation, or macro editor modules, and you may find there's not enough room for

EXECUTIVE SUMMARY

Lucid 3-D 2.2

Spreadsheet

This pop-up spreadsheet is a terrific accessory for people who work mainly with other applications. It lacks advanced features, and its performance is so-so, but what it does, it does very well.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet			●	
Data base n/a				
Reporting and graphs			●	
Macros				●
Performance			●	
Overall value			●	

Reader service no. 645

your primary application.

Lucid's unconventional pulldown menu interface may prove an initial inconvenience to *1-2-3* habitués. Copy and move operations, for example, are accomplished with a clipboard. It's an intuitive approach, but *1-2-3* users will begrudge the excessive number of steps required.

It's easy to create macros with *Lucid*'s keystroke macro recorder and to add conditionals by plucking them from a pulldown menu. But if you work in an office dominated by *1-2-3*, note that *Lucid* can't read or generate *1-2-3*–compatible macros.

Lucid 3-D is a lean, well-executed spreadsheet. If you spend your days deep in an accounting package and need to whip out the occasional "what if," *Lucid* is ideal. But if your needs go beyond the basics, look elsewhere.

Twin Level III 3.07

Twin Level III is roughly equivalent to *1-2-3 2.2*, minus *Allways*. It also has some advanced features—a data base entry form, a slide show generator, and sophisticated multifile connections. But its minimal spreadsheet publishing features, excessive memory needs, and tortoiselike performance make it difficult to recommend.

EXECUTIVE SUMMARY

Twin Level III 3.07

Spreadsheet

Uneven performance mars the credibility of this inexpensive 1-2-3 look-alike. It has very good file linking and a nice data base entry form, but it's slow and not as good as the alternatives.

	POOR	FAIR	GOOD	EXCELLENT
Spreadsheet			●	
Data base				●
Reporting and graphs			●	
Macros				●
Performance	●			
Overall value			●	

Reader service no. 651

You can pop Lucid 3-D over your favorite application for quick "what if" analysis. You can also cut and paste text between applications and the spreadsheet with Lucid's clipboard.

Twin's pulldown menu interface is keystroke compatible with *1-2-3* and includes the same commands and prompts. But the menus aren't overlapping like *Quattro Pro*'s, so novices can easily lose their bearings. *Twin* also lacks the reliability and performance of its namesake: It leaves half as much memory available as *1-2-3 2.01* with Undo turned off, and in informal testing, a 200-line *1-2-3* macro that ran perfectly in *Quattro Pro* crashed *Twin* and the test PC.

Twin exhibits other quirks, too. It takes several steps to list and retrieve files in a different directory. Files aren't listed alphabetically, you can't get a full-screen list of selectable range names, and when you open a second worksheet you can't even get a worksheet directory. The documentation is poorly organized, and the help screens lack an index.

On the plus side, *Twin* does multisheet consolidations as easily as *SuperCalc*. You can name a range in a file, then use that range name as a formula element in another open or disk-resident file. But you can't build a true 3-D range, and you can't move the cell pointer between sheets while building formulas, create data base or graph ranges that span worksheets, or access a range name in another sheet with the {Name} key.

Twin's data base is a clone of *1-2-3 2.01*'s with an added data entry form that's much easier to set up and use than *PlanPerfect*'s. But the data base does not allow you to extract data from one file into another, preclud-

ing a host of multifile applications.

Twin's report module is almost a spitting image of *1-2-3 2.2*'s, with a few extras. There's no font control or preview, but you can create text, mix pie charts and horizontal bar charts, and produce 3-D effects (but not true three-axis graphs).

In short, while *Twin* provides some interesting multifile capabilities and is half the price of the competition, its uneven interface and slow performance merit a thumbs-down.

Quattro: The Winner Takes All

The current crop of spreadsheets presents some excellent options for users with special requirements. *Lucid*'s stripped-down, memory-resident program is an invaluable accessory for people who primarily use other programs. *WordPerfect* users, on the other hand, can look to *PlanPerfect* for a well-integrated, familiar interface.

But for most spreadsheet users, especially those climbing up from *1-2-3 2.01*, only two products get the nod. If you can live with its demerits, *SuperCalc5*'s superb feature set, analytical tools, and approximation of *1-2-3* release 3's 3-D capabilities make it worth a look.

But the overall Best Buy is clearly *Quattro Pro*. It's as reliable as *1-2-3 2.2* yet offers a friendlier interface, superior speed, and outstanding graphics—improvements Lotus should consider for release 2.3 if it wants to maintain its hold on the mass of spreadsheet users. ●

Richard Scoville is a computer consultant and writer in North Carolina and a contributing editor for PC World.

For more information about all products in this article, circle reader service no. 909.

WHERE TO BUY

Lucid 3-D 2.2
DacEasy, Inc.
17950 Preston Rd. #800
Dallas, TX 75252
800/877-8088 (orders), 214/248-0205
LIST PRICE: $99
REQUIREMENTS: 256K (384K for graphics, 512K recommended), DOS 2.0 or later version, hard drive recommended for graphics, Microsoft or compatible mouse recommended
TECHNICAL SUPPORT: 10 minutes free, then $90 per hour via toll-free number, M–Th 8–5, F 9–5
OTHER SUPPORT: newsletter, user BBS
Reader service no. 645

1-2-3 release 2.2
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge MA 02142
617/577-8500
LIST PRICE: $495, upgrade from all previous versions $150
REQUIREMENTS: 320K without Allways, 512K plus hard drive with Allways; DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, 24-hour toll-free support for six months; then unlimited, toll number; M–F 8:30–8; priority support available
OTHER SUPPORT: CompuServe forum
Reader service no. 646

PlanPerfect 5.0
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
800/321-4566 (orders), 801/225-5000 (information)
LIST PRICE: $495
REQUIREMENTS: 384K (512K recommended), DOS 2.0 or later version, hard drive recommended
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 7–6 (toll-number support available 6 p.m.–7 a.m.)
OTHER SUPPORT: company BBS; CompuServe forum, newsletter
Reader service no. 647

Quattro Pro 1.0
Borland Int'l
1800 Green Hills Rd.
P.O. Box 660001
Scotts Valley, CA 95066
408/438-8400
LIST PRICE: $495; upgrade for Quattro owners $79.95, for users of other Borland products $99.95
REQUIREMENTS: 512K, DOS 2.0 or later version, hard drive
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–5; special support including a designated support person and priority access $2500
OTHER SUPPORT: newsletter, CompuServe forum
Reader service no. 648

SmartWareII Spreadsheet 1.01
Informix Software
16011 College Blvd.
Lenexa, KS 66219
913/599-7100
LIST PRICE: spreadsheet module $349, full system $699
REQUIREMENTS: 512K (640K recommended), hard disk, DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll number M–F 8:30–5:30
OTHER SUPPORT: company BBS
Reader service no. 649

SuperCalc5 Revision C
Computer Associates
1240 McKay Dr.
San Jose, CA 95131
800/531-5236, 408/432-1727
LIST PRICE: $495, upgrade from previous version or competing spreadsheet $100, Silverado add-in $149
REQUIREMENTS: 512K (640K recommended), DOS 3.0 or later version, hard drive
TECHNICAL SUPPORT: free for six months, toll number, M–F 7–5, then $150 per year for toll-free priority phone support
OTHER SUPPORT: newsletter
Reader service no. 650

Twin Level III 3.07
Mosaic Marketing
1972 Massachusetts Ave.
Cambridge, MA 02140
800/255-8662, 617/491-2434
LIST PRICE: $219
REQUIREMENTS: 512K, DOS 3.0 or later version, hard drive recommended
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–5:30
OTHER SUPPORT: none
Reader service no. 651

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Five at 25 MHz: The System Standard Rises Higher

To get the most out of modern business software, nothing less than a 25-MHz 386 will really do. But do these systems have what it takes to earn a place on your desktop?

John Diebold

Tomorrow's business software is already showing up in offices, boasting accessible graphical user interfaces (GUIs) that require heavy-duty processing power to keep from slowing to a crawl. Most of these programs are *Windows* applications; upcoming *Presentation Manager* and *X Window* applications will demand even more muscle.

Devoting greater CPU power to easy-to-use GUIs is a healthy trend—one that increases productivity by opening up a wider range of applications to experienced users and by attracting new users who might be intimidated by character-based command conventions. But to get acceptable performance from graphics-intensive programs, you need at least a 25-MHz PC.

In fact, we can expect to see 25- or even 33-MHz 386 systems become the dominant mainstream business machines soon, with 386SXs taking the entry-level position and 486 power being shared by LAN work groups. Clock speeds for 386 systems may level off at 33 MHz, but for now 25-MHz machines offer the best price/performance ratio, thanks to their ability to use less expensive RAM.

The five machines in this review are recent arrivals from major vendors: AST's Premium 386/25, AT&T's 6386/25, NCR's PC925, Toshiba's T8500 Model 25, and Wyse's 386 Model WY3225. Including these, we've reviewed a grand total of eighteen 25-MHz 386s to date; so far only the Dell System 325 and the Micro Express ME 386-25 have received *PC World* Best Buy awards.

Since these machines will spend their best hours on people's desks, not stuck in a closet running a network, we evaluated them as single-user systems. This means that board and drive capacities are less important than a high ceiling for CPU-speed RAM to handle graphics-based, multitasking environments. Moreover, since people will be using these machines every day, well-designed ergonomic features such as a space-saving footprint, easy-to-reach front-panel switches and monitor controls, and simple setup are highly desirable. Fortunately, all the vendors represented here (except Toshiba, which had not settled on a monitor at press time) offer excellent keyboards and sharp, bright VGA monitors.

One of the most impressive entries in the roundup is Toshiba's T8500, a machine primarily designed as a superior desktop workstation. Unique features include a small foot-

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print and easy access to expansion boards; moreover, power *and* reset switches are conveniently located on the front panel. The other standout is AST's Premium 386/25—a larger and more traditional system that delivers outstanding DOS performance at the lowest price in the roundup. However, neither system rated Best Buy honors.

Obviously, performance is a key buying consideration. Among this group, National Software Testing Laboratories (NSTL) benchmarks reveal only minor differences in DOS scores. The larger variation in OS/2 benchmarks is probably due to the quality of each manufacturer's version of OS/2, suggesting that a system maker's ability to adapt OS/2 to its specific hardware can have a significant performance payoff.

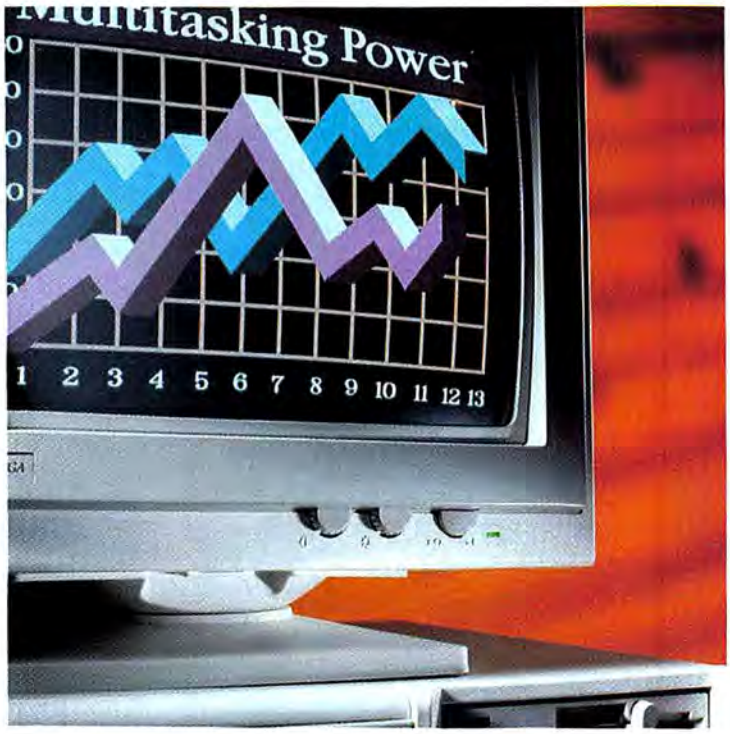
To maximize performance, all five machines have been designed to take advantage of hardware-based memory caching, and they all include disk caching software as well. In addition, all feature "shadow RAM," an important new capability that boosts performance even higher by copying system and video BIOS from slow ROM into faster, 32-bit memory (see the sidebar "Breaking the BIOS Bottleneck").

To make it easier to compare list prices, the machines have been set up and priced in the standard *PC World* configuration: 4MB RAM; a 150MB (or thereabouts) hard disk; at least one parallel port, serial port, and mouse port; a VGA graphics adapter and color monitor; and DOS 3.3 or a later version.

AST Premium 386/25

At $8990 in the standard *PC World* configuration (but with a 110MB hard disk), the Premium 386/25 is the least expensive machine in the roundup—but it gives you a lot for your money, including impressive DOS performance and a high ceiling for CPU-speed

AST's Premium 386/25 is relatively inexpensive and provides an easy 486 upgrade path. Toshiba's T8500 Model 25 features superb ergonomics.



AST's Premium 386/25 comes with a VGA color monitor that houses all controls right beneath the screen for easy operation.

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RAM. Furthermore, you get a painless upgrade path: A simple board swap lets you move up to 33 MHz or even to full 80486 performance. Unfortunately, in its 25-MHz 386 incarnation, neither its OS/2 performance nor its ergonomics will make much of an impression.

The Premium 386/25 is a high-velocity DOS machine, turning in top scores on the *Microsoft C* benchmark—but its overall OS/2 performance was the worst in the roundup. (This system was tested with an ESDI drive, but PCs that are currently shipping come with IDE drives, so you may get different performance from that described here.)

The Premium 386/25's ergonomics are less than dazzling. It's a long reach to the rear of the large chassis to turn on the power switch; even the keylock is rear-mounted. The only thoughtful touches are a front-panel reset button and monitor controls placed conveniently at the bottom of the screen.

The Premium 386/25 has seven slots, and you end up with five of them free. The CPU, the RAM cache, and up to 4MB of RAM live on a CPU board that plugs into a 32-bit slot. (A 33-MHz CPU board, available as a $2395 option, goes into the same slot; a 25-MHz 80486 upgrade costs $3695.) Two more 32-bit slots (which also accept 8/16-bit boards) let you install up to 32MB of additional CPU-speed RAM for a generous total of 36MB—20MB more than even OS/2 can address directly. (UNIX users, however, will find that "extra" 20MB handy.) The 386/25 has room for five half-height 5¼-inch storage devices, three of them externally accessible.

Service and support are a mixed bag. There's no on-site service, and the tech support line works only on weekdays and shuts down at 3 p.m. PST—but at least long-distance calls are toll free, and there's an in-house BBS with a great color interface. As we do for all systems, we placed three test calls to evaluate the quality of tech support. All three of our calls were answered immediately.

If you're looking for a desktop workhorse to give good service well into the 1990s, AST's Premium 386/25 is worth thinking about, thanks to its easy upgrade path, fine DOS performance, and huge capacity for CPU-speed RAM. Despite its unimpressive ergonomics and slow OS/2 scores, its low tariff makes for a tempting price/performance ratio.

EXECUTIVE SUMMARY

AST Premium 386/25

25-MHz 80386-based computer

Start with the lowest price in the roundup. Add points for an easy 486 upgrade path, excellent DOS performance, and a high ceiling for CPU-speed RAM. Subtract points for poky OS/2 scores and unimpressive ergonomics. Result: a strong value—but there are smarter buys available.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability				●
Ergonomic design			●	
Service and support				●
Performance				●
Overall value				●

Reader service no. 665

AT&T 6386/25 Work Group System

AT&T's 6386/25 boasts excellent performance across the board—in both DOS and OS/2 tests, it turned in the best overall scores in the roundup. Its capacity for CPU-speed RAM is the highest of the reviewed machines, but its 22-by-19-inch box is the biggest of the bunch. Moreover, at $10,463 in the standard *PC World* configuration, it's a pricey speedster.

The 6386/25's ergonomics are not particularly impressive. The front-panel reset button and easy-to-reach monitor controls are well placed, but the rear-panel on-off switch suggests that AT&T's engineers didn't devote much thought to user comfort.

EXECUTIVE SUMMARY

AT&T 6386/25
Work Group System
25-MHz 80386-based computer

This hot rod turns in fine test scores and boasts a huge capacity for CPU-speed RAM, but it's not cheap—and its oversized case and underwhelming ergonomics put it at a disadvantage on the desktop.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability				●
Ergonomic design			●	
Service and support				●
Performance				●
Overall value			●	

Reader service no. 666

The 6386/25 can handle 8MB of 32-bit RAM on its Intel motherboard. Two 32-bit slots accommodate memory boards that bring the total for CPU-speed RAM to 40MB. The large case includes eight slots—and you end up with six of them free in the *PC World* configuration. The AT&T has bays for five half-height 5¼-inch storage devices, three of which are accessible from the front.

AT&T's service and support package is better than some: At least the tech support

FEATURES EVALUATION

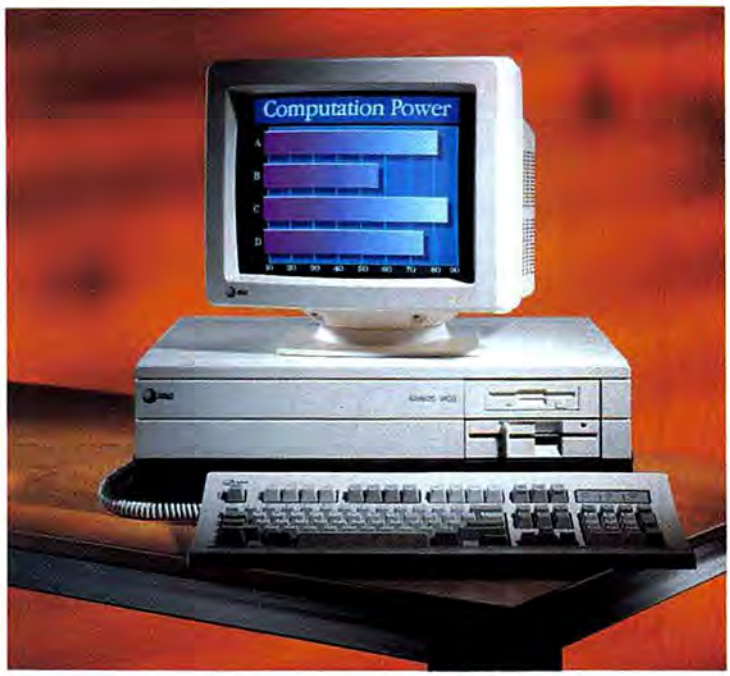
Toshiba Tops on Desktop

Outstanding ergonomics make Toshiba's T8500 a natural for desktop service. AST's Premium 386/25 is a credible choice, with more expansion capacity.

● Yes
○ No

	AST Premium 386/25	AT&T 6386/25 Work Group System	NCR PC925	Toshiba T8500 Model 25	WYSEystem 386 Model WY3225
Standard features					
Price	$8990[1]	$10,463[2]	$10,694[3]	$9498[4]	$9613[5]
Coprocessor support	80387-25 3167	80387-25 3167	80387-25 3167	80387-25	80387-25 3167
Disk caching software	●	●	●	●	●
Disable system shadowing	●	●	○	●	●
Disable video shadowing	●	●	●	●	●
CPU-speed RAM					
Capacity[6]	36MB	40MB	16MB	8MB	16MB
Cache memory	32K	64K	64K	64K	64K
Expandability					
32-bit expansion slots/ number free	3/2[7]	2/2[7]	1/1[8]	0/0	0/0
8/16-bit expansion slots/ number free	3/2	5/3	6/4	3/3	8/3
8-bit expansion slots/ number free	1/1	1/1	1/1	1/1	3/1
Half/full-height storage device bays	5/2	5/2	5/2	3/0	5/2
300MB or larger hard disk available from maker	●	●	●	○	●
Ergonomic design					
Compact footprint	○	○	○	●	○
Tilt-and-swivel monitor	●	●	●	n/a	●
Front-panel reset button	●	●	○	●	○
Front-panel on/off switch	○	○	●	●	○
Service and support					
Free on-site service	○	○	●	●	○
Toll-free support number	●	●	○	●	○
Daily support (hours)	8–3	8–5	8–8	7–5	8–5[9]
Weekend support	○	○	●	○	○
BBS	●	○	○	●	○

[1] Price based on 4MB RAM, 1.2MB floppy drive, 110MB ESDI hard disk, at least one parallel port and serial port, VGA video board and color monitor, 101-key keyboard, DOS 3.3 or a later version.
[2] Same as footnote 1, except with 135MB IDE hard disk.
[3] Same as footnote 1, except with 100MB SCSI hard disk.
[4] Same as footnote 1, except with 100MB IDE hard disk, and includes $700 for color monitor (not offered by vendor).
[5] Same as footnote 1, except with 150MB ESDI hard disk and 150MB internal tape backup.
[6] Includes motherboard memory and CPU-speed RAM installable in 32-bit slots.
[7] 32-bit slots also take 16-bit and 8-bit boards.
[8] 32-bit slot also takes 8-bit board.
[9] $45 fee for each call; free tech support may be available via dealer.



AT&T's 6386/25 has the largest system unit in the roundup, but it delivers outstanding CPU-speed RAM capacity and excellent performance.

JOHN GREENLEIGH

number is toll free. Unfortunately, there's no on-site service. Our three test calls were answered after an average of 4 minutes on hold. Twice we received help; the third time we had to leave a message and were called back quickly.

With its excellent performance and generous capacity for expansion slots, storage devices, and CPU-speed RAM, the AT&T 6386/25 will make a good server—if that's what you're looking for. But as a desktop system, its bulky case, unimpressive ergonomics, and high price put it at a disadvantage.

NCR PC925

NCR's PC925 delivers fine DOS performance with good drive and expansion slot capacity, and its SCSI drive interface allows you to address six peripherals easily. But there are two problems: At $10,694 in the *PC World* configuration, it's the most expensive box in the roundup—and that's with a measly 100MB hard drive. Worse yet, the SCSI adapter is incompatible with *Windows/386*.

The PC925's DOS scores are close to the front of the pack. Running under OS/2, however, its overall performance was nearly the worst in the roundup, due mainly to its lowball score on the disk-intensive *R:base* test. The PC925's slow SCSI hard disk (NSTL rated it at 29.6ms) is the probable culprit. Our inability to get the test unit to run *Windows/386* was due to an apparent conflict with the SCSI adapter; according to NCR, new units will correct the problem and provide a faster ESDI hard disk option as well.

The PC925's ergonomics are only fair. Although NCR puts the power switch on the front panel (where it belongs), and VGA controls are easy to reach, the system case is large, and there's no front-panel reset button. Moreover, changing the amount of system RAM, or performing even simpler setup tasks like enabling an I/O port, requires fiddling with far too many switches and jumpers.

You can put 16MB of 32-bit RAM in the PC925. The motherboard is host to eight expansion slots, six of which remain vacant in the *PC World* configuration. Two of five half-height 5¼-inch drive bays are accessible from the front, and there's an internal full-height bay as well.

EXECUTIVE SUMMARY

NCR PC925

25-MHz 80386-based computer

Despite outstanding DOS scores, a handy SCSI drive interface, and fairly good ergonomics, this system has two big problems: It's the most expensive box in the roundup, and it won't run *Windows/386*. A replacement is on the way; wait for it.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability				●
Ergonomic design			●	
Service and support				●
Performance				●
Overall value			●	

Reader service no. 667

Service and support has its ups (free on-site service, weekend tech support) and its downs (you pay for long-distance calls). We had to leave messages on all three of our test calls; the third was never returned.

The PC925's strong DOS scores and SCSI device expansion capacity are big pluses—but these days you'd have to be crazy to pay top dollar for a desktop PC that can't run *Windows*. At press time, NCR announced plans to ship a new, and much improved, 25-MHz system in late February. Under the circumstances, it makes sense to look for the upgrade.

Toshiba T8500 Model 25

The T8500 is the first desktop entry from this leading laptop vendor—and the company's experience seems to have paid off in a design that boasts a compact footprint, superior ergonomics, and a surprisingly low price ($9498 in the standard *PC World* configuration), but with an undersized 100MB hard disk. It even comes with a built-in SCSI port so you can connect seven additional peripherals.

The T8500's performance scores are unexceptional but perfectly creditable, falling midrange on both DOS and OS/2 benchmarks. A bottom-place finish in the processor-intensive *1-2-3* test suggests that perhaps the memory-caching algorithm could be improved.

The T8500's ergonomics are outstanding. Its compact footprint (16 by 16 by 4 inches) is no larger than IBM's PS/2 Model 30; the reset switch, the keyboard port, and a speaker volume control are all on the front panel. Moreover, Toshiba makes it unusually easy to slide in expansion boards through a removable right-hand door that exposes four horizontal slots. As of this writing, Toshiba was not offering a VGA monitor under its own name.

The small cabinet takes its toll in expandability. The motherboard holds only 8MB RAM—the lowest count in the roundup. (When 4MB DRAMs become available, probably early this year, the T8500's RAM ceiling will rise to 14MB.) The machine has only four slots, and even though all of them are left free, that's still a tie for the lowest slot count in the roundup. Worse yet, there are only two externally accessible half-height 3½-inch bays; an internal half-height bay of the same size holds the 100MB hard drive. You can daisy-chain as many as seven exter-

The Toshiba T8500's outstanding ergonomics include easy access to expansion slots via a removable side cover (top), and front-panel reset switch and keyboard port (bottom).

JOHN GREENLEIGH

EXECUTIVE SUMMARY

Toshiba T8500

25-MHz 80386-based computer

Designed for the desktop, this system is small, ergonomically sophisticated, and relatively low priced, with good performance and a SCSI port. Still, you can buy better machines for less.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM			●	
Expandability			●	
Ergonomic design				●
Service and support				●
Performance				●
Overall value				●

Reader service no. 668

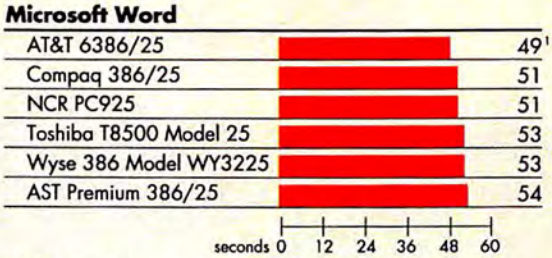
NSTL TEST REPORT

AT&T Keeps Up With Compaq's 25-MHz Pacesetter

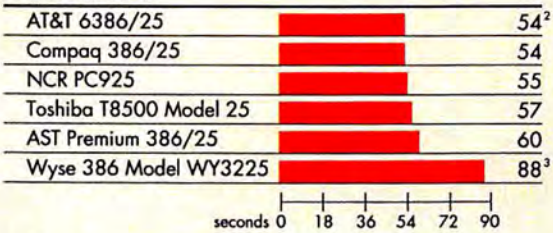
With a few exceptions, our tests showed only minor differences in performance among the five machines reviewed. Still, AT&T's 6386/25 was a bit faster than the competition in nearly every DOS and OS/2 application.

DOS

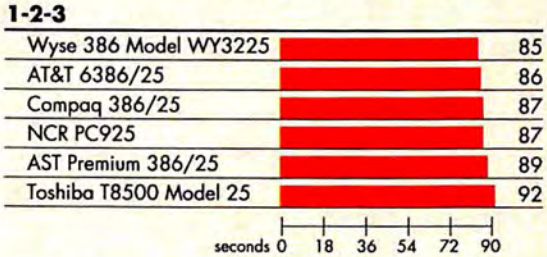
Microsoft Word



dBASE III Plus

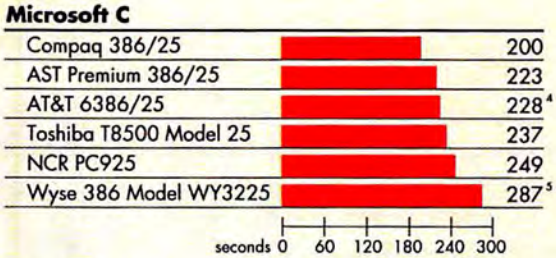


1-2-3

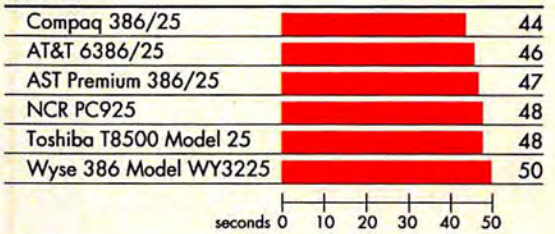


[1] Time was 48 seconds with the PC-Kwik cache.
[2] Time was 52 seconds with the PC-Kwik cache.
[3] Time was 59 seconds with the PC-Kwik cache.
[4] Time was 213 seconds with the PC-Kwik cache.
[5] Time was 272 seconds with the PC-Kwik cache.
[6] At test time, Wyse was unable to provide a version of OS/2.

Microsoft C



AutoCAD



Methodology
All machines were tested with a coprocessor and a 256K extended memory disk cache (except in the *1-2-3* benchmark). Each system was tested with 4MB of RAM. Systems were configured with the following sizes of hard disks: NCR PC925 and Toshiba T8500 Model 25, 105MB; AST Premium 386/25, 110MB; AT&T 6386/25 and Wyse 386 Model WY3225, 140MB; Compaq 386/25, 300MB.

Microsoft Word 4.0
A *Microsoft Word* macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

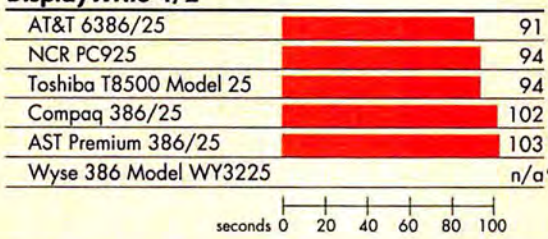
dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not 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.

nal devices via the SCSI port, and Toshiba has included a port for an optional external 5¼-inch drive.

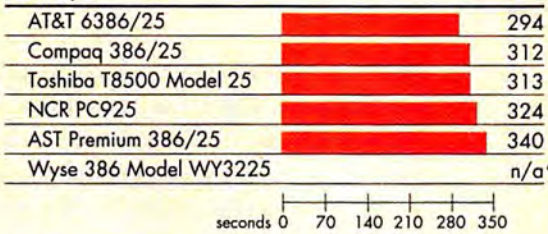
Theoretically, Toshiba offers the best service and support in the roundup. The company provides free on-site service within 50 road miles of any TRW service center, a toll-free tech support number, and not one but two BBSs—one in-house and one on CompuServe. Unfortunately, that toll-free tech support number could use some work: Two of our three calls were met with a busy signal. We got through on the third call but had to hold for 6 minutes before we reached a support representative.

OS/2 Single-Tasking

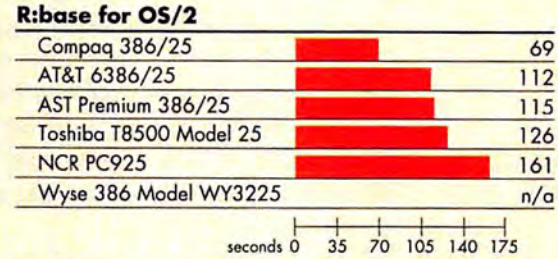
DisplayWrite 4/2



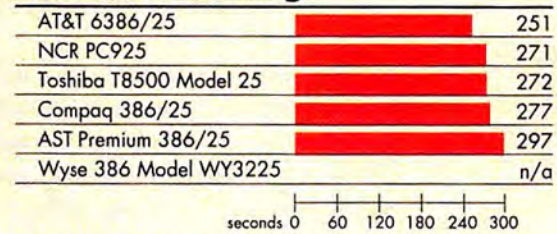
IBM C/2



R:base for OS/2



OS/2 Multitasking



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.

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.

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.

DisplayWrite 4/2
Although the hard disk access rate plays a small part in this benchmark, processing and memory access speeds are the most significant factors. Memory architecture affects memory access speed: Systems that require additional memory in standard expansion slots to run OS/2 exhibit below-average performance.

While *DisplayWrite 4/2* is loading, the keystrokes to start a *DisplayWrite* macro are entered. The macro loads a 35-page, 140-paragraph document, replaces each occurrence of the word *today* with *tomorrow*, uses the built-in spelling checker to look for any incorrectly spelled words (there are none), paginates the document, prints the first page to an IBM Proprinter II, and exits *DisplayWrite*.

IBM C/2
In this benchmark, processing and hard disk sequential access speeds are the most important factors. The benchmark measures the time required to compile the 25 source code files that make up *XLISP*, a public-domain LISP interpreter.

R:base for OS/2
Processing and hard disk random access speeds are the most significant factors in this benchmark. Disk caching dramatically improves apparent disk access speed. This benchmark measures the time it takes to produce a report based on a three-file join, select, and sort.

OS/2 Multitasking
In two sessions, IBM's *C/2* compiles the 25 C source code files that make up *XLISP*. The results of this benchmark are determined by calculating the difference between the first session's starting time and the second session's ending time.

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

Toshiba is betting that there are users out there who want a compact, capable, ergonomically designed workstation on their desk and are willing to trade RAM, slot, and drive capacity to get it. Given the T8500's low price, SCSI port, and outstanding service and support, that's a bet Toshiba may win.

WYSEsystem 386 Model WY3225

At $9613 in the standard *PC World* configuration, the WY3225 costs only $600 more than the bottom-end AST—and you even get a 150MB tape backup unit in the bargain. Moreover, the machine seems to have what it takes to be a top OS/2 performer—but there's a catch: You have to run Compaq

OS/2 to get that performance. The system delivered the worst DOS performance in our roundup, and its ergonomics are anything but impressive.

Wyse claims to offer a proprietary version of OS/2, but since it was unavailable at benchmark time we tested the WY3225 with Compaq's OS/2, which has a superior disk caching algorithm, among other optimizations. The machine ran extremely fast, but there's no guarantee you'll get similar results with Wyse's OS/2—and in any case, we do not recommend running a system with any but its own version of OS/2. Under DOS, the WY3225 took top spot on the CPU-intensive *1-2-3* test but fell off badly where hard disk performance and disk caching efficiency were critical.

In designing this system, Wyse seems to have given little thought to ergonomics. The WY3225 is bulky, its power switch is in the back, and while a flip-up lid over the drive bays may look great, it's a pain in the wrist when you have to change floppy disks. You'll

BREAKING THE BIOS BOTTLENECK

The current crop of 386-based PCs offers the broadest set of speed enhancements ever included as standard options in desktop machines: fast CPUs, equally fast 32-bit system memory, 25ns memory caches, sophisticated disk caching software, and, recently, "shadow RAM." The latter (which ought to be called simply "BIOS relocation") lets you trade in a small amount of "high" memory (above 1MB) to get major enhancements in performance.

DOS depends on low-level routines stored in ROM (read-only memory) chips to handle basic input/output for the system (BIOS): putting characters on the screen, reading data from the keyboard, writing it to disk, and so on. The routines are called very frequently—often hundreds of times a second—and if they run slowly, throughput suffers drastically.

ROM chips are usually addressed 8 bits at a time at a poky 8 MHz, fast enough for the PCs and XTs for which they were originally designed, but way too slow for today's 32-bit 25- and 33-MHz speedsters. And the cost of developing and producing faster ROMs is prohibitive.

Why not just copy the system BIOS and video BIOS into faster RAM and access them from there? Until recently, that's been impossible because DOS expects to find those BIOS routines at specific addresses between 640K and 1024K.

DOS was written to address 1024K (1MB) of memory locations. When you buy a PC with 640K of RAM, what you get is a motherboard with physical memory whose addresses range from 0 to 640 kilobytes. Although you rarely have to think about it, you also get an extra 384 kilobytes of *address* space. Some of these "upper" addresses are used by DOS to access ROM-based system BIOS, hard disk BIOS, video BIOS, and video RAM. If you buy a machine with more than 640K of memory, the extra RAM is given addresses in high memory, starting at 1MB, and is called extended memory.

Since the 80386 chip is able to remap, or "virtualize," memory addresses on the fly, now you *can* copy system and video BIOS from slow ROM chips to faster 32-bit RAM—as long as the system virtualizes the address. So when DOS (or a misbehaved application) goes looking for a BIOS routine at some specific address between 640K and 1MB, it's automatically sent to fast RAM above 1MB.

Are there any drawbacks to shadow RAM? Of course. One is that shadowing reduces the amount of available RAM. Programs that require nearly a full megabyte of memory (such as 1-2-3 release 3) won't run in "1MB" 80386 systems that, because of shadowing, actually provide less than 1MB. However, most 80386 PCs probably have at least 3MB of extended memory, so devoting 128K or 256K to shadowing is no big deal. Another problem can arise if a newly installed video board tries to relocate its video BIOS to the same high memory the system is using for its relocated *system* BIOS: The system will refuse to boot.

Therefore it's essential to be able to change the relocation address or to disable shadowing altogether. It's also handy to have the capability to disable video BIOS shadowing while maintaining system BIOS shadowing—or vice versa. Finally, it's essential to regain access to all the high memory addresses when shadowing is disabled; some systems (like Compaq's) won't give it back. —*J. D.*

have to resort to DIP switch flipping to add or subtract RAM and to configure the I/O ports.

The WY3225 employs a backplane with 11 slots—but by the time you're done installing boards to reach the standard *PC World* setup (including a controller for the tape backup), you're down to 4 free ones. The WY3225's drive bay capacity is fairly standard for a large-footprint desktop model: You get five half-height 5¼-inch bays, four of them accessible from the outside.

Service and support are awful. There's no on-site service, the tech support number is a toll call, and Wyse charges $45 for each question! (We didn't bother calling.) Wyse suggests you try your local dealer for free tech support. End users with modems can get tech support via an in-house BBS, but it costs a steep $200 a year.

Arriving at a meaningful price/performance ratio for the WY3225 is not easy. True, $9613 (with a built-in tape backup) is a cheap ticket for an outstanding OS/2 ride, so it's tempting to overlook the machine's poor DOS performance and disappointing ergonomics. However, those OS/2 scores are achieved with another company's version of OS/2. Given all that, plus the unacceptable service and support, we suggest you pass this system by.

The flip-up lid that covers the drive bays on Wyse's WY3225 may be elegant, but it's not very handy. Fortunately, it's removable.

JOHN GREENLEIGH

EXECUTIVE SUMMARY

WYSEsystem 386 Model WY3225

25-MHz 80386-based computer

While this system boasts a fairly low price (and includes a 150MB tape backup unit at no extra cost), its DOS scores are disappointing and its service and support package is poor. Moreover, although it scored well on tests under Compaq's OS/2, it might not do as well under its own version (unreleased at press time).

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability				●
Ergonomic design			●	
Service and support	●			
Performance				●
Overall value			●	

Reader service no. 669

Desktop Workhorses

There are no Best Buys in this roundup, but the best bargains clearly are the AST Premium 386/25 and the Toshiba T8500. The Premium 386/25 is relatively inexpensive ($8990 in the *PC World* configuration) and combines outstanding DOS performance and a huge 36MB capacity for CPU-speed RAM with an easy 486 upgrade path. Its unimpressive ergonomics and slow OS/2 scores are drawbacks. Toshiba's $9498 T8500 limits memory, slot, and device expansion, but its ergonomics (including a very small footprint) are outstanding—and the SCSI port makes it easy to connect seven peripherals.

Nonetheless, these five systems have to go up against the Best Buys from our previous 25-MHz 386 roundup reviews (June 1989 and August 1989)—specifically the $8099 Dell 325 (almost $1000 less than the AST Premium 386/25) and the even cheaper $6324 Micro Express ME 386-25. Despite a number of winning features, none of the new contenders can match the low prices and superior performance of those two Best Buy winners.

With 80486 PCs starting to come on line at last, once-exotic 25-MHz 80386 PCs are looking more and more like everyday desktop machines. If you choose wisely, you'll end up with a system whose RAM capacity, speed, and ease of use will make blazing through yesterday's benchmarks a pleasure while it helps to solve tomorrow's problems. ●

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. 912.

WHERE TO BUY

AST Premium 386/25

AST Research, Inc.
16215 Alton Pkwy.
P.O. Box 19658
Irvine, CA 92718-9658
714/863-1333
LIST PRICE: Model 5 with 2MB RAM, two serial ports, one parallel port, 1.2MB or 1.44MB floppy drive, DOS 3.3, GW BASIC, ASTCache $5695; Model 115V same as Model 5 except with 110MB AT-embedded hard disk and AST-VGA Plus adapter $7595; Model 325 same as Model 115V except with 325MB ESDI hard disk $9345
ACCESSORIES: 1MB RAM $350, 32-bit 16MB RAM expansion card with 1MB RAM $850, Fastboard 386/33 accelerator board with 2MB RAM $2395, Fastboard 486/25 with 2MB RAM $3695, 14-inch color VGA monitor $695
WARRANTY: one year parts and labor
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 8–3
OTHER SUPPORT: in-house BBS
Reader service no. 665

AT&T 6386/25 Work Group System

AT&T National Products Center
1 Speedwell Ave.
Morristown, NJ 07960
800/222-3111
LIST PRICE: Model CPU311 with 4MB RAM, 64K cache, 1.44MB floppy drive, two serial ports, one parallel port, one mouse port $6695; Model CPU313 same as Model CPU311 except with 80MB ESDI hard disk $8495; Model CPU314 same as Model CPU311 except with 135MB ESDI hard disk $8995
ACCESSORIES: 2MB RAM $1295; 4MB/16MB RAM expansion board with 4MB RAM $2595; 300MB ESDI hard drive $5195; 25-MHz math coprocessor $1395; VGA adapter $599; 14-inch color VGA monitor $749; mouse $139; DOS 3.3 $120, DOS 4.01 $150; OS/2 1.1 $340; UNIX System V/386 3.2.2 $795
WARRANTY: one year parts and labor
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 666

NCR PC925

NCR Corp.
Customer Service Division
P.O. Box 2989
Norcross, GA 30091
800/544-3333
LIST PRICE: Model 3386-3506 with 4MB RAM, one serial port, one parallel port, 1.44MB floppy drive, disk caching software $6895; Model 3386-3558 same as Model 3386-3506 except with 100MB SCSI hard disk and controller, VGA adapter $9695; Model 3386-3568 same as Model 3386-3558 except with 327MB SCSI hard disk and controller $11,595
ACCESSORIES: 4MB RAM $2995; 4MB/8MB RAM expansion board with 4MB 32-bit RAM $3250; VGA adapter $599; 12-inch VGA monochrome monitor $255, 12-inch VGA color monitor $699, 14-inch T&SW VGA color monitor $699; 101-key keyboard $150; Microsoft serial mouse $150; 80387 25-MHz math coprocessor $1550; DOS 4.01 $150, OS/2 1.1 $340
WARRANTY: one year parts and labor
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll number, M–F 8–8
OTHER SUPPORT: none
Reader service no. 667

Toshiba T8500 Model 25

Toshiba America Information Systems, Inc.
Computer Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
800/999-4273,
714/583-3000
LIST PRICE: with 2MB RAM, 100MB hard disk, 1.44MB floppy drive, VGA adapter, two serial ports, one parallel port, one SCSI port, one external floppy drive port, DOS 4.01 $7799
ACCESSORIES: 100MB hard disk expansion kit $1999; 2MB RAM $999; external 360K floppy drive $499; OS/2 1.1 $325
WARRANTY: one year on site via TRW (within 50 road miles of service centers)
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 7–5
OTHER SUPPORT: in-house BBS, CompuServe BBS
Reader service no. 668

WYSEsystem 386 Model WY3225

Wyse Technology
3471 N. First St.
San Jose, CA 95134
800/626-3160
LIST PRICE: Model WY3225-01 with 4MB RAM, 1.2MB floppy drive, DOS 3.3 $5999; Model WY3225-150T same as WY3225-01 except with 150MB hard disk and 150MB tape drive $8599; Model WY3225-300T same as WY3225-150T except with 300MB ESDI hard disk $10,099
ACCESSORIES: 1.44MB floppy drive $179, 1.2MB floppy drive $260; 1MB RAM $349; VGA adapter $345; 12-inch color VGA monitor $669; OS/2 version 1.1 $340
WARRANTY: one year parts and labor
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 669

POWER TIP NO. 93

Smoother WordPerfect Spell Checks

Next time *WordPerfect 5.0*'s spelling checker flags a mistake for you to edit, don't select 4 (Edit) from the menu and then use the cursor keys to move to the mistake; just press <Cursor Left> or <Cursor Right> to activate the edit function. This lets you move to the error a little faster and hit <Delete> or <Insert> more easily. Then press <Enter> instead of <F7> (Exit) to search for the next error.

Judith Ann Nihei
Davis, California

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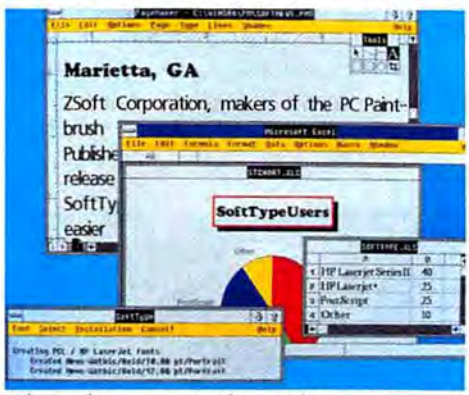

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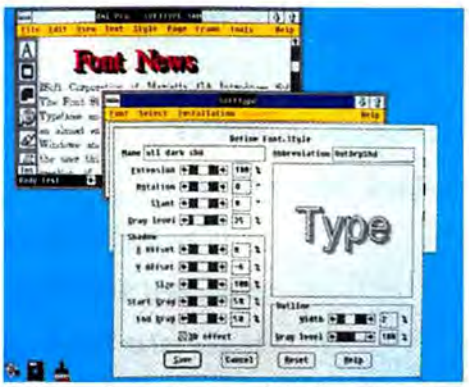

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71 Works with Ventura Publisher®

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Bauer-Bodoni Italic
Blippo Heavy
Brush-Script
Schoolbook Bold
Schoolbook Bold Italic
Schoolbook
Schoolbook Italic
Cooper Heavy
Cooper Heavy Italic
Eurostile Bold
Eurostile
Flora Bold
Flora
Frutiger Bold
Frutiger
Futura Bold
Futura
Garamond Bold
Garamond Medium
Garamond Medium Italic
Garamond
Garamond Italic
Goudy-Old-Style Bold
Goudy-Old-Style
Goudy-Old-Style Italic
Kaufmann Bold
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Mono Bold
Mono
Mono Italic
News-Gothic Bold
News-Gothic
Old Towne
Palatino
Palatino Italic
Palatino Semi-bold
Park-Avenue
Roman Bold
Roman Bold Italic
Roman Extra-bold
Roman Extra-bold Italic
Roman
Roman Italic
Sans Bold
Sans Heavy
Sans Light
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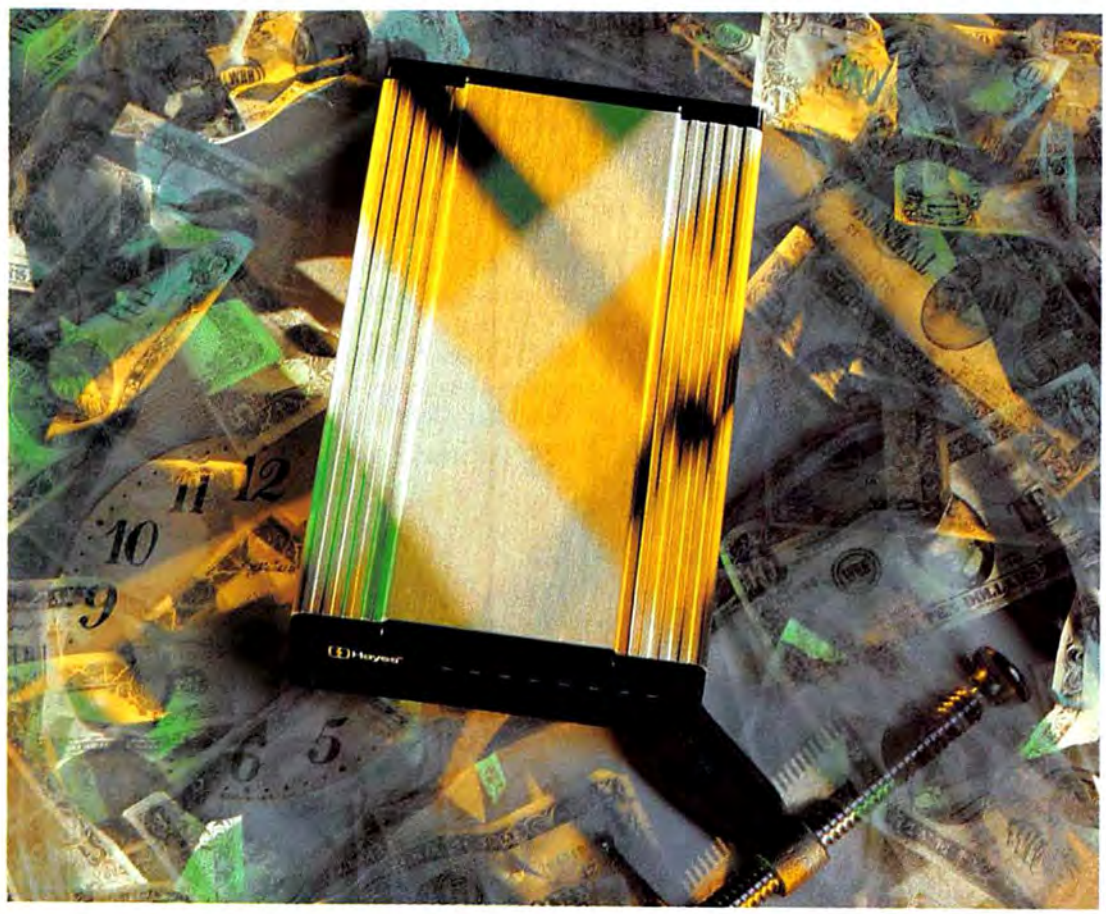
Circle 206 on reader service card

Nine MNP Modems for Corporate Communications

When your business sends files over phone lines, time is money. With twice the throughput of standard 2400-bps modems, these MNP-5 alternatives pay for themselves in a hurry.

Judy Getts



In their flight from fearsome phone bills and interminable terminal sessions, modem users have turned to file compression utilities such as ARC and PKZIP. Although great for reducing disk glut, ARC and PKZIP have their limits when it comes to communications. You must compress and decompress files manually, and you and your partner need the same utility.

Wouldn't it be nice if modems handled such details automatically? Some can—modems equipped with the Microcom Networking Protocol level 5 (MNP-5) provide much better compression than software methods. Throughput averages about 4800 bits per second (bps) compared to about 2800 bps with PKZIP. Because the modem itself handles all the courtesies of *handshaking*—sizing up its counterpart on the other end of the line—you needn't worry whether your counterpart also has MNP-5. If not, the modem automatically drops down to the highest rate possible with its partner, and it can communicate equally well at 300 bps, 1200 bps, or 2400 bps. Yet in the business world, it's increasingly likely the other modem *will* be running MNP-5.

MNP also includes superb error correction. With software-based protocols such as XMODEM or Kermit, non-MNP modems can also ensure error-free transmissions, but performance lags because some blocks of data must be retransmitted as line noise increases. In contrast, MNP-5 error correction is so efficient that it actually *improves* performance, even on noisy lines.

All nine of the external 2400-bps modems reviewed here offer MNP-5, but only the Hayes V-series Smartmodem 2400 v.42 also includes V.42/V.42bis, an error correction and data compression protocol recently adopted by the CCITT international standards-setting body. The Smartmodem wins a Best Buy based on several factors, but its V.42/V.42bis support is key—the protocol nearly triples throughput when communicating with a like modem, compared to a doubling of throughput with MNP-5. It's even slightly faster than the rarely implemented MNP-7 protocol, which builds on MNP-5.

In the coming years V.42/V.42bis will supplant, or at least rival, MNP-5. At press time, all the vendors represented here except Practical Peripherals, Ven-Tel, and Prometheus had announced they would add V.42/V.42bis this year (see the sidebar "V.42 and MNP: Peaceful Coexistence"). Multi-Tech's $25 single-chip upgrade will probably be typical, but check the upgrade cost with the vendor before you buy.

Who Needs MNP?

The 2400-bps MNP-5 modem is becoming standard issue in the corporate world, but it's not for everybody. If you need a LAN gateway or if you swap hundreds of kilobytes of data a day, a high-speed V.32 modem may be a better choice. Prices range from $1000 to $1800, and throughput from 9600 bps to 33,000 bps (see "High-Speed Modems: Files in the Fast Lane," December 1989).

In contrast, if you rarely transfer files, a non-MNP 2400-bps modem will suffice. Many BBS's support MNP, but few commercial online services do. Prices for non-MNP modems range from $100 to $300, compared to $300 to $700 for MNP-5 modems. And you can always simulate MNP-5—slowly—in software (see the sidebar "MNP on the Cheap"). Finally, if panel controls aren't important and you have a free slot in your PC, consider an internal modem. Internal models of many of these modems are available for about $100 less.

For most corporate buyers, however, an external MNP-5 modem is the answer. In a few years, 9600-bps modems may become the corporate workhorse, but for now they're overkill for most users. Compared to plain 2400-bps modems, the increased speed of these 2400-bps MNP models can save phone costs and free up your PC. And your MNP-equipped business contacts will appreciate not having to slow down.

PIERRE-YVES GOAVEC

FEATURES EVALUATION

Protocols, Not Panel Controls, Give Hayes Best Buy

Fancy front-panel controls are helpful, but hardly crucial to a smart buying decision. Witness the continuing success of the bare-bones Hayes Smartmodem, with its fast V.42bis throughput.

● Yes
○ No
◒ Deficient

	ATI 2400 etc/e	Hayes V-Series Smartmodem 2400 V.42	Mitrocom AX/2400c	Multi-Tech MultiModem 224E7	Oktel 2400 Plus	Practical Modem 2400SA MNP	Prometheus Promodem 2400G	U.S. Robotics Courier 2400e	Ven-Tel 2400 Plus II
Standard features									
Price	$299	$649	$599	$549	$549	$299	$299	$699	$499
Average speed (bps)	4551	6379 [1]	4538	5948 [2]	4598	4640	4530	4620	4541
MNP-5	●	●	●	●	●	●	●	●	●
V.42	●	●	○	●	○	○	○	○	○
V.42bis	○	●	○	○	○	○	○	○	○
Synchronous communications	●	●	●	●	●	○	○	○	●
Setup and configuration									
DIP switches	○	○	●	●	●	○	○	●	●
Software-based RAM settings	●	●	●	●	●	●	●	●	●
Maximum stored phone numbers	3	4	9	10	4	4	3	4	8
Callback security	○	○	○	●	○	○	○	○	●
Remote configuration	○	○	○	●	○	○	○	○	●
Controls									
Power switch	●	●	○	●	●	●	●	●	●
Speaker-volume knob	●	○	◒ [3]	◒ [3]	●	○	●	●	○
Synchronous switch	●	○	●	○	○	n/a	n/a	n/a	○
Speed switch	●	○	○	●	○	○	○	○	○
Voice/data switch	●	○	●	●	○	○	○	○	○
Auto-redial button	●	○	○	○	○	○	○	○	●
Status lights									
Power on	●	○	●	○	○	○	○	●	○
Off hook	○	●	●	●	●	●	●	●	●
Data terminal ready	●	●	●	○	●	●	●	●	●
Carrier detect	●	●	○	●	●	●	●	●	●
Send/receive	●	●	●	●	●	●	●	●	●
Auto-answer	●	●	○	○	●	●	●	●	●
Modem ready	●	●	○	●	●	●	●	●	●
Error correction	●	○	○	○	●	○	○	●	●

[1] Based on V.42/V.42bis tests, not MNP-5 tests.
[2] Based on MNP-7 tests, not MNP-5 tests.
[3] Must adjust with screwdriver.

Speed First

In the past, speed and Hayes compatibility almost always separated the winning modems from the losers. But today's competition is so tough that your buying decision may hinge on secondary issues such as the ease of setup and the variety of panel controls and status lights. The warranty and the cost, quality, and accessibility of technical support may also influence your choice (see the sidebar "How PC World Evaluates Service and Support" for more details).

Speed, however, comes first. In National

Software Testing Laboratories benchmarks, the same model was placed on each end of a simulated phone line mimicking average line conditions. Five types of files—text, spreadsheet, data base, TIFF (graphics), and program—were shuttled over the line using MNP-5. The same tests were then run in a simulation of various poor (but not atypical) line conditions, including high levels of static. All nine modems worked as fast on poor lines as they did on average lines.

There were scant differences between the modems in MNP-5 mode—they averaged between 4640 bps for the top-ranked Practical Peripherals to 4530 bps for the Prometheus.

When NSTL tested the Hayes and Multi-Tech with their faster protocols, the gap widened. The Hayes took top honors with a 6379-bps average score using V.42/V.42bis, and the Multi-Tech, running MNP-7, followed at 5948 bps.

Beyond raw speed, Hayes compatibility is key. NSTL checked how well each modem supports the crucial Hayes AT commands and S-registers and thoroughly tested the modems with popular communications packages. Only the Hayes and the Okidata modems were perfectly compatible with the AT command set, but most of the other programs' glitches were minor or involved niche

HOW PC WORLD EVALUATES SERVICE AND SUPPORT

Eric Brown

If you're shelling out $300-plus for a modem, you want the vendor to guarantee it will work properly. Because most of the modems reviewed rate so closely on speed and compatibility, service and support may end up determining your buying decision.

To evaluate service and support, *PC World* separately rated four categories: warranty, support cost, support accessibility, and support quality. These criteria were weighted equally and the ratings combined for the final service and support evaluation in the Executive Summaries.

To test support accessibility and quality, *PC World* called the technical support number three times—in the morning, midday, and in the afternoon. Each company was asked three questions that covered basic information about modem setup issues. The caller's *PC World* affiliation was not disclosed in any of the calls.

The specific criteria evaluated are described below.

Warranty **If a modem is defective, you'll usually find out fairly soon. Still, there are exceptions to the rule, so a long-term warranty that covers both parts and labor is an asset. A one-year warranty is considered fair, two years good, three or more years excellent. A low-cost extended warranty is also a plus.**

Support Cost **This category takes into account whether the technical support is free and whether the vendor provides a toll-free number. To earn an excellent rating, companies must provide both. The lack of a toll-free number means a fair rating at best.**

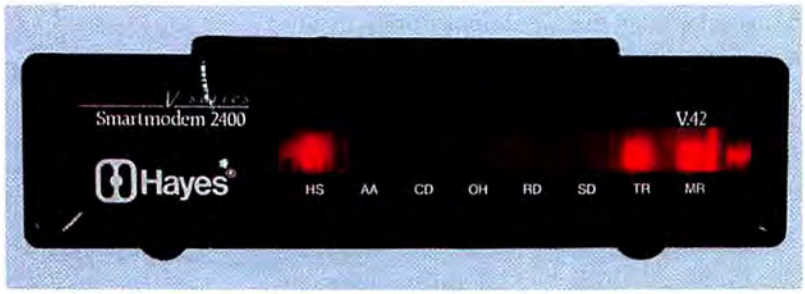
Support Accessibility **To judge the accessibility of technical support, *PC World* considered the hours the support line is open (40 hours a week is good), the number of attempts required to get through, and the time spent on hold. Extras such as a BBS and fax-based support are also factored in. A callback system, in which the technician calls the user back if lines are busy, is considered a demerit.**

Support Quality **In this category, *PC World* judged the accuracy of the answer to the three questions. Variables such as the clarity of the explanation and the courtesy and patience of the operator were also factored in.**

Generally, warranties and support costs were quite good. All but Microcom provided warranties of two years or more, no vendor charged for technical support, and roughly half the companies provided toll-free numbers. However, the accessibility and quality of the support were often disappointing. Only Hayes garnered an excellent rating on quality, and only Hayes and Practical Peripherals earned a good rating on accessibility. More typical were endless busy signals, long periods on hold, and technicians who were poorly versed in the basics of modem technology.

***Eric Brown is the senior associate editor for* PC World.**

ATI 2400 etc/e



Hayes V-Series Smartmodem 2400 V.42

Microcom AX/2400c

Multi-Tech MultiModem 224E7

Okitel 2400 Plus

applications. All the modems worked well with *Smartcom III*, *HyperAccess*, *Procomm Plus*, *Crosstalk XVI*, and *Crosstalk Mk.4*.

Most users will never need to configure a modem, but some might. If you're setting up a BBS or a micro-to-mainframe link, you may need to tinker with setup commands, and custom LAN gateway software and shaky shareware packages may send you scurrying for your manual. Luckily, most of the modems were fairly easy to set up, and all save the Microcom AX/2400c worked with popular packages without a change of setting. All the modems let you store configuration data in built-in CMOS RAM, and most provide alternative switches.

Bright Lights, Big Switches

Panel controls and indicator lights are often overrated. A good communications package will duplicate the controls and status information provided by a modem. Indicators are more important than controls. From time to time, even the best communications package will lose track of what's going on, and LED lights are handy for monitoring modes such as auto-answer and MNP or determining whether your modem is still on line. Equally desirable is an easily adjustable speaker.

All the modems include two phone jacks and, unless otherwise noted, an on/off switch and a volume control dial. Toggles for switching the data rate and other settings are usually helpful only if you lack communications software. One exception—switching a call between voice and data works better with a button than with software.

Six of the modems offer synchronous modes, useful for communicating with some mainframes; today, however, most mainframes also speak asynchronous. The Multi-Tech and Ven-Tel add security features that make them ideal as LAN gateways.

The following reviews zoom in on the details. Unless otherwise noted, each modem's speed and Hayes compatibility are rated as good.

ATI 2400 etc/e

A bargain at $299, the ATI 2400 etc/e offers a bounty of panel controls. In addition to MNP-5, it includes V.42 error correction, but

EXECUTIVE SUMMARY

ATI 2400 etc/e

2400-bps modem

The low-priced ATI includes V.42 error checking and top-notch panel controls. Only poor phone support and a few AT glitches get in the way.

	POOR	FAIR	GOOD	EXCELLENT	
Performance				●	
Hayes compatibility				●	
Setup and configuration				●	
Controls					●
Service and support			●		
Overall value				●	

Reader service no. 670

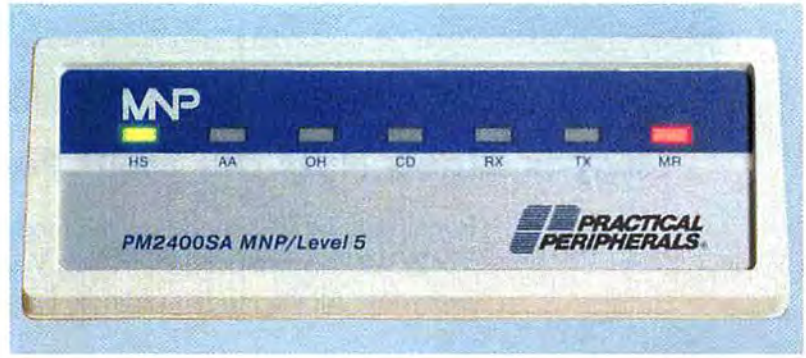
without V.42bis compression (which should be added by the time you read this), V.42 performance was the same as in MNP-5 mode. The ATI is a good value, but poor technical support keeps it from the top.

The ATI's panel controls and indicators are superb—membrane buttons let you redial, change speeds, and switch to synchronous mode. Extra LEDs signify when error correction, answer, and synchronous modes are in use.

The software-based configuration is easy enough, but a few incompatibilities with the Hayes AT command set disqualify it for PC-to-mainframe use: The unit doesn't generate a break signal upon disconnect, so a remote mainframe may not know when you log off; it also lacks the ATY1 long-space disconnect, used by mainframes to end a session.

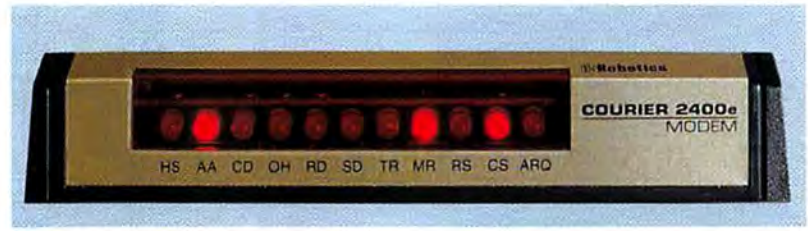
The review unit also hissed annoyingly. ATI's tech support dismissed this as harmless "resonation from the coil." Other ATI owners that *PC World* contacted reported no such problem.

In contrast with the unlimited technical support provided by the other vendors, ATI's support is available for only two years. Also, there's no toll-free number (calling Canada can add up), and you'll spend ages getting through and waiting on hold. The tech support was disappointing—one technician wrongly insisted that the modem had DIP

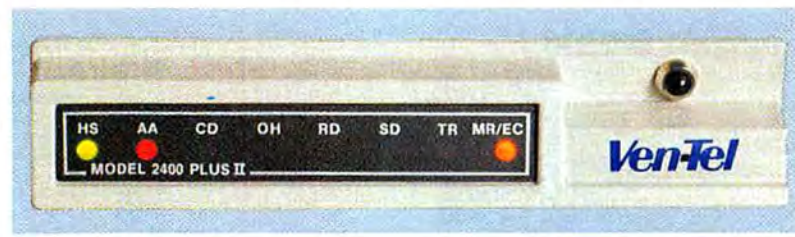


Practical Modem 2400SA MNP

Prometheus Promodem 2400G



U.S. Robotics Courier 2400e



Ven-Tel 2400 Plus II

The many faces of MNP modems. One of the advantages of having an external modem rather than an internal model is that you'll always know what's going on—even if your communications package drops the ball. In addition to the standard LED indicators provided by the Hayes Smartmodem, several modems have displays that let you know whether you're running in MNP mode. Panel controls are less important than LEDs, but voice/data and on/off switches are helpful.

PHOTOGRAPHS BY PIERRE YVES GOAVEC

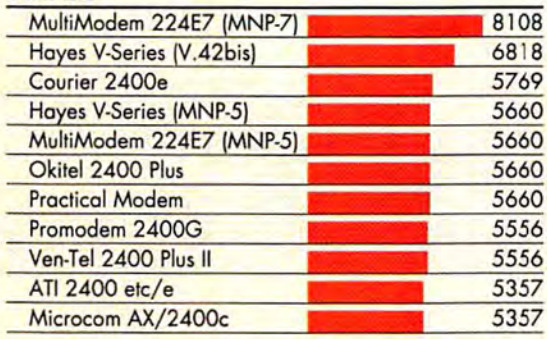
NSTL TEST REPORT

Hayes Blows Past the MNP Pack

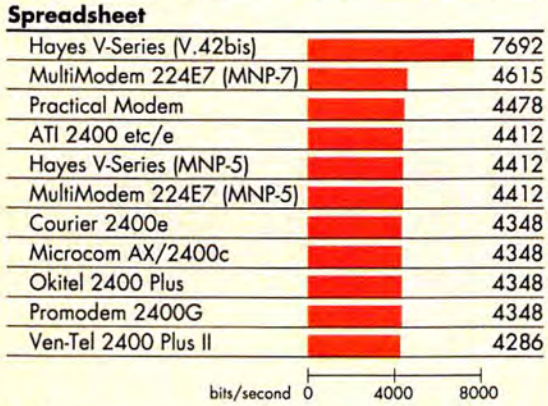
Running in MNP-5 mode, all the modems are closely bunched, but using the V.42/V.42bis protocol, the Hayes V-series runs much faster. Good news for everyone: All the modems handle line impairments perfectly.

Average Line[1]

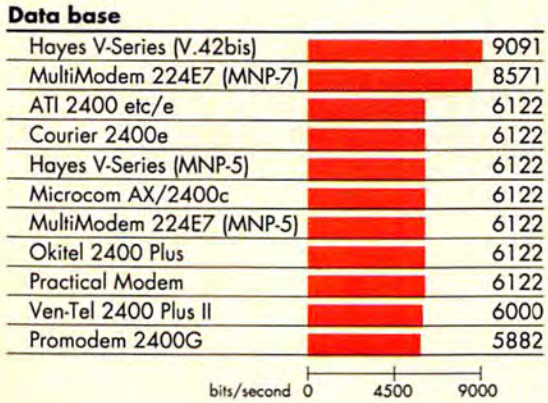
Text file



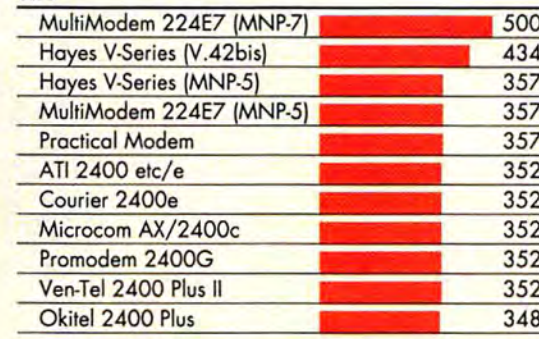
Spreadsheet



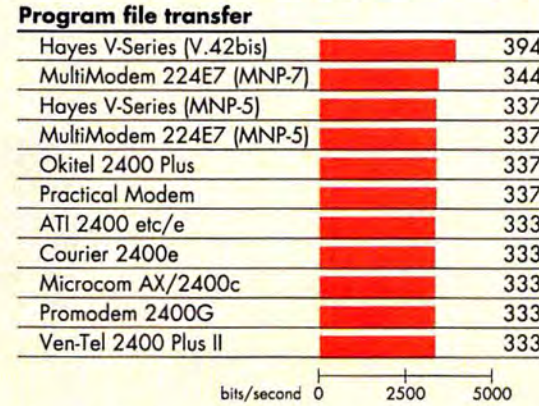
Data base



TIFF



Program file transfer



[1] Dirty Line results not shown since all modems produced results identical to the Average Line text transfer tests (see Methodology).

Methodology

These benchmarks measure the modems' throughput in bits per second (bps), using two 12-MHz Compaq Deskpro 286 Model 20s with 20MB hard disks equipped with *Crosstalk Mk.4* and YMODEM-G. Identical modems on both ends of the link exchanged 30,000-byte files. A TAS 1010 VoiceBand Channel Simulator was used to add impairments commonly found on average phone lines. Settings were based on the 1982–1983 AT&T Bell Labs *End Office Connection Study*. An ASCII file was used for the text file test. The spreadsheet benchmark used a *1-2-3* worksheet. The data base test used a *dBASE III Plus* DBF file. A TIFF (Tagged Image File Format) graphics file was used in the TIFF benchmark, and the Program test used a *Smartcom III* executable program. In the Dirty Line tests (results not shown), the TAS 1010 was set to reproduce conditions found on dirty phone lines. Modems were tested with various combinations of line impairments, including drop-off, white noise, and phase-shift jitter. This test used the same 30,000-byte ASCII file as the Average Line text file benchmark. Dirty Line throughput matched Average Line throughput on all tests.

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

switches, and another lacked knowledge of the voice/data switch.

Hayes V-Series Smartmodem 2400 V.42

Hayes is back—and with a vengeance. The modem giant lowered prices, added MNP-5 support (finally), and was the first to add V.42bis data compression. The $649 V-series is the fastest modem in the roundup when talking to a like unit, Hayes compatibility is a given, and tech support is tops. Add it up, and the V-series wins a Best Buy.

Running V.42/V.42bis, spreadsheet and data base transfers were especially swift, with the latter clocking in at 9091 bps. Also, the unit incorporates protocols used in previous V-series models, so it can link up with them at speeds well over 2400 bps.

Externally, the Smartmodem hasn't aged a day. It mimics its forebears, right down to its eight LEDs, acoustically clear speaker, and heavy metal jacket. Its only flaw is the Spartan interface. Most users won't mind the lack of fancy switches, but they'll miss a volume control knob. Nevertheless, the Smartmodem is a valuable investment in the future.

EXECUTIVE SUMMARY

Hayes V-series Smartmodem 2400 V.42

2400-bps modem

BEST BUY

The fastest modem in the roundup using the new V.42/V.42bis protocol, the Smartmodem also shuttles data with MNP-5. Solid support and V-series compatibility add up to a Best Buy.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility				●
Setup and configuration			●	
Controls	●			
Service and support			●	
Overall value				●

Reader service no. 671

EXECUTIVE SUMMARY

Microcom AX/2400c

2400-bps modem

The AX/2400c's setup woes disqualify it for most users. It's dependable, but unfriendly.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility				●
Setup and configuration		●		
Controls			●	
Service and support			●	
Overall value			●	

Reader service no. 672

Microcom AX/2400c

Microcom spawned MNP, but it no longer fields the best MNP modem. The $599 AX/2400c was the only modem reviewed that needed to be configured to work with *Procomm*, a task made stickier by dense documentation. All told, it's only a fair value.

Between the turgid manuals and confusing DIP switch procedures, working with the AX/2400c will abrade your nerves quickly. Confusingly, you configure it with a combination of DIP switches (in two different banks), software commands, and a reset button. Fortunately, Microcom's tech support is sharp.

Panel controls are lacking. The AX/2400c provides voice/data and synchronous toggles, but there's no on/off switch. You need a screwdriver to tame the speaker volume.

The AX/2400c is slow to respond to AT commands, and it lacks the ATY1 command used by mainframes. The AX/2400c's proprietary SX command mode can come in handy in some mainframe environments for configuring serial port speed.

Multi-Tech MultiModem 224E7

The MultiModem's MNP-7 compression almost rivals Hayes's V.42/V.42bis—it's slower overall, but the 8108-bps text transfers and the 5000-bps TIFF transfers are the fastest in the roundup. Like the ATI, the $549 Multi-

Hayes is back—its Smartmodem is a valuable investment in the future.

EXECUTIVE SUMMARY

Multi-Tech MultiModem 224E7

2400-bps modem

When talking to an MNP-7 modem, the MultiModem is the second fastest unit in the roundup. Its security features make it a good choice for a LAN.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility			●	
Setup and configuration			●	
Controls			●	
Service and support			●	
Overall value				●

Reader service no. 673

The Okitel's Hayes compatibility is beyond reproach, and its five-year warranty is generous.

Modem also includes V.42, and V.42bis should be available by the time you read this. In sum, the feature-rich MultiModem is an excellent buy, and its security features make it a natural as a LAN gateway.

Configuration is straightforward—you adjust two sets of bottom-mounted DIPs or configure it via software. Tech support is adequate, but you spend ages on hold. Hayes compatibility is fine except for a nonfunctional @ dial modifier, required with some PBX systems.

Controls and indicators are better than most. The LEDs include a speed indicator, but there are no auto-answer or data-terminal-ready lights. You get a voice/data toggle, but you need a screwdriver to adjust the speaker volume.

The MultiModem is well suited as a LAN gateway. Three levels of password protection screen callers, and an automatic callback feature dials up to 30 users. The modem can also be configured remotely.

Okitel 2400 Plus

The Okitel fails to capture a Best Buy as it did in *PC World*'s last 2400-bps roundup ("Smarter Modems," September 1988), but it's still a good deal. Its Hayes compatibility is beyond reproach, and the five-year warranty is generous. Okidata's poor technical support is the only sour note.

The well-designed Okitel is girded in sturdy plastic and offers easy-to-read LEDs. You set up the modem via stored AT commands and rear-mounted DIPs.

Okidata's technical support was hard to reach and fuzzy on details. One representative did not know how to configure the modem for *Crosstalk*, and another gave an incorrect answer regarding voice/data switching.

For the same $549 price as the 2400 Plus, you can buy Okidata's CLD 2400, which adds security callback features. The CLD was unavailable for review.

MNP ON THE CHEAP

It will probably be easy and inexpensive to upgrade an MNP modem to V.42, but not so a plain, non-MNP modem. Because such a modem lacks basic correction and compression circuitry, you almost always have to scrap it to move up to either protocol.

Fortunately, there's another option. MagicSoft of Lombard, Illinois, has hit pay dirt selling an MNP-5–equipped communications package called *MTE* to modem vendors, who bundle it with their MNP-deficient wares. MagicSoft also licenses its MNP module to SoftKlone Distributing, which offers it as an option to its *Mirror III* package. Anyone can buy *MTE* and dress up an old modem with MNP—you can even upgrade 1200-bps models.

Since automatic handshaking is part of MNP's basic blueprint, using software-based MNP to forge a link with an MNP modem is just as transparent as if two hardware-based–MNP modems were communicating. However, don't expect big gains in throughput. MagicSoft representatives admit that an *MTE*-equipped 2400-bps modem runs 17 percent slower than an MNP-5 modem, and others claim the difference is even greater.

Don't count on seeing V.42 software. Due to V.42's complexity, it would be tough to duplicate it in software without negating performance benefits. —*J. G.*

EXECUTIVE SUMMARY

Okitel 2400 Plus

2400-bps modem

Impeccably compatible, the Okitel also offers a five-year warranty. Poor technical support is its only drawback.

	POOR	FAIR	GOOD	EXCELLENT	
Performance				●	
Hayes compatibility					●
Setup and configuration				●	
Controls				●	
Service and support			●		
Overall value				●	

Reader service no. 674

Practical Modem 2400SA MNP

Flimsily cast and sporting a tinny speaker, the Practical Modem is a big seller among bargain hunters. Surprisingly, it turns in the fastest MNP-5 scores in the roundup. Considering the $299 price, the five-year warranty, and its stable backing (the company is owned by Hayes), the Practical Modem is indeed practical. Some users may want to make sure the company announces V.42 plans before they buy, but most will find the modem beats out the ATI as their best low-cost bet.

The Practical Modem is easy to set up with AT commands. The manual flounders in technobabble, and the company's tech support is inconsistent. Most technicians were helpful, but one was unaware of the concept of voice/data switching. Panel controls are frugal—there's a full array of LEDs but no extra switches or volume knob.

EXECUTIVE SUMMARY

Practical Modem 2400SA MNP

2400-bps modem

Despite confusing manuals and limited controls, the Practical Modem is a solid bargain. You'll get a five-year warranty and the fastest MNP-5 speed in the roundup.

	POOR	FAIR	GOOD	EXCELLENT	
Performance				●	
Hayes compatibility				●	
Setup and configuration				●	
Controls			●		
Service and support				●	
Overall value					●

Reader service no. 675

V.42 AND MNP: PEACEFUL COEXISTENCE

Why buy modems with built-in MNP or V.42 error-correction protocols when your communications package includes its own error-checking protocols? Efficiency is the key. Software protocols such as XMODEM often slow performance, but the hardware-based MNP-4 (included in MNP-5) and V.42 not only keep your data pure, they boost throughput by about 20 percent.

Compression schemes included in MNP-5 and V.42bis then squeeze the data to further increase throughput. MNP-5 can double performance, and V.42bis can triple it. Hence, V.42/V.42bis is a shoo-in to gradually displace the slower MNP.

V.42 error correction has been available from Hayes and some other vendors since it was adopted by CCITT over a year ago. But since V.42 alone is no more efficient than MNP-5, most vendors stuck with MNP. It wasn't until last fall, when V.42bis was adopted, that V.42 took off.

Fortunately, V.42 and MNP are fairly compatible. The V.42 spec requires that complying modems also add MNP-4, so MNP-5 and V.42 modems can swap error-free data. The two cannot exchange compressed data, thus limiting you to a 20 percent speed boost instead of 50 percent. In practice, however, almost all vendors who sell V.42/V.42bis modems also include MNP-5.

Finally, a word of caution: Some unscrupulous salespeople claim their MNP-5 modems are V.42 compatible when they're really not. Their rationale is that the modem's MNP error correction makes it compatible with V.42 modems at a slower data rate. —*J. G.*

U.S. Robotics' Courier 2400e smacks of good engineering.

Prometheus Promodem 2400G

Also geared toward budgeteers, the Promodem 2400G is hardly a bargain. Though performance is respectable, it's the slowest in the roundup. What's more, the Promodem can't pulse dial, it dials slowly, and it occasionally misdials. Also, there's no announced support for V.42. Even at $299, it's not worth the price.

The Promodem's panel controls are Spartan. The speaker's default setting is faint, and to adjust it, you must turn a small plastic stick, a job that requires the delicacy of a watchmaker. You configure the modem via software, but the unit often remains mulishly unresponsive to AT commands—a sign of poor Hayes compatibility. Prometheus's hard-to-reach tech support personnel sound unhappy; buy this modem and you may join them.

EXECUTIVE SUMMARY

Prometheus Promodem 2400G

2400-bps modem

Inattentiveness to AT commands, a penchant for dialing the wrong number, and other glitches make the Promodem a unit to avoid.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility	●			
Setup and configuration				●
Controls			●	
Service and support			●	
Overall value	●			

Reader service no. 676

U.S. Robotics Courier 2400e

One of the faster modems in the roundup in MNP-5 mode, the Courier 2400e smacks of good engineering. The Courier's solid compatibility, extended warranty, and easy setup are attractive, but an inflated $699 price limits it to an overall rating of "good." Fortunately, U.S. Robotics plans to add V.42/V.42bis by the time you read this.

The Courier is easy to configure—DIP settings and AT commands are mapped out on the bottom of the modem. Documentation and tech support are above average, and extra AT commands display modem settings, help screens, and a built-in clock that times your sessions. The speaker is notably clear, and there's a volume control slide. The LEDs, including speed and MNP lights, are very readable.

EXECUTIVE SUMMARY

U.S. Robotics Courier 2400e

2400-bps modem

The Courier boasts a clear speaker, reliable operation, and superb Hayes compatibility. Its one failing—it's overpriced.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility				●
Setup and configuration				●
Controls				●
Service and support				●
Overall value				●

Reader service no. 677

Ven-Tel 2400 Plus II

The $499 Ven-Tel 2400 Plus II offers a five-year warranty and good Hayes compatibility, and its security features suit it to LAN duties. There are no announced V.42 plans, and you can't adjust the speaker, but it's still a good value.

The Ven-Tel is configured via software or switches, but you must pry the metal cover off the modem to get at the DIPs. Ven-Tel's technical support staff were pleasant but lacked sufficient knowledge of modem basics, such as flow control. In addition, Ven-Tel uses an inconvenient callback system.

Panel controls are a mixed bag—extra LEDs signify modes such as speed and MNP, but the speaker is faint, and you can't adjust the volume, not even via software. The Ven-Tel's password security is on a par with the MultiModem's. You can program the modem to call back users, and you can configure it remotely.

EXECUTIVE SUMMARY

Ven-Tel 2400 Plus II

2400-bps modem

A solid contender except for its faint speaker, the Ven-Tel's robust security features recommend it for LAN use.

	POOR	FAIR	GOOD	EXCELLENT
Performance				●
Hayes compatibility				●
Setup and configuration			●	
Controls			●	
Service and support				●
Overall value				●

Reader service no. 678

On to V.42

Buying a Hayes modem has always meant buying dependability, but it's been a while since you felt you were getting the sharpest deal. Now that Hayes has dropped the price of its V-series and added MNP-5 and V.42/V.42bis, you can be satisfied on both counts.

Hayes wins the Best Buy, but some of its rivals also make a mark. For bargain hunters, the ATI and Practical Peripherals modems make sense, and the MultiModem is your best pick for network use.

As usual, the modem market is a moving target, and it will remain so over the next year as vendors add V.42/V.42bis. In the meantime, Hayes has set up the bull's-eye that other vendors will aim for. ●

Judy Getts is a contributing editor to PC World.

For more information about all products in this article, circle reader service no. 911.

WHERE TO BUY

ATI 2400 etc/e
ATI Technologies, Inc.
3761 Victoria Park Ave.
Scarborough, Ontario
M1W 3S2 Canada
416/756-0718
LIST PRICE: $299
WARRANTY: two years, parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: two years only, toll number; M, W–F 9–5:30, T 10:30–5:30
OTHER SUPPORT: none
Reader service no. 670

Hayes V-series Smartmodem 2400 V.42
Hayes Microcomputer Products, Inc.
P.O. Box 105203
Atlanta, GA 30348
404/449-8791,
404/441-1617 (sales)
LIST PRICE: $649
WARRANTY: two years parts and labor
EXTENDED WARRANTY: two more years $75
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–8
OTHER SUPPORT: company BBS, GEnie roundtable
Reader service no. 671

Microcom AX/2400c
Microcom, Inc.
500 River Ridge Dr.
Norwood, MA
02062-5028
800/822-8224
LIST PRICE: $599
WARRANTY: one year parts and labor, one-way shipping paid
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll number, M–F 8–7
OTHER SUPPORT: installation support for corporate volume buyers
Reader service no. 672

Multi-Tech Multi-Modem 224E7
Multi-Tech Systems, Inc.
2205 Woodale Dr.
Mounds View, MN
55112
800/328-9717,
612/785-3500
LIST PRICE: $549
WARRANTY: two years parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8:30–5
OTHER SUPPORT: company BBS
Reader service no. 673

Okitel 2400 Plus
Okidata
532 Fellowship Rd.
Mount Laurel, NJ 08054
800/654-3282,
609/235-2600
LIST PRICE: $549
WARRANTY: five years parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–6
OTHER SUPPORT: none
Reader service no. 674

Practical Modem 2400SA MNP
Practical Peripherals
31245 La Baya Dr.
Westlake Village, CA
91362
800/442-4774
LIST PRICE: $299
WARRANTY: five years repair and replacement
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–5
OTHER SUPPORT: CompuServe forum (GO PTIFORUM), company BBS
Reader service no. 675

Prometheus Promodem 2400G Plus
Prometheus Products, Inc.
7225 Bonita Rd.
Tigard, OR 97223
503/624-0571
LIST PRICE: $299
WARRANTY: two years parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll number, M–F 9–5
OTHER SUPPORT: company BBS
Reader service no. 676

U.S. Robotics Courier 2400e
U.S. Robotics, Inc.
8100 McCormick Blvd.
Skokie, IL 60076
800/342-5877
LIST PRICE: $699
WARRANTY: two years parts and labor
EXTENDED WARRANTY: $10.50 per year
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8:30–5
OTHER SUPPORT: company BBS
Reader service no. 677

Ven-Tel 2400 Plus II
Ven-Tel
2121 Zanker Rd.
San Jose, CA 95131
408/436-7400
LIST PRICE: $499
WARRANTY: five years parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–5
OTHER SUPPORT: 24-hour express replacement service
Reader service no. 678

Who brought Manzanita the BIG numbers?

Glenn Cousineau, Vice President of Manzanita Software Systems, tells why he holds PC WORLD "accountable" for a remarkable increase in sales of BusinessWorks, his company's powerful software package. . .

On reaching the right readers

"Our target customer is the everyday business manager who uses computers to make his job easier and his business more profitable. And if our experience says anything, it seems they all read PC WORLD.

"We're small and have to be cautious about where we spend our advertising dollars. That's why we go with the quality readership in PC WORLD."

On making a "mark" in the marketplace

"We've been in the accounting/business software industry for over 5 years and have been steadily successful throughout. Yet when the review of our product came out in PC WORLD, it was like we just hit the market all over again.

"Thanks to a single review in PC WORLD, we were catapulted into the limelight and our presence in the marketplace grew tremendously . . .almost overnight!"

On PC WORLD's performance

"I've been in marketing for over 15 years. I know what works and what doesn't. . .and PC WORLD works!"

On PC WORLD's responsiveness

"The response to the review was overwhelming—over 10 times as effective as any other review. PC WORLD was our 4th review since August 1988 and no other publication came even close to the PC WORLD response!

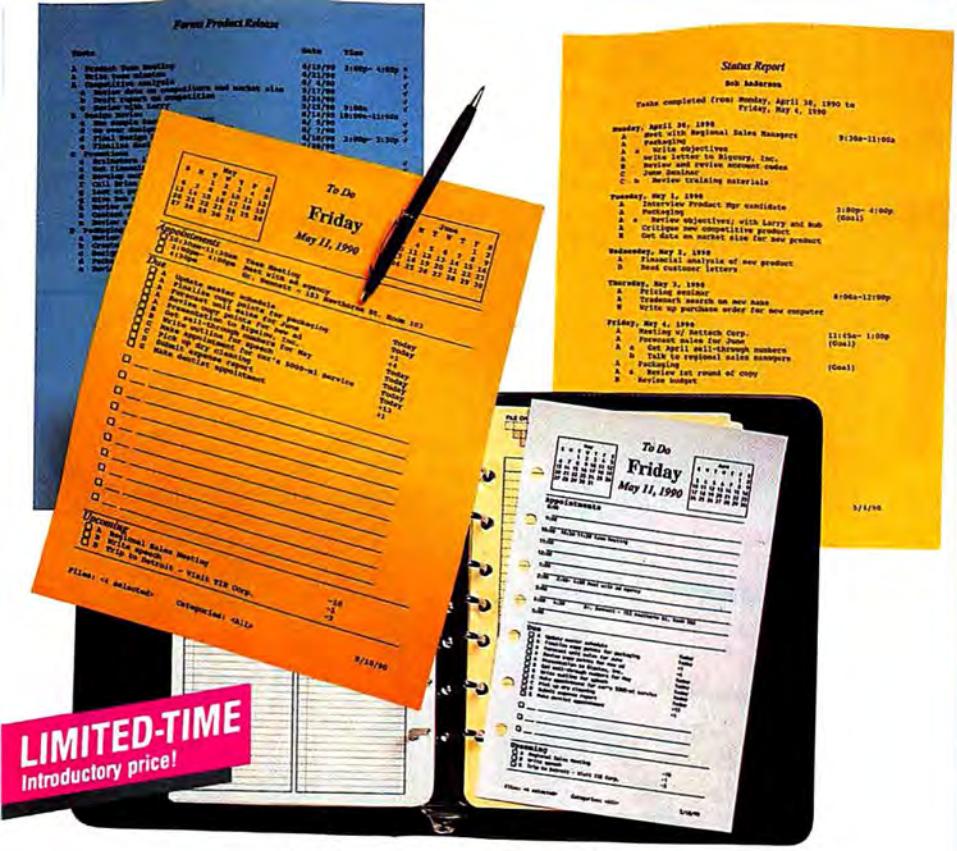
"We monitor and track all responses carefully at Manzanita. Within the first three weeks of our PC WORLD review, we received over 1000 direct telephone responses for information. What's more, the closing ratio on the calls has been very, very strong!

"When I tell my colleagues in the industry about the response, they're astonished. We've gotten over 3000 responses from a single PC WORLD review! And two months later, we're still getting calls and inquiry card returns every day."

PC WORLD WORKS

PC WORLD

Circle 900 on reader service card



Top Priority

NEW! Our clever time and task manager keeps you organized and on track.

You know how tough it can be to keep track of things to do today, tomorrow, and a month from tomorrow. At a moment's notice, priorities and events can change. Your days are filled with creating, revising, and adjusting goals, activities, projects, and the to-do lists that go with them.

Now you can make better use of your time with *Top Priority*. It helps you complete your most important business and personal activities each day by making it easy to plan and manage goals, and monitor the progress of those in your charge.

Helps you make the best use of your time

▼

Creates the task and goal lists for any project

▼

Prints to-do lists and reports in multiple sizes and formats

▼

Memory-resident option

Developed by Power Up!

You can enter activities, projects, and goals in any way that helps you work most effectively. Keep lists for business and personal activities. Or organize by project, by subordinate, or any other way you like.

Give each task a priority, description, date, and start and end time. Everything is entered in one place—quickly and easily. Top Priority merges all your lists into daily to-do lists so that large projects and goals appear as smaller, achievable tasks each day.

If you don't finish a task when expected, Top Priority carries it over to the next day's list. And it can warn you in advance of birthdays, deadlines, and other upcoming events. It also schedules recurring events automatically, so you never miss a regular meeting—or forget to change your oil.

Top Priority lets you "filter" your information by team member, calls to make, things to buy, letters to write—any category you've assigned. Review a subordinate's list by itself, or merge it with a co-worker's for a quick comparison or progress report. Add notes to any goal or task using Top Priority's handy notepad.

Top Priority can also run in memory-resident mode, where it's always at your fingertips. Add, delete, or update your lists without ever leaving the program you're in.

You also can transfer data between Top Priority and Calendar Creator Plus to create high-impact weekly and monthly calendars. And it's easy to import and export ASCII files from other programs.

Daily and weekly to-do lists, goal cards, and task completion reports print in a variety of formats and sizes—including sizes that fit your DayTimer,® Lefax,® or other organizer. Time marches on, but with Top Priority you'll always be a step ahead.

Top Priority

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	2004B	2004A	~~$99.95~~

SPECIAL INTRODUCTORY PRICE $79.95

Requires 384K of memory.

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Easy-to-use software that makes life simpler and more productive

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Unrivaled service: most orders ship within 24 hours

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Power Up!®

SOFTWARE

FROM THE PRESIDENT

Making It New

A good software product is in many ways a dynamic, living thing—one that changes and grows and gets better as people work with it.

When we introduced Calendar Creator, a whole new product concept was born. For the first time, people could automate their paper calendars and turn them into truly powerful time-management tools.

As the product matured, we enhanced its database features, gave it better fonts, and it became Calendar Creator Plus.

Now it gives me great pleasure to introduce the latest incarnation of this nationwide bestseller: Calendar Creator Plus 3.0.

It's the best Calendar Creator yet, with new presentation-quality fonts and graphics, new output sizes, and much more. It's the product of a true collaboration between us and our customers, whose suggestions helped guide our efforts.

Together, we've created another winner. I invite you to look at the facing page, where the program's terrific new benefits will speak for themselves.

Sincerely,

Ed Lauing

LOOK FOR THIS SYMBOL

Developed by Power Up!

It's your key to high-quality programs created by our own staff of software development experts.

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Name Tag Kit

Professional-looking name tags at a do-it-yourself price!

When looks count, count on *Name Tag Kit*. It lets you make high-quality name tags faster and more easily than you can say, "Hello, my name is..." —and do it at a fraction of the cost of any other method.

Everything you need is included in the kit: easy-to-use software, 100 pin-feed peel-off tags with blue borders, and 100 pin-feed cardboard tags with 3½" by 2¼" plastic holders.

Choose from six formats provided, or design your own. The eight fonts are easy to read and they print in razor-sharp resolution—no "computer jaggies."

Set type in a variety of sizes and styles. A handy autoscaling feature ensures that each line of text fits just right.

Name Tag Kit saves valuable data-entry time. Enter your host information once, and Name Tag Kit prints it on each tag automatically. You can enter each person's name, title, company, and address into the program directly. Or if you have this data in another program, you can import it via ASCII files.

Name Tag Kit prints mailing labels for each name, too. And it also lets you search for names by any category: name, title, address, etc., and to sort your list by any category.

All-in-one solution includes software, name tags, and holders

▼

Great for businesses, clubs and organizations, schools and churches

Developed by Power Up!

The next time you need name tags in a jiffy, take out your Name Tag Kit. The results will be so impressive, they'll never know you made them yourself.

Name Tag Kit

VERSION	5.25" DISK	3.5" DISK	PRICE
Software Only	I374Y	I791Y	$79.95
Complete Kit	I373Y	I775Y	~~$99.95~~

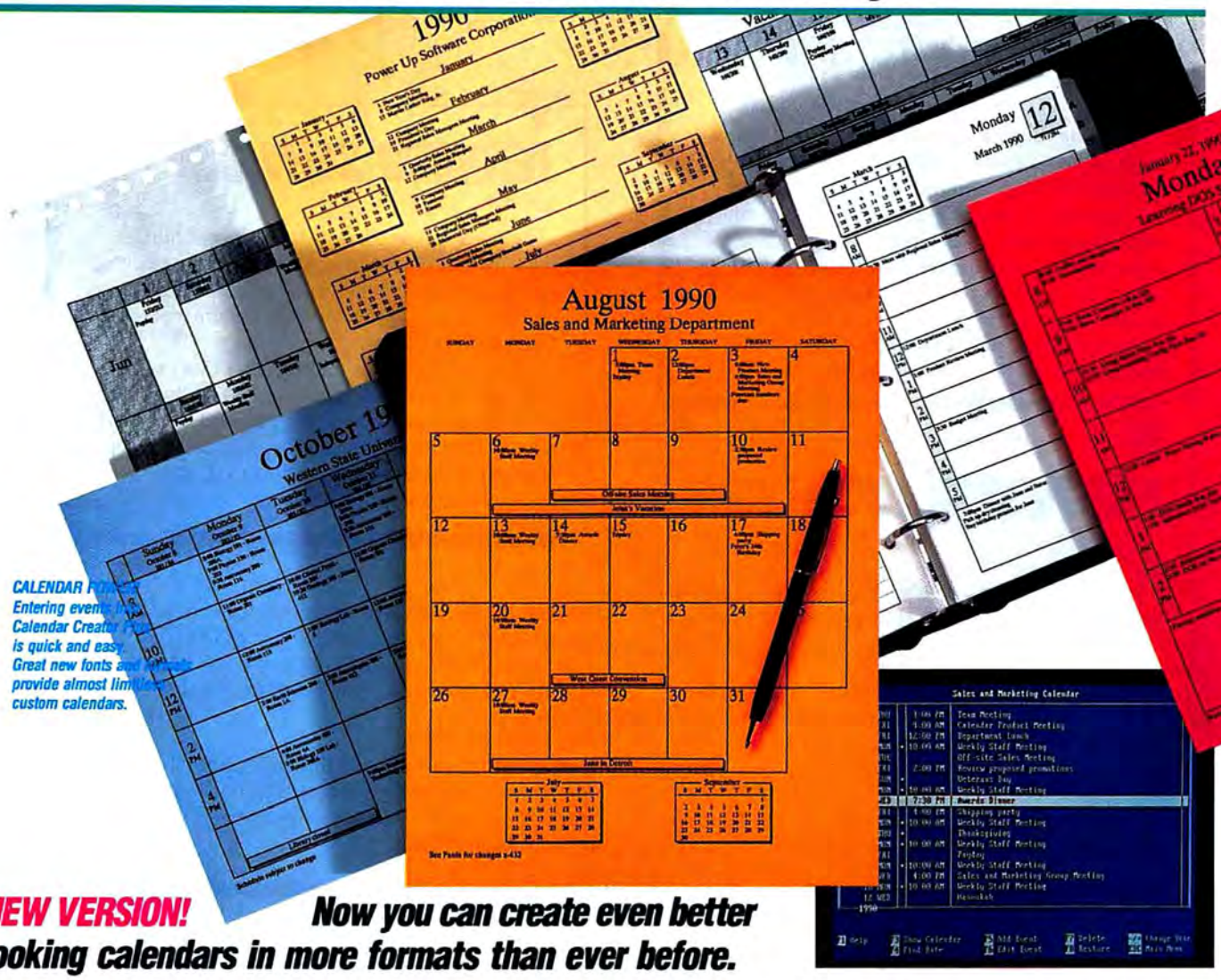
SPECIAL: Save $10! $89.95

Complete Kit includes software, 100 pin-feed peel-off name tags, 100 pin-feed cardboard name tags, 100 3½" x 2¼" plastic holders. Software requires 384K of memory. Supports IBM Graphics, Proprinter, Color Printer; Epson (all models); Okidata 92 or 93 (with Plug n' Play), 182, 192, 193, 292, 293; C. Itoh Prowriter; HP LaserJet Plus, Series II; Dataproducts 8050; NEC P5, 8023; Toshiba P351. No graphics card required.

Name Tag Supplies

ITEM	QTY.	ITEM #	PRICE
Cardboard tags with plastic holders			
Pin-feed	100	I2750	$21.95
Laser	100	I2760	$21.95
Cardboard tags without plastic holders			
Pin-feed	250	I3970	$9.95
Laser	250	I3980	$9.95
Peel-off tags with blue borders			
Pin-feed	250	I2770	$9.95
Laser	250	I2780	$9.95
Color laser cardboard tags			
Blue	250	M0950	$11.95
Green	250	M0960	$11.95
Yellow	250	M0970	$11.95

Calendar Creator Plus 3.0



CALENDAR POWER: Entering events in Calendar Creator Plus is quick and easy. Great new fonts and formats provide almost limitless custom calendars.

NEW VERSION! Now you can create even better looking calendars in more formats than ever before.

Calendar Creator Plus 3.0 makes it easy to keep all kinds of calendars neat, accurate, and up-to-date. Whether it's appointments, schedules, deadlines, holidays, paydays, or anything else—this is the only program on the market with the power and flexibility to handle it all.

No matter if it's a managers' meeting each Monday at noon, or choir practice every third Wednesday, Calendar Creator Plus lets you enter any unique, recurring, or "floating" event (recurring events without specific dates). And you can create exceptions to floating events—the Monday of Memorial Day when the managers don't meet, for example.

A unique calendar overlay system lets you create separate event files for yourself and for each person, project, or schedule you deal with. To print a calendar, choose one or more event lists, including as many events as you like. Data is merged from multiple files and printed in your choice of dozens of calendar formats.

NEW presentation-quality fonts
▼
NEW multi-day event display
▼
NEW sizes for portable organizers
▼
Multiple printing and sorting options

Developed by Power Up!

Version 3.0 adds 300-dpi laser fonts, and improved dot-matrix fonts, plus drop-shadow boxes that highlight events that extend over several days. And now it prints in even more sizes, including 5½" by 8½" and 3¾" by 6¾", so you can slip your custom calendars into your DayTimer®, Lefax®, or other organizer. We've also added a new printed manual that makes using the program even easier than ever.

Print your calendars upright or sideways in a variety of styles: Daily, Two-Day, Weekly, Two-Week, Monthly, Six-Week, Quarterly, Six-Month, and Annual. Annual calendars can begin with any month—ideal for fiscal and school year calendars.

The program counts birthdays and anniversaries, and it can show you how many days are left in the year—and how many have passed. It handles 12-hour and 24-hour time notations. And if your week begins on Tuesday, you can start your calendar on Tuesday—or any other day.

With all this new power, now is the time to discover Calendar Creator Plus.

Calendar Creator Plus 3.0

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	2002B	2002A	$59.95
Calendar Creator/MACINTOSH		R002Y	$59.95

Macintosh features differ slightly: call Product Support for details. IBM version requires 320K of memory. Supports IBM Graphics, Proprinter; Epson (all models); Okidata 84, 92, 93, 182, 192, 193, 292, Laserline; C. Itoh Prowriter; HP DeskJet, PaintJet, Laserjet Plus, Series II; IDS 460, 560, Prism; Dataproducts 8050; NEC 8023; Toshiba P321, P351; Apple ImageWriter; no graphics card required.

UPGRADES: Send your original disk and $25 to Power Up Calendar Creator Plus Upgrade, 2929 Campus Drive, San Mateo, CA 94403.

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The result? A unique collection that helps you discover new uses for your personal computer.

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We Make It Easy For You.

At Power Up, we know that buying and using software can be difficult and confusing. It's often hard to get enough information to make a wise choice. And once you buy, you often can't return a purchase when it fails to satisfy.

Call us, and discover the difference that true dedication to customer service can make. Our order-takers are polite and informed. Our product-support reps are the envy of the industry. And our warehouse consistently ships—by ultra-reliable UPS and Federal Express—within 48 hours of receipt.

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If you're not satisfied with a product, return it within 30 days for a product refund or exchange. (Videos not returnable.)

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Most of our software runs on IBM and compatible PC, XT, AT, 386, 486, and PS/2 computers with just 256K of memory and DOS 2.0 or later. Additional requirements, if any, are listed by individual product.

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Please give us your name and address.

Name

Company

Street Address (Sorry, we cannot ship to P.O. boxes.)

City State Zip

Daytime phone (in case we have a question; required for credit cards)

Tell us how you'd like to pay.

☐ Personal check enclosed
☐ Please charge my credit card:
☐ VISA ☐ MasterCard ☐ American Express

Card Number ___/___ Expires

Print Name on Card Signature

Tell us what you'd like to have.

Qty.	Item No.	Title	Amount
		SUBTOTAL	
		TAX Residents of CA, MA, NY, PA, WA: applicable sales tax	
		SHIPPING AND HANDLING ☐ Surface UPS: $4.95 ☐ Federal Express 2-Day: $7.95	
		TOTAL	

Mail to: Power Up!
Power Up
P.O. Box 7600 San Mateo, CA 94403-7600

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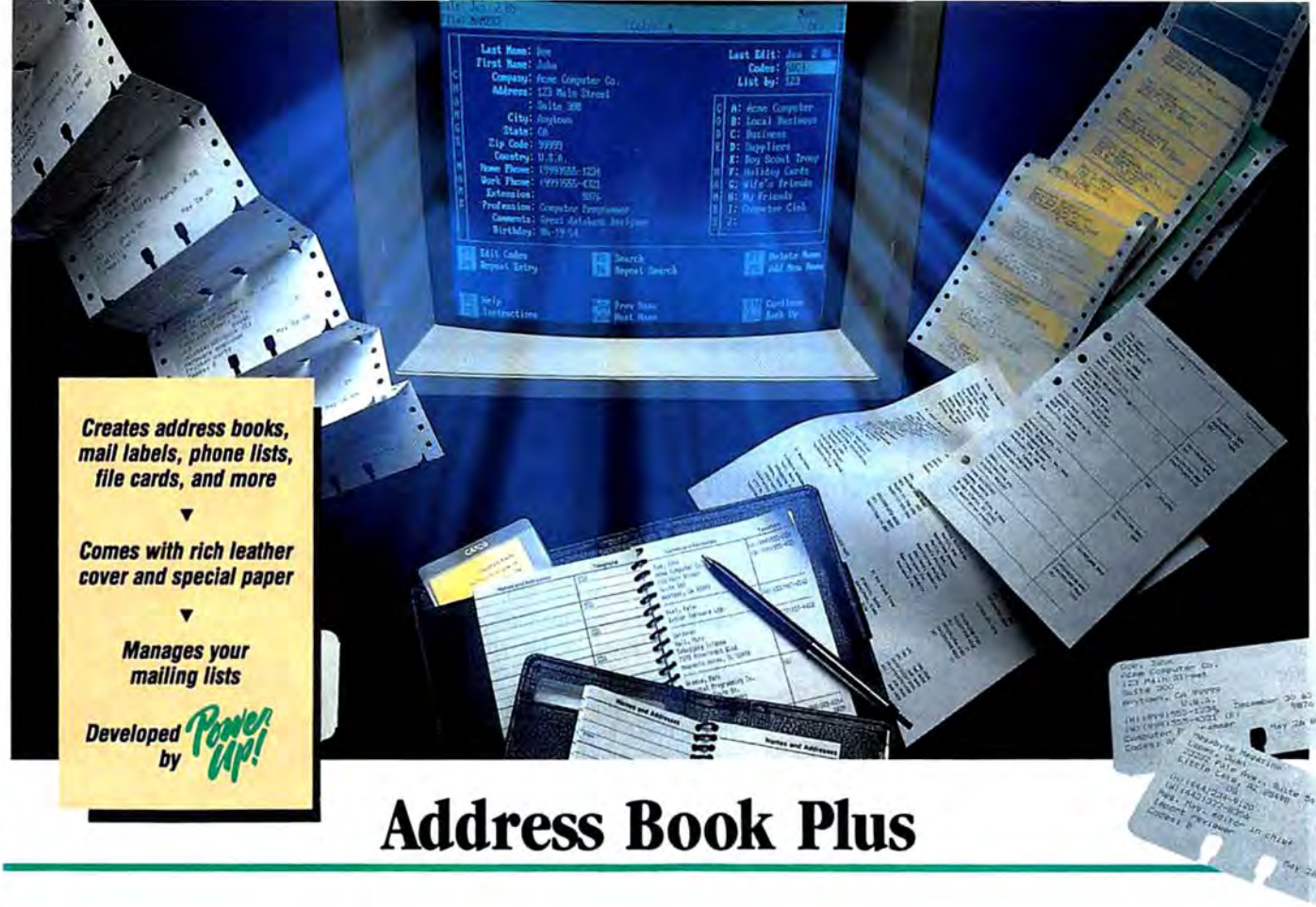
Prices good through June 29, 1990



Creates address books, mail labels, phone lists, file cards, and more

▼

Comes with rich leather cover and special paper

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Manages your mailing lists

Developed by Power Up!

Address Book Plus

Address Book Plus is truly a breakthrough in personal address management. It gives you total control over your names, addresses, and phone numbers.

You can organize and produce listings to fit nearly any need: address books, phone lists, Rolodex files, mailing lists and labels—even envelopes. And for a luxurious finishing touch, *Address Book Plus* includes a black leather wallet.

The easy-to-use entry screen has ample room for each person's name, company, and a three-line address. You can add three phone numbers, a profession, your comments—even a birthday.

Sort by name, profession, date, company name, zip code, or comment line. Organize names by last name, company, or profession. A fast-search function locates text in any field. And you can use up to ten codes to organize printouts by your own categories: business contacts, friends, club members, holiday card recipients—whatever you like.

Address Book Plus handles ASCII files, so you can import lists from other programs. Each file accepts up to 1500 names and the number of files is unlimited. Print address books and phone lists in four preset sizes: Senior and Junior pocket size, Organizer size, or 8½" by 11". Or set custom dimensions and print out LeFax® DayTimers,® or any other size you like.

Both the Junior and Senior editions come with a handsome DayTimers black leather wallet, 100 sheets of punched, preprinted pin-feed paper, 100 rotary-file cards, 200 pin-feed mailing labels, three spiral bindings, and a pen.

"For my money, it's the software of choice . . . fast, with a lickety-split versatility . . . . engineered by [people] thoroughly alert to the old snafus of personalized databases. Its businesslike ease of operation will make a believer of you . . . . This elegant thoroughbred does not disappoint."

—Compute! Magazine

If you have Action Planner or another organizer, order our software and paper to create special address books or handle your mailing list. Order extra wallets and pages so you have books wherever you need them—for home, office, and briefcase.

Organize all your names and numbers with the all-in-one solution: *Address Book Plus!*

Address Book Plus

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM Senior	2124B	2124A	$119.95
IBM Junior	2125B	2125A	$99.95
IBM Software only	1126Y	1701Y	$69.95
Macintosh Senior		8000A	$129.95
Macintosh Software Only		8002A	$79.95

Address Book Plus Supplies

ITEM	SZ./QTY	ITEM #	PRICE
Senior Leather Wallet	4.25"x 7"	10730	$24.95
Junior Leather Wallet	3.5" x 5.5"	10690	$19.95
Sr. Pin-Feed Paper	100 pp.	10740	$11.95
Sr. Laser Paper	200 pp.	10940	$13.95
Jr. Pin-Feed Paper	100 pp.	10910	$9.95
Jr. Laser Paper	200 pp.	10930	$12.95
Organizer Pin-Feed Paper	100 pp.	10920	$13.95
Organizer Laser Paper	100 pp.	10950	$17.95
1000 Rotary Cards	2 3/32"x4"	M1800	$12.95

Macintosh features differ slightly: call Product Support for details. For IBM and compatibles only. Pocket address books require condensed-character printing (15-17 characters per inch—see your printer manual). Total entries per file depend on available memory (RAM): approximately 300 names for 256K, 1500 for 640K machines. Paper sizes: Sr.—3 3/8" by 6"; Jr.—2.5" by 4.5"; Organizer—5.5" by 8.5" (fits Action Planner, DayTimers, etc.). Sr. and Jr. paper refills include three spiral bindings with cardboard covers.

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In California, 1-800-223-1479
7 AM - 5 PM Pacific Time, M-F

Desktop Publishing

Express Publisher

NEW! Now you can get professional-quality desktop publishing in an easy, affordable package. Express Publisher sets a new standard of quality and value.

Finally: professional-quality desktop publishing that's easy and affordable! *Express Publisher's* state-of-the-art features make it technically advanced, yet simple to use. Here's what you get.

Laser-sharp text and art: full 300-dpi on lasers, and near-laser quality on dot-matrix printers.

Scalable outline fonts: an exclusive feature that lets you set type styles and sizes *as you work.* Other programs force you to pick your fonts separately, before you can see what looks good on the page.

Advanced page-layout features: linked text frames with auto-flow and auto-wrap of text around irregular graphics. With Express Publisher, you can begin a story on one page and continue at any place on another page. Your text flows automatically between linked blocks of text whenever you change the size or shape of one of the linked blocks. And Express Publisher imports your word processing files with style attributes intact.*

All type is instantly adjustable as you work—from 6 to 144 points—without time-consuming font downloading. Our fonts provide the highest resolution your printer can deliver—up to a full 300 dots per inch on lasers. CG Times and CG Triumvirate® fonts, from AGFA Compugraphic,® are provided with the program, and additional Express Fonts are available, too.

Advanced technology that's easy to learn and use

▼

Laser-sharp, 300-dpi type and graphics

▼

Compugraphic® fonts with on-the-fly scaling

▼

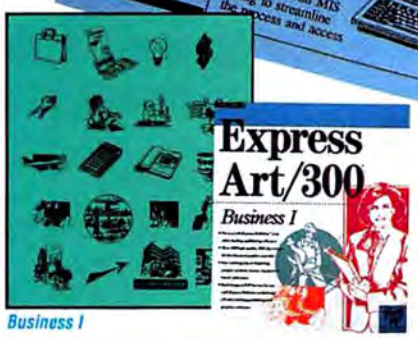
Linked text blocks with auto-flow

Developed by Power Up!

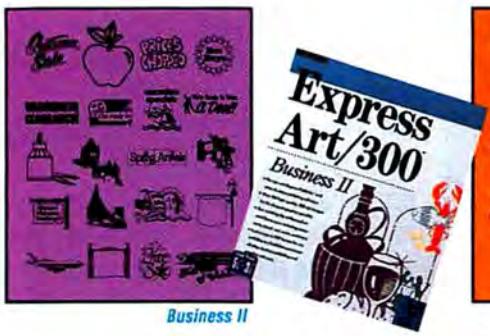
You also get automatic hyphenation, kerning, and tracking. There's a search-and-replace function for fast, efficient editing, plus drawing tools for boxes, lines, circles, and other design elements. Learn-by-example style sheets make formatting your text quick and easy.

Professional, 150-dpi and 300-dpi clip-art images are included with the program, and specialized Express Art/300 portfolios are available, too. All images print with extra-fine detail and subtlety, unlike the jagged, 72-dpi art typical of other programs. And Express Publisher handles art in virtually any file format.**

If you've been looking for an easy, inexpensive page layout program with truly professional output, look no further. Express Publisher is the new standard by which others will be judged.



Business I



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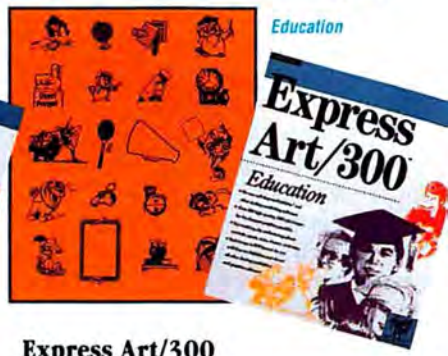

Education

Special Occasions

Express Publisher

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	2440B	2440A	$149.95

SPECIAL UPGRADE OFFER!

Owners of First Publisher, Finesse, Publish It, Springboard Publisher, GEM Desktop Publisher, Byline, and Pages: Send us the title page of your manual and pay just $4.95 for Express Publisher!

Offer applies to mail-order only and expires 3/31/90; please pay only by check, and include $4.95 for shipping and handling. Requires 640K RAM; DOS 3.0 or later; hard disk; CGA, EGA, VGA, or Hercules graphics card; IBM, Microsoft, or compatible mouse. Supports most dot matrix, inkjet, and laser printers from Epson, Panasonic, Hewlett Packard, NEC—plus most PostScript printers. *Accepts files from MS Word, MS Works, WordPerfect, Wordstar, Wordstar 2000—plus DCA and ASCII files. **Accepts graphics in TIFF, PCX, IMG, GIF, MAC, ART, NAM, and EPS formats.

Express Art/300

ITEM	5.25"	3.5"	PRICE
Business I	2446B	2446A	$59.95
Business people, events, symbols, dingbats, equipment. Includes exclusive borders and blank mortises.			
Business II	2448B	2448A	$59.95
Restaurant, real-estate, health-care, financial images. Includes sales-oriented headings, borders, and mortises.			
Education	2450B	2450A	$59.95
School symbols, sports, clubs, activities, music, theater. Includes prom, homecoming, graduation, special borders.			
Special Occasions	2452B	2452A	$59.95
Holiday and seasonal images, mortises, and borders. Includes birthdays, weddings, parties, musical events.			

Express Art/300 images are at 300-dpi, bit-map, TIFF format.

Breakthrough!

Classic

Flair

Stylist

Express Fonts

ITEM	5.25"	3.5"	PRICE
Classic	2442B	2442A	$59.95
CG Palacio™ and CG Triumvirate™ Condensed fonts.			
Flair	2454B	2454A	$59.95
Park Avenue and Brush fonts.			
Stylist	2444B	2444A	$59.95
CG Century Schoolbook™ and CG Omega™ fonts.			

Express Fonts from AGFA Compugraphic are scalable, 6 to 144 points in one-point increments; bold, italic, bold italic, and other enhancements for each font are created in Express Publisher.

The Complete Scanners

Half page scanner

NEW OCR SOFTWARE!

The Complete Half-Page Scanner/400

The Complete Half-Page Scanner/400 scans subjects 4.1" wide to 14" long at 200, 300, or 400 dots per inch. It's great for drawings, photos, and graphics. And its sleek, space-age housing is a pleasure to behold and use.

You also get SmartScan software for resizing, scaling 10-200%, rotating, cropping, and editing pictures to fit your layout. SmartScan lets you place multiple images on a page, and it saves your work in all major graphics-file formats.

If you need an economical, versatile scanner choose The Complete Half-Page Scanner.

Full page scanner

The Complete Page Scanner

The Complete Page Scanner scans entire pages in a single pass—text, drawings, photos, virtually anything—and prepares them for use in all major desktop publishing, word processing, and facsimile programs. And its low price is unprecedented.

Just feed in your artwork and the image appears on your screen, ready for editing or transmission. You can scan pages up to 8½" by 14" at your choice of 200 or 300 dots per inch resolution. The included SmartScan software (see above) provides broad editing capabilities.

Compact, flexible, easy to use, and priced at less than half the cost of other full-page scanners, The Complete Full-Page Scanner is a real breakthrough.

NEW! CAT Reader OCR Software

At last, the answer to a scanner owner's dream: text recognition software that can read in printed text for use in word processors, spreadsheets, desktop publishers, and more.

Together with your scanner, *CAT Reader Optical Character Recognition* (OCR) software converts printed documents into computer-readable files. Instead of hours of rekeying, you simply pass the scanner over the text.

With built-in dictionaries for popular typefaces, you can scan text immediately. CAT Reader is also trainable and can learn new typefaces in just a few minutes. It handles both monospaced and proportional type with high accuracy and automatically eliminates simple graphics from printed text. If you've wished for an easy way to get the printed word into your computer, here it is.

The Complete Scanners

MODEL	5.25" DISK	3.5" DISK	PRICE
Half-Page Scanner/400	H4062	H6801	$299.00
Full-Page Scanner	H3942	H6751	$899.00
CAT Reader Half-Page	H0772	H0771	$295.00
CAT Reader Full-Page	H0782	H0781	$495.00

Scanners require 512K of memory; 640K recommended; DOS 2.1 or later; CGA, EGA, VGA, or Hercules graphics card; hard disk; half or full slot for provided scanner interface card. 100+ laser and dot-matrix printers are supported, plus TIF, PCX, MSP, CUT, and IMG graphics file formats. CAT Reader for IBM and compatibles only; requires 640K of memory and DOS 3.1 or later.

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PC Paintbrush IV and *NEW* IV Plus

Easy high-resolution graphics

PC Paintbrush IV and *IV Plus* deliver everything you need to create, refine, and retouch images easily and precisely.

You get 256 shades of color on screen, automatic text effects, an adjustable split screen, gray-scale retouching, and much more. Special effects include blend, smudge, gradient, and repeating designs. You can capture screens, graduate colors, make 3-D and shadowed letters, edit text, and enhance your graphic images. You can rotate, tilt, shrink, expand, flip, zoom, or invert any part of any image.

Creates and edits 300-dpi graphics quickly and easily
▼
Powerful drawing, painting and positioning tools
▼
Vital partner for desktop publishing

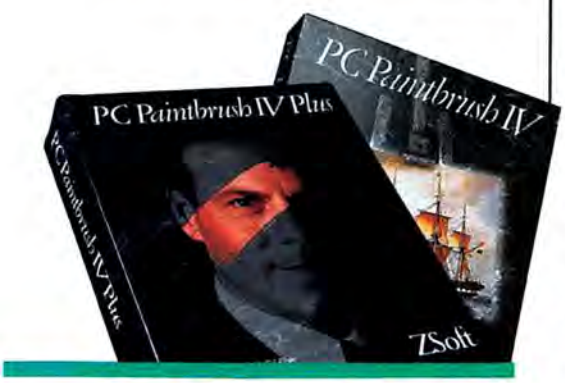
Brand new, PC Paintbrush IV Plus adds sophisticated scanner control, large-scale image support, and other powerful features. You can control your scanner from within the program. You can work with full-page images in black-and-white, gray-scale, and color. And a special prescanning feature lets you frame the precise area you want, then scan only that area at high resolution.

See for yourself why *PC World* called PC Paintbrush IV the "better choice" for real graphics power. Try one of these outstanding paint programs.

PC Paintbrush IV Plus

VERSION	5.25" DISK	3.5" DISK	PRICE
PC Paintbrush IV Plus	H0992	H0991	$149.95
PC Paintbrush IV	H4552	H4651	$99.95

Requires 640K of memory; DOS 3.1 or later; CGA, EGA, VGA, or Hercules graphics card; mouse or other drawing device.



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Try any product for 30 days.

AtlasPC

NEW! World maps at your fingertips

Nothing can beat the impact and clarity of a map when it comes to communicating geographic information. And there's no better "clip-art" source for world and U.S. map graphics than *AtlasPC*.

Designed for people who need accurate, attractive geographic illustrations for use in desktop publishing programs, AtlasPC contains over 60 publication-quality maps. It's the most complete and economical set of map graphics you can buy for your PC.

Contains over 60 maps of the world, countries and U.S. States
▼
Ideal for business presentations and desktop publishing
▼
Works with all popular paint and page layout programs

Perfect for presentations and documents, you get detailed maps of the world, world regions by country, the USA by state, and all 50 states by county.

You can use maps in outline form as provided, or customize them to display any information you want. You can enhance map files with a paint or graphics package, using its tools to add fill patterns, drop shadows, titles, text or legends. AtlasPC maps are stored in PCX file format, so they work with popular graphics, page layout, and paint programs.

If you need PC-based maps, look no further. Here is the finest collection on the market.

AtlasPC

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H2582	H8581	$79.95

Requires a graphics, presentation, or page layout program that reads PCX (paint) files.

CAT Image Enhancer

NEW! Gray-scale for hand scanners

The *CAT Image Enhancer* allows your hand scanner to output images in gray levels as if they were produced with an expensive, gray-scale desktop scanner.

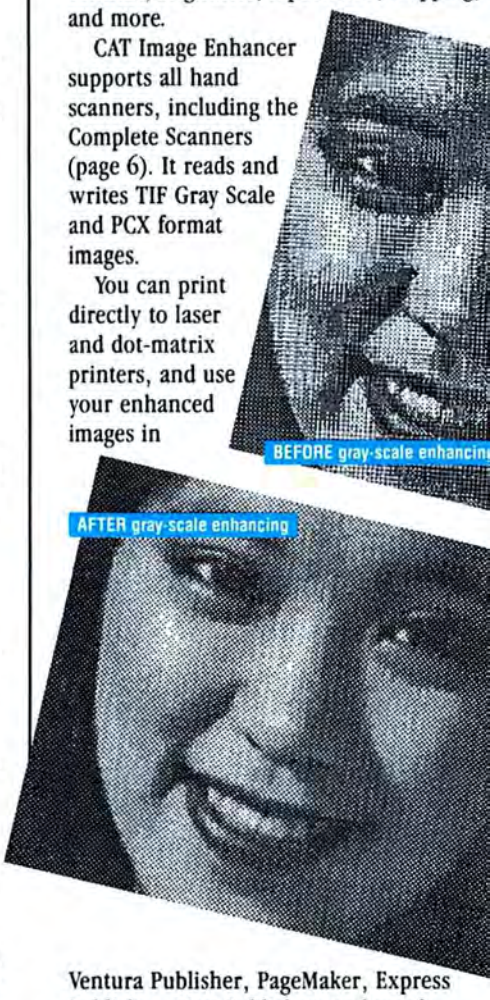
Since the images are in shades of gray, they can be scaled to any size to meet your needs—and transferred to desktop publishing software without loss of quality.

Gives hand scanners sophisticated gray-scale capacity
▼
Rivals desktop gray-scale scanners
▼
Works with popular desktop publishers

Besides enhancing photographic image quality, CAT Image Enhancer also makes your hand scanner more useful by giving you more sophisticated control over contrast, brightness, aspect ratio, cropping, and more.

CAT Image Enhancer supports all hand scanners, including the Complete Scanners (page 6). It reads and writes TIF Gray Scale and PCX format images.

You can print directly to laser and dot-matrix printers, and use your enhanced images in Ventura Publisher, PageMaker, Express Publisher, First Publisher, and word processors that take TIF and PCX files.



CAT Image Enhancer

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0762	H0761	$99.95

Requires DOS 3.1 or higher, 640K of memory, and a VGA, EGA, CGA, or Hercules graphics card. Hand scanner required.

PC-USA & PC-Globe+

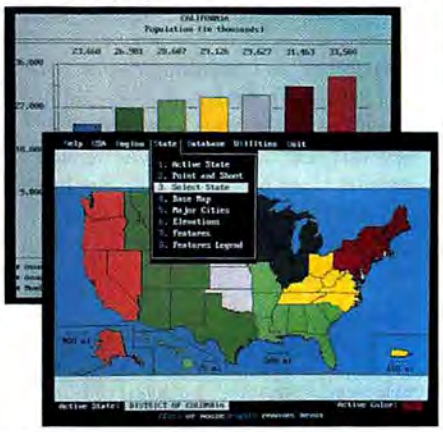
Global information in an instant

Planning a trip? Creating a marketing campaign? Or are you just curious about other places?

PC-Globe+ and *PC-USA* let you see the USA and 177 other countries as never before. They put a wealth of information right at your fingertips—facts, maps, demographics, and more. It's like having an on-board atlas right in your PC.

Comprehensive data on the U.S. and 177 countries
▼
High-quality maps and graphics
▼
Great for travelers, marketers, students, and others

PC-USA is a great source of instant data on all aspects of U.S. geography and demographics. You'll find maps of the U.S. and all 50 states, plus Puerto Rico. It shows elevations, major natural features, each state's largest cities and even zip codes.



PC-USA uses colorful bar charts and tables to provide plenty of demographic information, including educational statistics, average income, tax rates, employment and industrial statistics, electoral data, climate information, tourist attractions, and state history.

PC-Globe+ describes popular tourist attractions, plus visa and health requirements for almost 200 countries. It also calculates distances, provides telex, telephone, and ham radio codes, computes local time, and even converts currency.

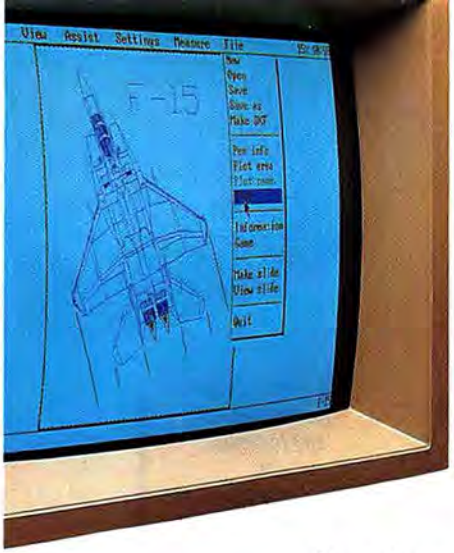
Both programs let you export their text and beautiful graphics into page layout and word processing programs for use in publications, reports, and correspondence.

Geographic Software

VERSION	5.25" DISK	3.5" DISK	PRICE
PC-Globe+	H0832	H0831	$69.95
PC-USA	H2682	H8681	$69.95
Combo Special	H4382	H6601	$119.95

COMBO SPECIAL: Order both, save $20!

For IBM and compatibles only. Requires a CGA, EGA, VGA, or Hercules graphics card, 512K of memory, additional diskette drive or a hard disk.



AutoSketch

***NEW VERSION!* Precision drawing on a budget**

Until now, getting your feet wet in computer-aided design (CAD) has meant jumping in at the deep end—with deep costs in both hardware and training.

Now there's *AutoSketch*, from the makers of AutoCAD. It gives you all major CAD features in a simple, inexpensive package.

AutoSketch is perfect for everything from quick architectural renderings and engineering prototypes to perfectly scaled plans for a new deck or room addition.

You get tools for creating basic lines, arcs, circles, boxes, polygons, curves, and text—plus scaling, mirroring, rotating, copying, and moving.

The new version includes multiple text fonts, area fills, chamfering, plus ring and bar arrays. Drawings are now automatically dimensioned and are accurate to within six decimal places. Dimensions are recalculated automatically whenever you alter an element.

Creates precise drawings, from quick sketches to accurately scaled plans
▼
True computer-aided design (CAD) at a bargain price
▼
AutoCAD compatible
▼
Powerful tools, multiple fonts

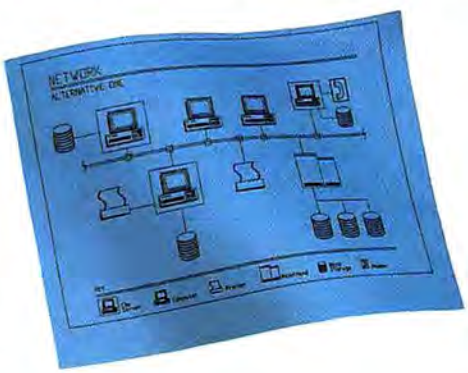
Unlike simple draw and paint programs, AutoSketch is *object-oriented*. It knows that a circle is a circle, not just a pattern of pixels. Accordingly, when you enlarge any part of a drawing the resolution *improves*; it doesn't degrade into the crude stair-stepping of less sophisticated computer graphics.

AutoSketch supports most input devices including mouse, digitizing tablet, and joystick. Output devices include most dot-matrix and laser printers—plotters, too.

AutoSketch now features two-way file exchange with AutoCAD—a great way to create preliminary designs for further development and expansion. And you can export to leading desktop publishing programs, to add really precise artwork to a newsletter or report.

AutoSketch packs tremendous power into an economical package. If you've been looking for a quality introduction to the world of computer-aided design, look no further.

"AutoSketch is a solid tool that's both easy to learn and use, and it creates quality work."
—Glenn Hart, PC Magazine



AutoSketch

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I231Y	I901Y	$149.95

Requires 512K of memory and an IBM VGA, MCGA, EGA, CGA, or Hercules graphics card. Supports IBM Graphics, Proprinter; Epson MX, FX, RX; Okidata 84 and up; TI 850, 855, 860, 865; HP laser printers. Supports HP and compatible plotters. Microsoft/compatible mouse, Koala Pad, or joystick strongly recommended. UPGRADES: Contact the manufacturer listed in the manual.

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Order any time, day or night.
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Builds a solid foundation for any business

▼

Produces a complete professional document

▼

Provides powerful Lotus worksheets

Developed by Power Up!

Business Plan

Create a winning business plan

Every business needs a thoughtful plan to ensure stable growth, higher profits, and even survival in today's competitive markets. Running a business without a plan is like navigating a ship without a compass. It's a sure course for disaster.

Business Plan is the compass all navigators need. It guides you step-by-step as you produce professional plans for your choice of manufacturing, service, retail, or distribution-related businesses.

Business Plan is equally useful for new and existing businesses. You'll learn to clarify your goals, identify your strengths, evaluate your markets, create solid management teams, assess capital needs, and develop winning strategies.

You'll also learn how to interest others in your venture—vital for acquiring investors and top-quality employees. You'll learn planning techniques and strategies and how to obtain outside financing.

Business Plan includes a comprehensive ring-bound manual written by two expert planners in the business development field. As consultants, they've helped scores of businesses chart a path for stable growth and longevity.

You also get a data disk loaded with powerful Lotus worksheets that perform essential financial analysis and graphing. New this year, the Stand-Alone Version includes spreadsheets and a built-in word processor so you can work with your business plan without using Lotus.

You get balance sheets, cash flow analysis, income statements, market size and penetration analysis, sales projections, and financial ratios. The worksheets are great time savers, since you don't have to "reinvent the wheel" to prepare standard "financials."

"Your office-related software programs are the best anyone could ask for—bar none!"

—B.C.F., Nordland, Washington

You can't undo the past or change the present, but you can plan for the future. Our Business Plan package has helped thousands of businesses take charge of their destinies. Have a look. We think you'll agree: it can do it for you, too.

Business Plan

VERSION	5.25" DISK	3.5" DISK	PRICE
Standard	I287Y	I787Y	$79.95
Stand-Alone	H0802	H0801	$79.95

For IBM and compatibles only. Both versions include workbook and binder. Regular Version requires Lotus 1-2-3 or compatible software. Stand-Alone Version includes spreadsheet software and does not require Lotus.

Personnel Policy

Create your own company policy manual

Personnel Policy quickly creates employee and company policies that would otherwise take months of research and writing. It thoroughly covers employee-employer laws and helps create thoughtful, workable policies for your company.

Written by a personnel expert and a corporate attorney, Personnel Policy offers comprehensive expertise in straightforward language. Each of its more than 40 policies contains a clear summary of purpose, related laws and regulations, alternatives, and pitfalls to avoid.

Reduces research and writing time

▼

Over 40 policies you can customize

▼

Includes valuable legal advice

Developed by Power Up!

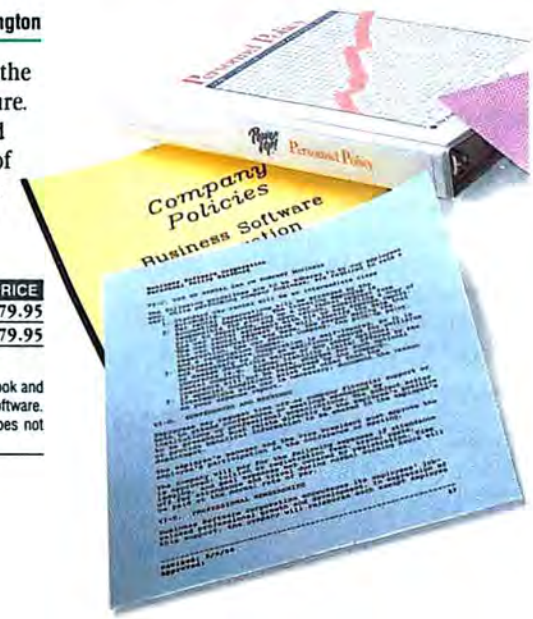
Subjects include compensation, employment policy, benefits, expenses, and policies for tricky areas such as smoking, substance abuse, sexual harassment, and equal opportunity.

A data disk provides all policies in ASCII format, ready for your word processor. New this year, the Stand-Alone Version includes word processing software in case you don't have a word processor. Just load the text you want and tailor it to fit your company.

Personnel Policy

SYSTEM	5.25" DISK	3.5" DISK	PRICE
Standard	I137Y	I737Y	$69.95
Stand-Alone	H0812	H0811	$79.95

For IBM and compatibles only. Both versions include workbook and binder. Regular Version requires a word processor. Stand-Alone Version includes word processing capability and does not require additional software.



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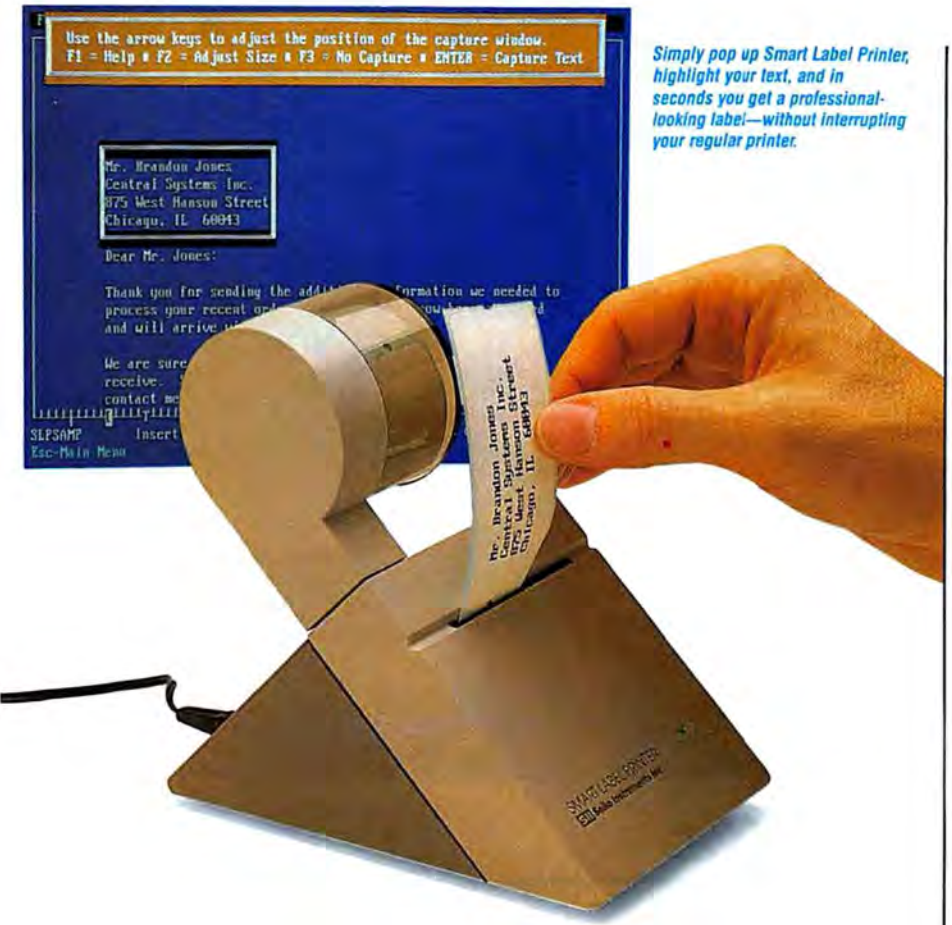
Try any product for 30 days.



Simply pop up Smart Label Printer, highlight your text, and in seconds you get a professional-looking label—without interrupting your regular printer.

Smart Label Printer

NEW! Personal label printer from Seiko

Printing small labels can be a real challenge. Rather than face the troublesome, time-consuming task of inserting single labels into your printer (vainly hoping they'll print accurately), you end up filling them out by hand or resorting to a typewriter to do the job.

Now there's a smarter, more convenient way to get the job done. *Smart Label Printer* is Seiko's clever new thermal printer that fills out labels one at a time for dozens of uses. It's so lightweight and compact, you can use it at home and in the office.

Prints high-quality labels one at a time, as you need them
▼
For use with all applications—word processors, databases, spreadsheets, and more
▼
Simple, silent, and speedy
▼
Works side-by-side with your existing printer

At the touch of a button, Smart Label Printer prints just about any label you need: file folder and disk labels, mailing labels, bar code labels, video cassette labels, and more. It's especially handy when you need to produce labels in a hurry for last-minute mailings.

Setting up Smart Label Printer is easy. Simply connect it to your serial port with the cables provided, and install its easy-to-use software. A roll of labels is provided to get you started.

No matter what application you're in—word processor, database, spreadsheet—just pop up a window, highlight the text you want, and edit it if you like. Then push a button—and voila!—your label is printed...quietly and in crisp, high-contrast, near-letter-quality characters. Your regular printer operates just as before, without interruption.

Maintaining your Smart Label Printer is easy, too. Because there are no ribbons or cartridges to replace, its print is consistently sharp, no matter how many times you use it.

When you need labels, Smart Label Printer is the fast, fuss-free solution.

Smart Label Printer

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0682	H0681	$249.95

Requires an RS-232 serial port and DOS 2.1 or later.

Label Refills

ORDER NO.	PRICE
M0750	$17.95

Includes two rolls at 130 labels per roll.

Letters On-Line

800+ documents at your fingertips

Letters On-Line has helped thousands of our customers write better letters. It provides more than 800 professional letters, agreements, and other documents, covering virtually every business and personal situation. There's even a "Dear John" letter!

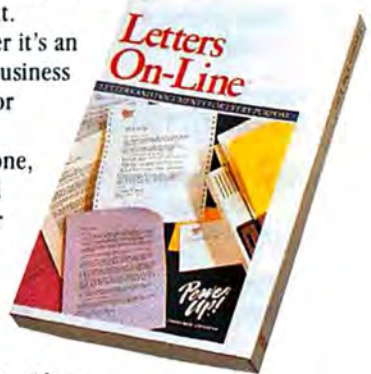
The efficient on-line index takes you straight to the document you want. You can browse quickly through all 800 by category, and by key words.

Professionally written letters, agreements, and documents
▼
Covers virtually all subjects
▼
Add your own letters
Developed by Power Up!

Categories include Accounting and Collection; Employers and Employees; General Business; Good Will and Sales; Legal Affairs (including standard "boilerplate" documents); Shipping and Ordering; Personal Affairs; Schools, Charities, and Organizations. You can add your own letters, too.

When you select a document, it's converted into an ASCII text file, ready for your word processor. And the program can also add the date, your standard salutation, or other text. Simply edit and personalize the document, save it as a new file, then print it out.

Whether it's an exacting business situation or a delicate personal one, you'll find your letter in Letters On-Line.



Letters On-Line

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I412Y	I720Y	~~$49.95~~

NEW LOW PRICE! $39.95

Requires a word processor or text editor, plus an additional diskette drive or a hard disk.

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In California, 1-800-223-1479
7 AM - 5 PM Pacific Time, M-F

ORDER BOTH
AND SAVE!

Program Director

Run programs the easy way

Program Director lets you run your hard-disk programs from a menu. It's absolutely the easiest, most convenient way to get going with your software applications.

To run a program, just type its number, press Enter, and the program appears. When you exit, the Program Director menu reappears, ready for a new selection.

Runs programs from custom menus
▼
Provides up to 16 menus for a total of 256 selections
▼
Gives access to the DOS command line whenever needed
▼
Passwords control access to your computer

Developed by Power Up!

Gone are the cryptic DOS prompt and the need to remember—then type correctly—long, complicated pathnames and commands.

Program Director gives you access to as many as 256 programs, with menus nested up to two levels deep. Three levels of optional password protection control access to programs and functions. To add a new program to a menu, just assign its start commands to a menu number. If you like, give the menu a custom title.

When you need to use DOS commands such as DIR or COPY, just send them from within The Program Director. Or better, run DOS Director—and forget about DOS almost entirely.

> ***"...the easiest of the menu programs to learn and to install."***
> **—Power User's Guide to Hard Disk Management**

The Program Director makes hard-disk use as easy and convenient as it should be. And when you combine Program Director with DOS Director, you have an unbeatable pair.

Program Director

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1233Y	1730Y	$59.95

Requires a hard disk.

SPECIAL OFFER

ITEMS	5.25" DISK	3.5" DISK	PRICE
Program & DOS Director	1026Y	1726Y	~~$109.90~~

SAVE $30! $79.90

DOS

DO

DOS Director puts a new face on DOS—to the great relief of our many happy customers. This new, "transparent" interface becomes a friendly interpreter between you and your disk operating system.

Uses single keystrokes instead of complex DOS commands
▼
Tags files for block operations
▼
Clearly shows directory structure and all files
▼
Simplifies disk organization

Developed by Power Up!

With DOS Director, single-key commands completely eliminate those aggravating letter-perfect commands DOS insists upon. And a graphic representation of your disk's directory structure lets you *see* what you're doing as you work with directories and files.

> ***"I use DOS Director every day. It keeps my files so organized, I always know where everything is."***
> **—S.F. Van Nuys, CA**

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In California, 1-800-223-1479
7 AM - 5 PM Pacific Time, M-F

Director

vithout tears!

By moving the highlight bar, it's easy to select, view, and manipulate files—even whole directories—*without ever typing a word.* You can Copy, Erase, and Rename files, Make, Remove, and Change Directories, and much more.

You can display files sorted by date/time, name, or extension. Searching by date created, you can find and erase all old files in all directories—or search by name or extension and copy dozens of common file types to archive disks.

You can print a copy of your directory tree—a handy "road map" for easy reference. You can print floppy-disk directory listings and keep them in the sleeve with the disk. You can even run other programs from within DOS Director.

With DOS Director you may never use the DOS prompt again. It gives you truly easy control of your files and your operating system.

DOS Director

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I022Y	I722Y	$49.95

NOTE: Be sure to order the correct disk format for your "A" drive.

SPECIAL OFFER

ITEMS	5.25" DISK	3.5" DISK	PRICE
DOS & Program Director	I026Y	I726Y	~~$109.90~~

SAVE $30! $79.90

The Typewriter

Makes your computer complete

As powerful as your word processor is, it's just not practical for many common typing jobs: envelopes, memos, notes, labels, short letters, and the like.

Instead of pounding them out on a typewriter, try *The Typewriter.* It can turn these (and other writings that you don't want to save in a file) over to your computer. With a daisy-wheel printer, you can even use The Typewriter to type checks and fill in preprinted forms.

Simply boot it up and type as you would on an ordinary typewriter. You see what you've typed right on the screen. Set The Typewriter to print character-by-character or line-by-line, so you can fix errors before they're printed.

Set tabs, margins and line length. And don't worry about carriage returns or word breaks: a word-wrap feature moves over-long words to the next line.

Turns your computer and printer into an electronic typewriter

▼

Prints character-by-character or line-by-line

▼

Automatic word-wrap for typing convenience

Developed by Power Up!

In short, this simple program adds a handy new capability to your computer and printer. You'll never need a typewriter again—when you're using The Typewriter.

"...it is a tribute to Power Up that I finally have someone I can believe. I have just booted up my fifth purchase from you, and it has performed exactly as you said. None of this, 'The ads giveth, and the shrink-wrap taketh away.' Just put the record in the slot, and it plays."

—W.W., Palo Alto, California

The Typewriter

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I016Y	I716Y	$39.95

Requires a printer.

Labels Unlimited

With our customers' most-asked-for features, our unique label maker creates great-looking labels of every shape and size.

Labels Unlimited has been a national bestseller from its introduction. With laser support, direct data importing, and expanded file capability, it gives you tremendous power to create all kinds of labels in standard and custom sizes.

For each series of labels, just specify dimensions and the location, size, and orientation of the lines of type. Then add text. Type fonts are bold and clear on both dot-matrix and laser printers. For each line of type, choose among five character heights, from crisp, clear, 1/8" type to bold 1/2" characters. Align text left, center, or right.

To save keystrokes, you can import data via ASCII files from word processors and databases. A "ditto" feature duplicates line entries on successive labels (it's great for a series of labels where only a line or two changes from label to label).

Automatic incrementing on any line lets you create those sequentially numbered labels you need for labeling parts boxes and shipping cartons.

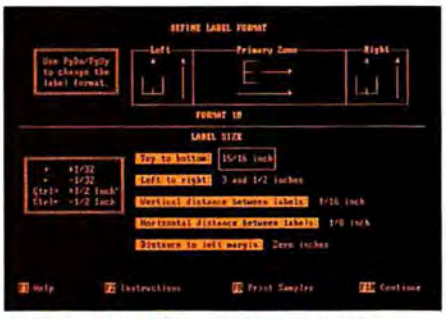
Create a library of labels, then edit and print them whenever you like. Print on tractor-feed and laser labels in standard and custom formats (see the order form for samples) or on plain paper. You can handle sizes from 3/8" by 3/8" to 11" by 13", working in 1/32" intervals.

Labels Unlimited lets you do the creative part—and leaves the tedious mechanical tasks to your computer and printer. Whatever the label, you'll make it better—with Labels Unlimited.

Labels Unlimited

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1639Y	1793Y	$64.95

Supports IBM Graphics, Proprinter, Epson (all models); HP LaserJet Series II; Okidata 84, 92, 93, 182, 192, 193, 292, C. Itoh Prowriter, IDS 460, 560, Prism; Dataproducts 8050; NEC 8023; Toshiba P321, P351. No graphics card required.



Setting up a label format is simple with this easy-to-use screen.

Once the format is set, entering data is quick and easy.

TECHNICAL QUESTIONS?

Toll-free product support 8 am - 5 pm, M-F
1-800-523-6982 (In CA, 1-800-523-6981)

Quick Schedule Plus

Our best-selling scheduler combines the visual clarity and practical advantages of Gantt charts with easy, intuitive software.

Quick Schedule Plus is the perfect alternative to expensive, hard-to-learn project-management programs. With Quick Schedule Plus, you'll set up project schedules, team assignments, flow charts—and more—the first time you run the program. Even big projects are easy.

What you see is what you get, with Quick Schedule's distinctive Gantt chart format. The visual clarity of a Gantt chart allows for easy inspection and quick comprehension of any schedule. With Quick Schedule Plus, you build schedules on-screen that instantly convey each project component, its duration, and its relationship to the total project—and then print them exactly as they appear.

Begin by entering your project name and start date, then choose the time scale that you prefer: scale by years, months, weeks, days, hours—even minutes. (There's a special zoom feature that enlarges smaller time scales for easier viewing and editing.)

Each task is entered into your schedule as a horizontal "task bar," to show its duration. Six different bar styles make it easy to distinguish between types of tasks. Quick Schedule Plus gives you the power and flexibility to create as many as 500 tasks, 400 rows, and 10 years per schedule.

There's no need to start from square one when schedule elements need to be revised. With just a keystroke, task bars can be inserted or deleted, shortened or lengthened, altered or rearranged. You can edit just the affected tasks, then adjust all or a portion of the schedule. You can also append to any task a 20-line pop-up "note card" of pertinent information.

Quick Schedule Plus is a powerful, timesaving tool for anyone who is in charge of both the big picture and the little details.

Quickly creates schedule charts on-screen, then prints what you see

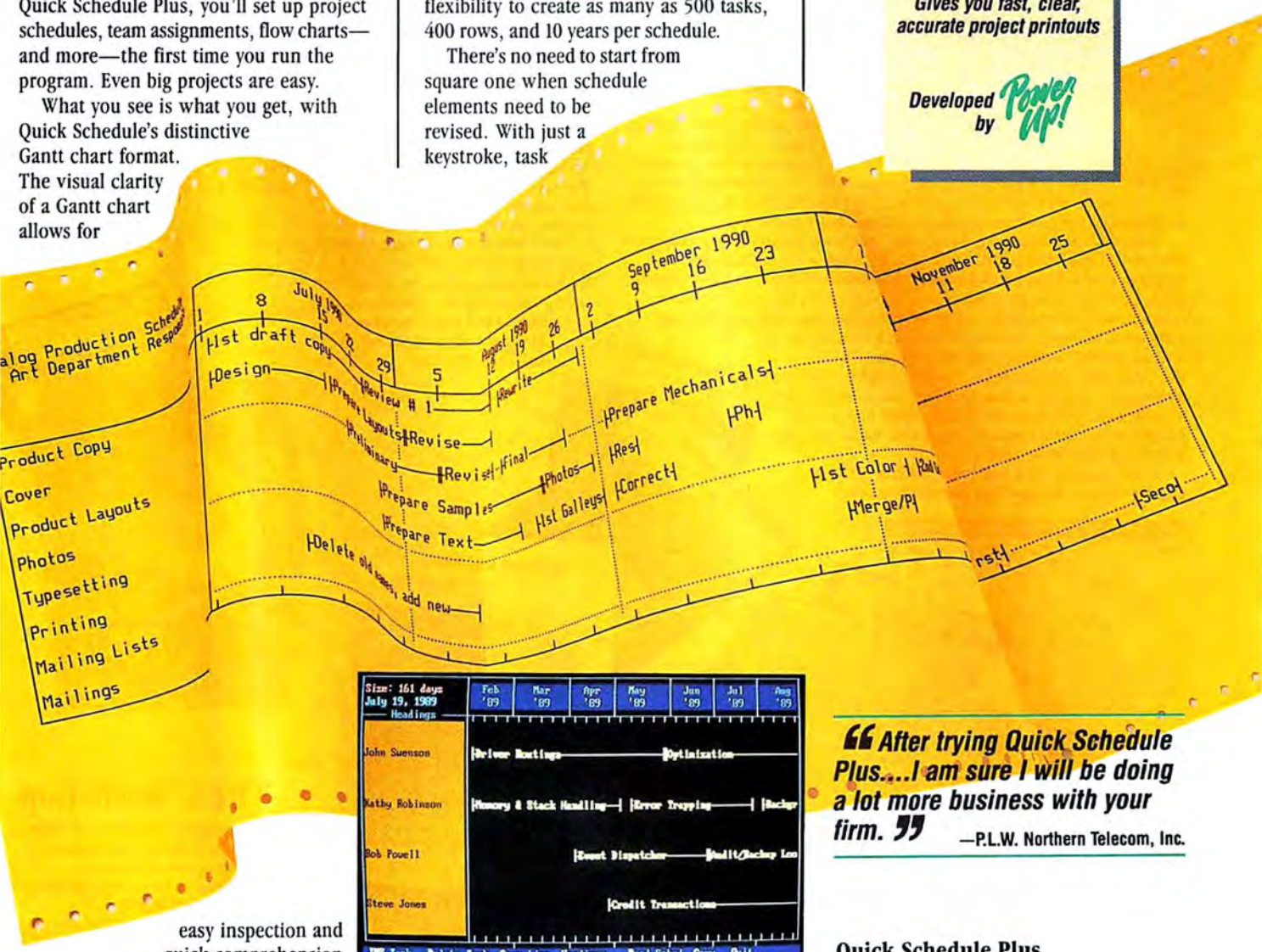
▼

Provides multiple time scales—years to minutes

▼

Gives you fast, clear, accurate project printouts

Developed by Power Up!



WHAT YOU SEE IS WHAT YOU GET—Quick Schedule's text-entry screen looks just like your printed chart. There's no guesswork, either: every command is displayed.

"After trying Quick Schedule Plus...I am sure I will be doing a lot more business with your firm." —P.L.W. Northern Telecom, Inc.

Quick Schedule Plus

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1355Y	1755Y	$84.95

Requires 384K of memory. Supports IBM Graphics, Proprinter; Epson (all models); HP LaserJet Series II; Okidata 82, 83, 84, 92, 93, 182, 192, 193, 292; C. Itoh Prowriter; IDS Prism, MicroPrism 480; Dataproducts 8050; NEC 8023; Toshiba P351; Facit 4510. No graphics card required.

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Order any time, day or night.
Our customers love this new service!

Expand Your Knowledge

Learning DOS

• ***Be an effective PC user fast***

DOS, your PC's disk operating system, is often its greatest mystery. *Learning DOS*, from Microsoft, demystifies the operating system and saves you endless trial and error.

Guided practice sessions and common-sense explanations help transform DOS from an obstacle into a useful tool. You also get fast on-line assistance any time you're using your computer. For novices, Learning DOS is the quickest, easiest way to start. Those with more experience find that it quickly fills in the holes in their knowledge, helping them become better informed.

Learn practical skills you can use every day: how to manage files and run programs; how to set up a time-saving AUTOEXEC.BAT file to load programs automatically; how to setup your hard disk with logical directories and subdirectories; and many more essential skills. You'll learn to tap the real power of DOS to automate your system: how to customize your DOS prompt to show directory and time; how to use batch files; and much more. Microsoft, the creator of DOS, teaches you with the best methods available, including award-winning interactive techniques. Your computer teaches, and you respond. When you need help with DOS, the on-line Quick Reference system provides it. Select a specific topic or command, or choose from an index. For basic and advanced procedures, it's quicker and far easier than working with your DOS manual.

Novice or expert, this is your guide. Learning DOS is the quickest way to get the most from your operating system.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1378Y	1836Y	$49.95

The Visible Computer

• ***Assembly language made easy***

Assembly language programming is a mystery no longer—with *The Visible Computer*. It leads you through all the fundamentals in an effective way that makes sense—visually.

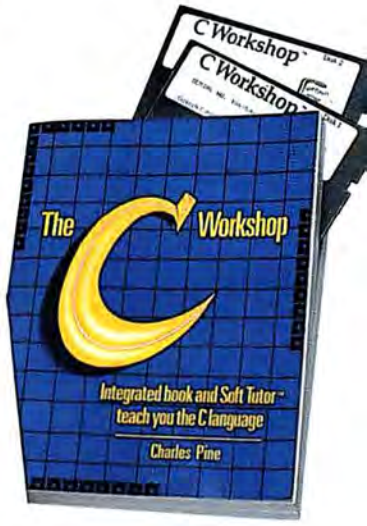
After learning binary and hexadecimal numbering systems, you move right into working with small sample programs. These provide a graphic view of the impact each command has on your computer's registers, memory banks, and peripherals.

You'll learn at your own pace, helped at every step by a lively, interesting manual. You'll learn about loading, storing, and shifting values, looping and branching, arithmetic and logical operations, addressing modes, subroutines, stacks, and interrupts.

For IBM PCs and XTs, choose the 8088 version; for the AT, choose the 80286 version. Try The Visible Computer. It opens new programming possibilities before your eyes.

VERSION	ITEM #	PRICE
IBM AT - 80286	1226Y	$99.95
IBM PC & XT - 8088	1209Y	$79.95

Available in 5 1/4" disk format only.



The Basics of BASIC

• ***BASIC programming made easy***

If you've ever wanted to learn to program and tap the true power of your computer, start with BASIC. It's the most versatile, adaptable language, and its English-like commands let you write sophisticated programs with minimal training. Now BASIC is simple to learn—with *The Basics of BASIC*.

The Basics of BASIC balances theory and practice, stressing both what to do and why to do it. Your computer is your teacher: interactive lessons and a comprehensive, step-by-step manual let you learn at your own speed. You'll quickly move from keyboard and command fundamentals to advanced concepts like strings, numeric constants, looping, branching, and arrays.

Uncover your programming ability and unlock your computer's power with the clearest, most logical introduction to BASIC programming on the market.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1206Y	1906Y	$49.95

The C Workshop

• ***Powerful programs made easy***

The C programming language produces powerful, compact programs. If you've wanted to learn C, we offer *The C Workshop*.

Everything you need to learn C is right here—from fundamentals to advanced concepts. You'll learn to write your own programs in C, using completely interactive, self-paced methods and a coordinated, comprehensive textbook loaded with instructive quizzes.

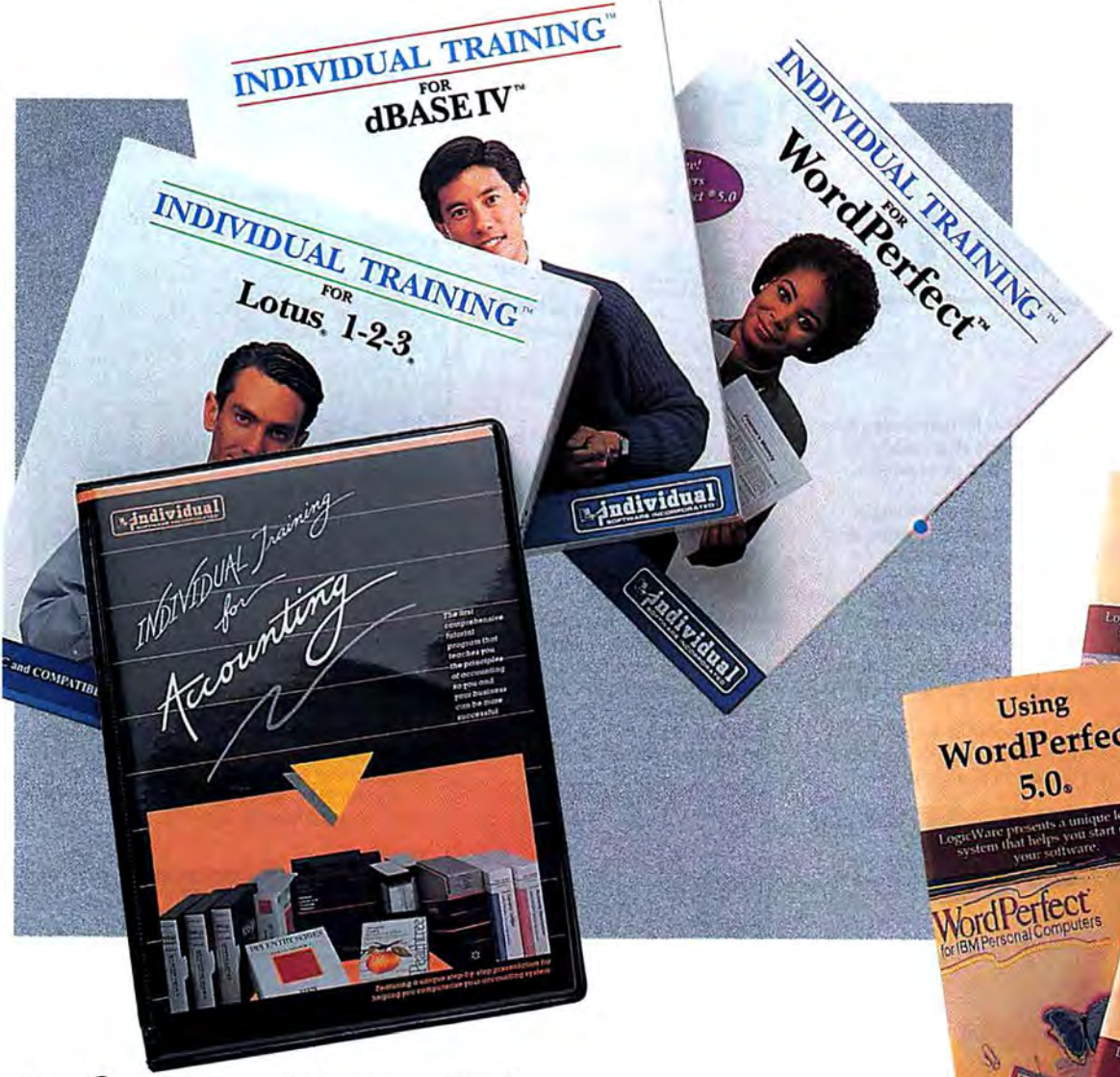
A memory-resident editor and high-speed compiler help you complete over 80 program exercises—and experiment on your own. As you display a program, you can compile and execute it on the spot.

A test module checks your work, reports whether your programs give correct results, and helps correct errors. The compiler also creates small stand-alone programs and is compatible with all popular C packages.

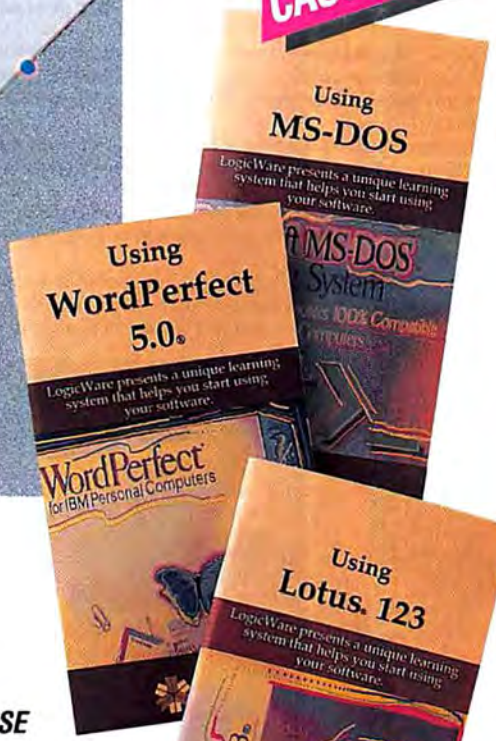
Because of its combination of print and software technology, The C Workshop is the most intriguing new type of training system we've ever seen. We give it our highest recommendation and are confident you will too.

SYSTEM	5.25" DISK ONLY*	PRICE
IBM	1213Y	$69.95

Requires 320K of memory. *3 1/2" disk available by exchange plus $20; contact the manufacturer listed in the manual.



NEW VIDEO TRAINING CASSETTES!



Software Tutorials

Save hours of digging through Lotus 1-2-3 manuals, days confined to a dBASE class, and weeks experimenting with WordPerfect.

Now you can learn these best-selling software programs the sensible way—using the latest hands-on, interactive computer and video instruction techniques. Whether you're a beginning or intermediate user, there's no better, faster way to get the most from today's powerful software.

Individual Training for use with Lotus 1-2-3

Spreadsheet analysis, graphing, basic macros, database management, and "what-if" analysis using data table commands. Covers all releases through 2.2. *Does not require Lotus.*

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1216Y	1923Y	$69.95

Individual Training for dBASE III Plus and IV

Setting up a database. Assistant's menus and commands, creating, editing, modifying, retrieving, sorting. Multiple files, dot-prompt commands, data catalog, screen painter, view function, report generation, plus dBASE programming language. *Does not require dBASE.*

VERSION	5.25" DISK	3.5" DISK	PRICE
dBASE III Plus	1224Y	1962Y	$69.95
dBASE IV	H5962	H8961	$69.95

Individual Training for WordPerfect 5.0

Writing, editing, printing. Teaches macros, merging, speller, thesaurus, indexing, outlining, multiple columns, Tables of Authorities, menus and prompts.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1239Y	1944Y	$69.95

Requires WordPerfect 5.0; 512K of memory; additional diskette drive or a hard disk.

Individual Training for Accounting

For novice to intermediate users. General ledger, balance sheets, income and owner's equity statements. Covers accounts payable and receivable, cash and accrual accounting, special journals, ledgers, and cash. Overview of PC accounting software.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1255Y	1972Y	$69.95

Using MS-DOS

Combines video and printed text. Presents most-needed DOS techniques and answers in a coloful, graphic presentation that's relaxed and easy to grasp. Especially good for beginners.

VHS CASSETTE	PRICE
M0440	$24.95

Using Lotus 1-2-3

Video/text presentation of spreadsheet analysis, graphing, and database management. Highly recommended for beginners.

VHS CASSETTE	PRICE
M0430	$24.95

Using WordPerfect

Video and printed text get you started fast with today's best-selling, most powerful wordprocessor.

VHS CASSETTE	PRICE
M0450	$24.95

Order Now!

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In California 1-800-223-1479

More Power For Your Laser

LaserMenu

• Instant laser-printer control

LaserMenu provides instant access to all features of HP laser printers from within other software. Just pull down a LaserMenu menu while running any other program, and you see and control every font and enhancement your printer has.

You get global and letter-by-letter control of installed fonts, easy output redirection, control of landscape and portrait modes, batch file configuration, and more. And you can download soft fonts without exiting your other program.

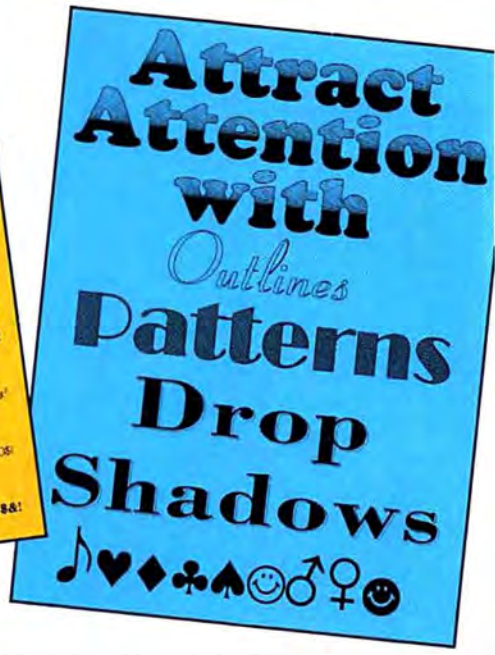
You can create forms by overlaying text with boxes, lines, and shading. And you can create printer configurations without dealing with difficult printer commands.

For graphics output, you can use your laser printer with software packages that lack laser-printer drivers (you don't have letter-by-letter control of graphics output, however).

Our test found LaserMenu to be the best and simplest laser-control program on the market—and it's the lowest in cost. You'll get the most from your laser printer with LaserMenu.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I085Y	I985Y	$99.95

Supports HP LaserJet and compatible laser printers. Uses 55K of computer memory.



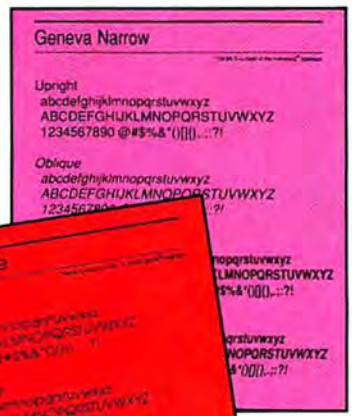
MoreFonts

• Fabulous fonts—fast & easy

MoreFonts unlocks the power of HP LaserJet and DeskJet printers by adding thousands of eye-catching soft-font combinations. Matching screen fonts give you WYSIWYG font selection. And installation in word processing and desktop publishing applications is the simplest we've ever seen.

MoreFonts includes fourteen popular typeface variations with extended attributes: bold, italic, drop shadows, outlines, fill patterns, and more. You also get 36 symbol sets including PC Graphic and Legal. A font generator with easy, drop-down menus lets you enhance the provided fonts. Five new add-on font packages extend the power of MoreFonts even further.

Try MoreFonts. It's a truly versatile enhancement for all your laser and inkjet printing.



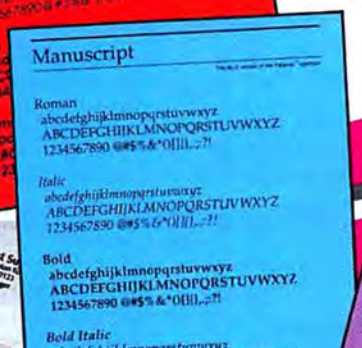
MoreFonts

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I380Y	I838Y	$99.95

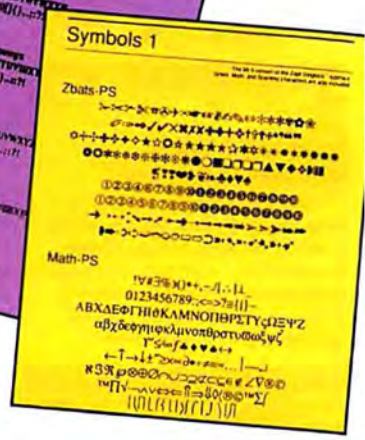
Add-on Fonts

PACKAGE	5.25" DISK	3.5" DISK	PRICE
Advantage	H0492	H0491	$59.95
Manuscript	H0522	H0521	$59.95
Geneva Narrow	H0512	H0511	$59.95
Display 2	H0502	H0501	$59.95
Symbols 1	H0532	H0531	$59.95

MoreFonts requires a hard disk and CGA, EGA, VGA, or Hercules graphics card. Supported printers: HP LaserJet Plus, Series II, DeskJet (with RAM cartridge), DeskJet Plus, and compatibles. Supports only MS Word 4.0 and later, MS Excel, PageMaker 2.0 and 3.0, Ventura Publisher 1.1 and 2.0, WordPerfect 5.0, Samna Ami, XyWrite, First Publisher 2.0, Multimate Advantage 4.0, Windows 2.0 and later. Add-On fonts require MoreFonts software.



NEW ADD-ON FONTS!



Laser Envelopes

• Put Your Best Foot Forward

Next time you print a letter on your laser printer, don't address the envelope by hand. Instead, use *Laser Envelopes*, and create laser-printed envelopes that match the quality of your letters.

Laser Envelopes handles up to four laser fonts at a time, positioning both mail and return addresses on envelopes from 2.8" to 8.5" wide, and from 6" to 11" long. It prints mailing labels, too.

Laser Envelopes saves keystrokes. The program stores your return address and picks up the mailing address from the text screen of any program you direct it to. Preview envelopes on-screen, and print envelopes one at a time or in batches. In all forms of correspondence, the envelope makes the first impression. Put your best foot forward with Laser Envelopes.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1253Y	1969Y	$49.95

Supports HP LaserJet, LaserJet Plus, II, IID, DeskJet; Kyocera F1010; Okidata LaserLine 6; Toshiba PageLaser12.

The Diet Balancer™

NEW! Your personal health manager

Now you can enlist your computer's help in staying healthy and fit. Whether you want to monitor your diet or lose weight safely, you'll get real help from *The Diet Balancer.*

Just tell The Diet Balancer your age, sex, height, and weight. It asks you about your general level of activity and if you want to change your weight; then it lets you choose from a long list of exercises you can pursue.

Compares your diet with your needs
▼
Recommends detailed exercise programs
▼
Contains information on over 1600 foods
▼
Monitors several persons' progress with complete privacy

The Diet Balancer compares your diet or plan with your personal nutritional requirements. Then it tells you the calories and essential nutrients (protein, carbohydrates, vitamins, etc.) you must add—or cut—for optimum weight and nutrition. And it recommends specific exercise programs to safely produce your desired weight.

Working with calorie content and nutrient information for over 1600 foods —including the complete menus of the leading fast-food chains—The Diet Balancer identifies unhealthful levels of fat, sodium, cholesterol, and caffeine. And you can add information for other foods.

"The highest quality nutrition software on the market."

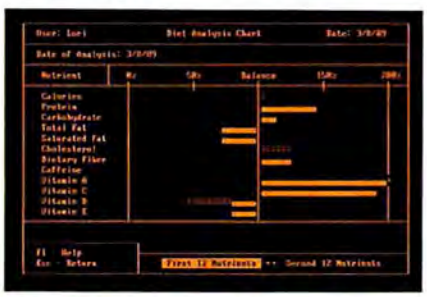
—Carol C. Caldwell,
Food & Nutrition Consultant, New York, NY

Use The Diet Balancer to analyze your diet, plan meals, or adhere to the requirements of a doctor-prescribed diet. It's a real breakthrough in personal computer applications. Here's to your health!

The Diet Balancer

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I375Y	I833Y	$59.95

Requires DOS 2.1 or later.



Diet + Exercise = Health. The Diet Balancer monitors your nutrition and activity.

Entrée by Masataka Kobayashi of Masa's.
Dessert by Bradley Ogden of Campton Place.

Cooking With Your Computer

NEW! Here are two of the most comprehensive and versatile computer cooking programs ever created

Great Chefs

Great Chefs gives you every recipe from the award-winning PBS television series of the same name. This three-volume set gives you over 800 recipe entries, plus a wealth of cooking tips, wine suggestions, and anecdotes from some of today's most celebrated chefs.

From artichoke souffle to orange zabaglione, this compendium of classical and nouvelle cuisine is chockfull of savory contributions from such culinary lights as Jeremiah Tower, Wolfgang Puck, and Bradley Ogden.

Great Chefs also provides easy-to-use meal planning software. You'll get step-by-step help in choosing recipes, plus wine suggestions to match your menu. Whether you're planning a meal for two or twenty-two, recipes are automatically proportioned to fit your needs.

When you cook, invite the Great Chefs of the world into your kitchen.

Great Chefs

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0062	H0061	$65.00

"An exceptionally good indexing system . . . by far the best recipes . . ."—Cooks Magazine

Micro Kitchen Companion

Here is the most advanced cooking reference system ever created.

Imagine being able to pick any recipe from your recipe file just by describing your needs. Need a fabulous flan? Or a vegetarian hors d'oeuvre? This amazing program will find it.

A sophisticated recipe storage and retrieval system, *Micro Kitchen Companion* lets you build your own recipe library using thousands of available entries or by adding your own.

It helps you plan ahead—or at a moment's notice. Just name a recipe or key ingredient. Recipes are proportioned for the number of servings you want, and your shopping list is prepared—organized by store aisles! The program is so well thought-out, it does nearly everything except set the table.

Micro Kitchen Companion

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0792	H0791	$39.95

Requires 512K of memory.

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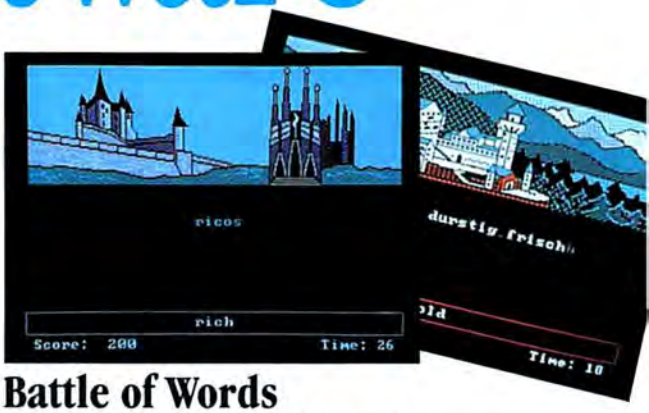
Special Software Selections



NEW! Whereabouts

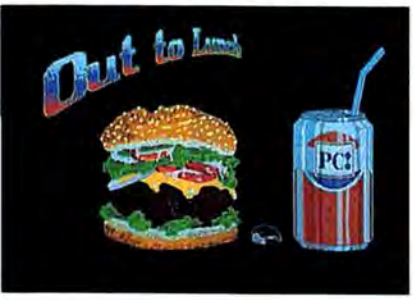
- *Let your computer tell people where you are*
- *Fun, imaginative—and truly useful*

Whereabouts leaves an illustrated, colorful message on your PC monitor that tells people your "whereabouts." You get eleven sprightly, animated graphics that have to be seen to be appreciated (we regret there's only enough space to show one). You also get *In a Meeting, Running Errands, At the Doctor's, Went to Restroom, Page Me, Leave Me a Note, This PC Off- Limits, Call Me at* (you add the extension), *Back at* (you add the time), and a screen-saver to prevent monitor burn-out.

When Whereabouts appeared in the Power Up offices, we all broke out in grins. Rarely have we seen such a neat, useful product rendered with such wit and invention. It's a steal at the price.

SYSTEM	5.25"DISK	3.5" DISK	PRICE
IBM	H3232	H6651	$27.95

Requires a CGA, EGA, VGA, or Hercules graphics card; 320K of memory; hard disk.



Language Master

- *Word definitions and synonyms at a keystroke—while you work with your other software*
- *Faster and easier than books or ordinary software programs*

Unlike simple spell checkers, *Language Master* provides word definitions as you work with word processor, spreadsheet, or other software. Just place your cursor on a word, hit the hot key, and definitions and synonyms appear.

The 80,000-word dictionary, based on *Webster's Concise Dictionary*, also provides usage notes and hyphenation, defines words used in its own definitions, and guesses at alternatives if your target word is misspelled.

Word Master, the 470,000-word thesaurus based on *Webster's Collegiate Thesaurus*, is keyed to 40,000 entry points, so a match is nearly certain. It even inflects synonyms according to tense and number (*jump* produces *leap*; *jumped* produces *leapt*).

Take your dictionary and thesaurus off the shelf and put them in your computer for faster reference—with Language Master.

VERSION	5.25"	3.5"	PRICE
Word Master**	1429Y	1929Y	$59.95
Language Master*	1428Y	1928Y	~~$99.95~~

SPECIAL: Save $10.00! $89.95

* Dictionary and Thesaurus. ** Thesaurus only. IBM and compatibles only. PC/AT requires DOS 3.0 or higher. Hard disk recommended (required for dictionary).

Battle of Words

- *Vital French, German, and Spanish vocabulary*
- *Hundreds of new words, reviews, and quizzes*
- *Colorful graphics and sound effects*

Battle of Words is a uniquely entertaining program that presents the most important words you'll need when studying French, German, or Spanish.

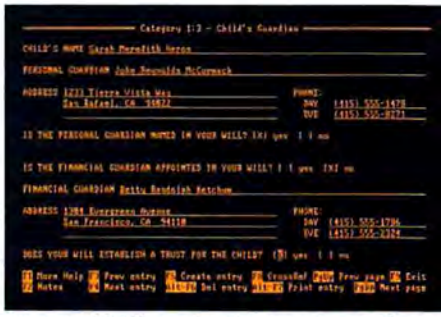
You begin with new words, including definitions and sample sentences. Next, you review key words and definitions. Then you take multiple-choice and fill-in-the-blank quizzes to test your knowledge. A colorful arcade game tests how quickly you can locate correct translations.

VERSION	5.25" DISK	3.5" DISK	PRICE
French	H2592	H8591	$49.95
German	H4992	H8791	$49.95
Spanish	H3992	H8991	$49.95

For IBM and compatibles only.

For The Record

- *Records vital information*
- *Easy data entry*
- *Password protected*



For the Record is the fastest, easiest way to record vital personal and family information. Easy question-and-answer sessions guide you, prompting you for all details. Reports list bank accounts, monthly bills, pensions, insurance, tax records, prop medical records, and much more.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	1377Y	1835Y	~~$49.95~~

SPECIAL: Save $10.00! $39.95

Accu-Weather Forecaster

- *Personal weather forecaster provides live weather data, hourly updates*
- *Highly detailed maps, graphs, pictures, and forecasts*
- *Great for travelers, gardeners, outdoor workers, and sports enthusiasts*

Accu-Weather, the nation's largest private weather service, puts accurate, live weather maps and information right on your computer. The data is updated hourly by the National Weather Service and FAA. Maps show temperature, humidity, wind speed, cloud cover, precipitation, and more.

You get forecasts and information for the next 48 hours, and you can make on-line inquiries directly to the Accu-Weather computer for world-wide data.

Whether your business depends on the weather, or you simply enjoy watching the sky, Accu-Weather is your best source for accurate, economical, up-to-date information.

SYSTEM	5.25"	3.5"	PRICE
IBM	H3132	H8071	$89.95

Requires Hayes or 100% compatible modem, 512K of memory; CGA, EGA, VGA graphic card or monochrome equivalent.

NEW! Special Days

- *Headlines, songs, people, and events, from 1850 on*
- *Instant historical insight—and fun*

What was happening the day you were born or when Joe joined the firm? Get the answer with *Special Days*. Its quality reports highlight headlines, songs, awards, people, consumer prices, and events for any day from 1850 to present times. The reports make perfect gifts, and they're terrific for newsletters, speeches, and other "this-day-in-history" applications. Try Special Days–and give the gift of history.

ITEM	ITEM NUMBER		PRICE
Special Days	5.25" H3562	3.5" H8761	$44.95
Certificate Pak		M0460	$12.95

For IBM and compatibles only. Requires DOS 2.1 or later. Certificate Pak contains 150 pages of pin-feed parchment paper, with stickers and seals.

NEW! Hometown U.S.A.

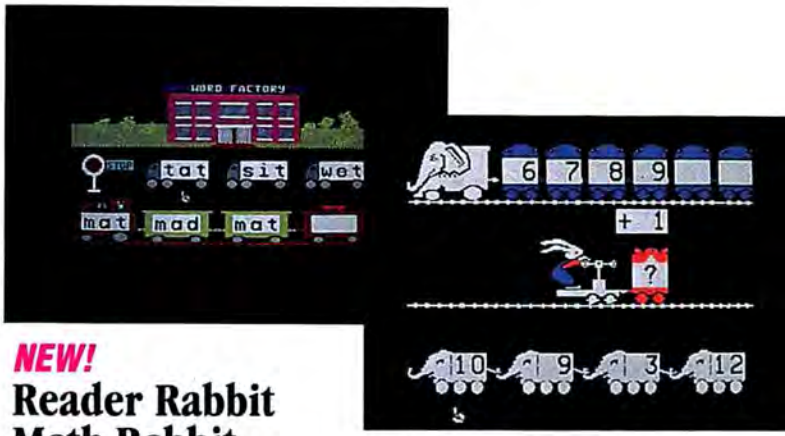
- *15 basic styles yield hundreds of customized model buildings*
- *Combine elements on-screen, print, color, and assemble*
- *Create entire miniature towns*

Now you can use your computer to create marvelous-looking model buildings with *Hometown U.S.A.* Design and build entire towns—complete with banks, movie theaters, bakeries, houses, and more.

First you select a plan. Next, you add doors, windows, shingles, and siding, using the program's own art tools or your favorite paint program. Then you use your dot-matrix printer to print each building on heavy paper. Finally, you color, cut out, and paste together the finished structure.

Fun for all ages, Hometown U.S.A. will stimulate your entire family's creativity and imagination in new and exciting ways.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0572	H0571	$39.95



NEW! Reader Rabbit Math Rabbit

- *Imaginative, entertaining, solid introductions to reading, early math and thinking skills*
- *Ideal for children ages 3 to 7*
- *Classic software for home and school*

From The Learning Company come *Reader Rabbit* and *Math Rabbit*, the all time best-selling reading and early math programs in the home and school market. These exciting programs build firm foundations for reading, math, and thinking skills...and make learning as much fun as playing a game.

Your children and a dancing Reader Rabbit will share unforgettable adventures in an award-winning program that improves early reading, spelling and vocabulary skills. Captivating graphics, music and sound effects, and over 200 carefully selected words add learning excitement and help children explore the magic of the written word.

Children discover number fun in a series of four imaginative games under the circus big top with Math Rabbit. A dynamic learning environment combined with animated graphics, music, and Math Rabbit's aerial acrobatics make it entertaining and easy for children to develop early adding, subtracting and counting skills.

A leader in children's software, The Learning Company is known for it's award-winning series of programs that teach children to THINK. The programs are uniquely designed by a team of experts to take children beyond basic curriculum skills. They teach children to think, solve problems, and make decisions. Each incorporates an easy-to-use game format that makes learning fun.

ITEM	5.25" & 3.5" DISKS	PRICE
Reader Rabbit	H0643	$49.95
Math Rabbit	H0663	$39.95

Reader Rabbit supports 16-color EGA; 4-color CGA; Hercules monochrome graphics; and hard disk installation. Joystick is optional. 256K memory is required.

NEW! Footprints in History

- *Historical timelines combine your own personal moments to remember with history-making events*
- *Includes thousands of historical events from multiple fields of interest*

Footprints in History shows you what else was happening in the world on or near any day you select. It's a great way to take a walk through history while strolling down memory lane.

You can take a collection of memorable moments in someone's life and place it against a backdrop of historical events: "July 16, 1969, Astronauts walk on the Moon. August 2, 1969, Harry Jr. learns to walk on earth."

Footprints' database contains thousands of events from history, sports, the arts, business, and more. Reports can cover a day up to 50 years. It's fascinating fun.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0542	H0541	$39.95

NEW! Design Your Own Home

- *Makes it easy to design houses and other architectural projects*
- *Creates accurate floor plans, elevations, graphs, charts, and more*
- *Computes dimensions, areas, and distances*
- *Provides dozens of appealing sample plans and architectural shapes*

Here's the first computer-aided architectural design software that's so simple anyone can use it. Yet it's got plenty of power to handle floor plans and elevations, including all essential structural details.

Design Your Own Home arranges structural elements and architectural shapes the way you want them—even calculates distances, diagonals, areas, and angles for you. It uses standard architectural scales plus time-saving icons, grids, snap lines, stud/beam repeaters, arcs, text, on-screen measurements, and much more. Handy pull-down menus make everything easy.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	H0632	H0631	$99.95

Requires 512K RAM; CGA, EGA or Hercules graphics card. Mouse and graphics printer recommended.

NEW! WritePro

- *Teaches creative writing interactively*
- *Helps you edit like a pro*
- *Eliminates writer's block*

Sol Stein, who guided Elia Kazan in writing his bestseller, *The Arrangement*, has now created software that actually teaches creative writing.

Culled from the experience of hundreds of writers, *WritePro* gives you proven techniques for composing vivid fiction. Using the built-in word processor, you'll create rounded characters and develop suspenseful plots, banishing writer's block and thinking like an editor.

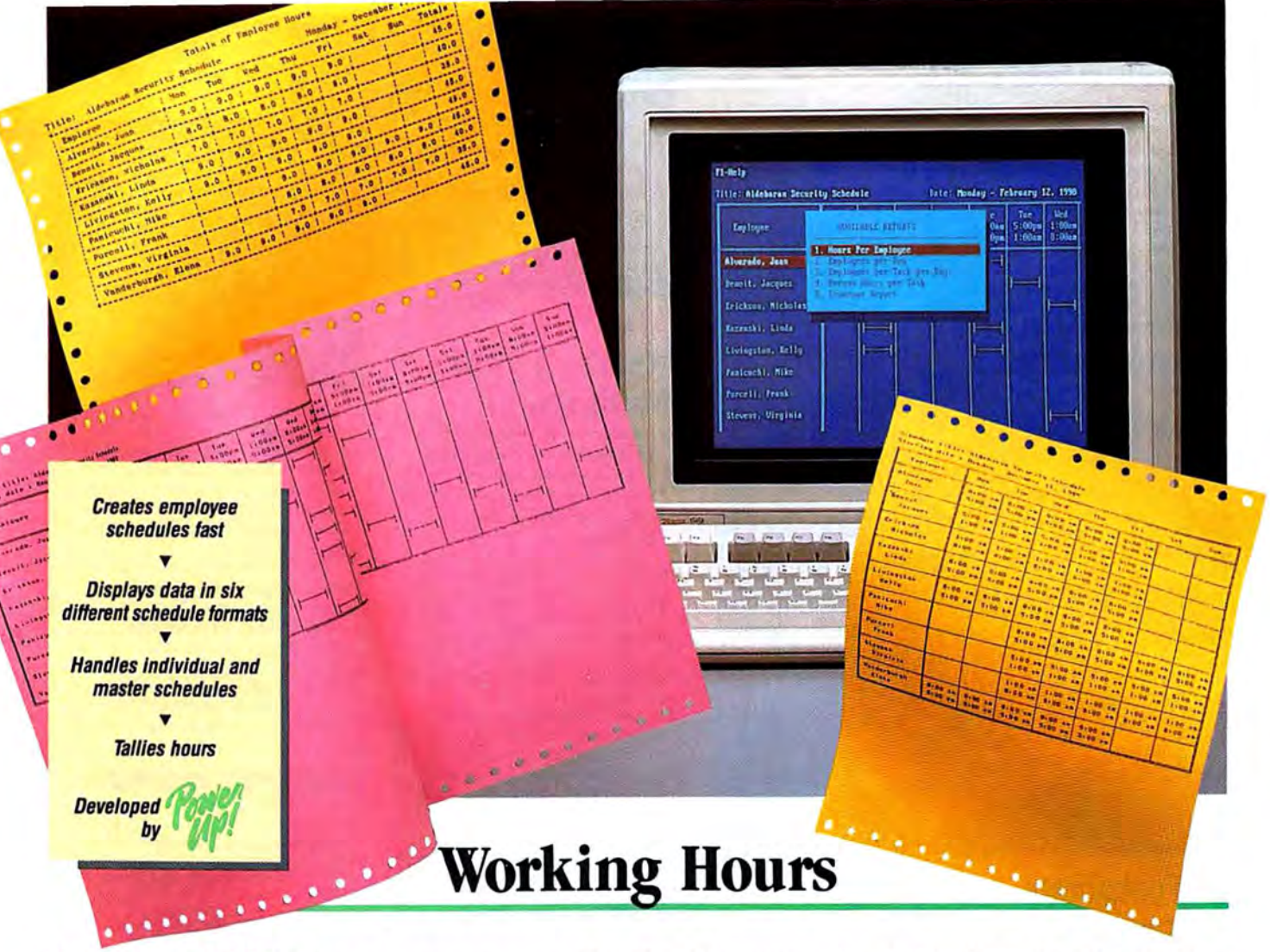
Stein's own novel, *The Magician*, was a million-copy seller, and as an editor and publisher he has guided hundreds of careers. Now he passes his wisdom on to you. WritePro is full of solid, professional techniques guaranteed to be of immediate use.

VERSION	5.25" DISK	3.5" DISK	PRICE
Lessons 1-2	H2992	H8701	$39.95
Lessons 1-4	H0942	H0941	$79.95

Order Now!

1-800-851-2917

In California 1-800-223-1479



Working Hours

NEW VERSION! Our unique personnel scheduler was a hit from the beginning. Now, with new math functions and scheduling options, it's even better.

Scheduling employees by hand can be a real chore. You figure and refigure, write and rewrite, cross out and erase. Once you have a schedule worked out, you often have to recopy it just so others can read it.

That's why we created *Working Hours.* Ideal for anyone who must schedule personnel, it solves these problems by letting you work in multiple schedule formats. And it keeps individual records for each employee.

You'll love the flexibility and convenience of its six versatile formats. Enter your data just once, and you can display and print it six different ways—even switch formats on the fly.

Working Hours creates weekly schedules that handle almost any combination of names, hours, shifts, and jobs. You're sure to find a format that displays people, tasks, and hours in the clearest, most advantageous way.

Choose among weekly schedules divided into days, hours, shifts, tasks, and functional areas. Schedule people in increments as small as 15 minutes, 24 hours a day—*even when their shift crosses over from one day to the next.**

Each schedule covers a week and can begin on any day. Create master schedules showing when everyone is working, when they have breaks, what they're doing, *and their total hours for the week.** Create individual schedules that effectively tell each employee when and where to report.

> ***"... more powerful than other scheduling programs we have seen costing more than ten times as much ... an extremely well-designed program that is easy to learn and use ... provides for quick changes and additions to schedules."***
>
> —AARC Times

For speed, you can use the previous week's schedule as a foundation for a new one. A built-in calendar graphically shows you each month, so it's easy to set schedule starting dates.

Working Hours supports dot-matrix and laser printers. You can print fast drafts in text mode, then switch to high-quality graphics mode for your finished schedules.

If you need to schedule people for any reason, Working Hours is your tool. It's a whole new idea in software—one that will lighten and simplify your work.

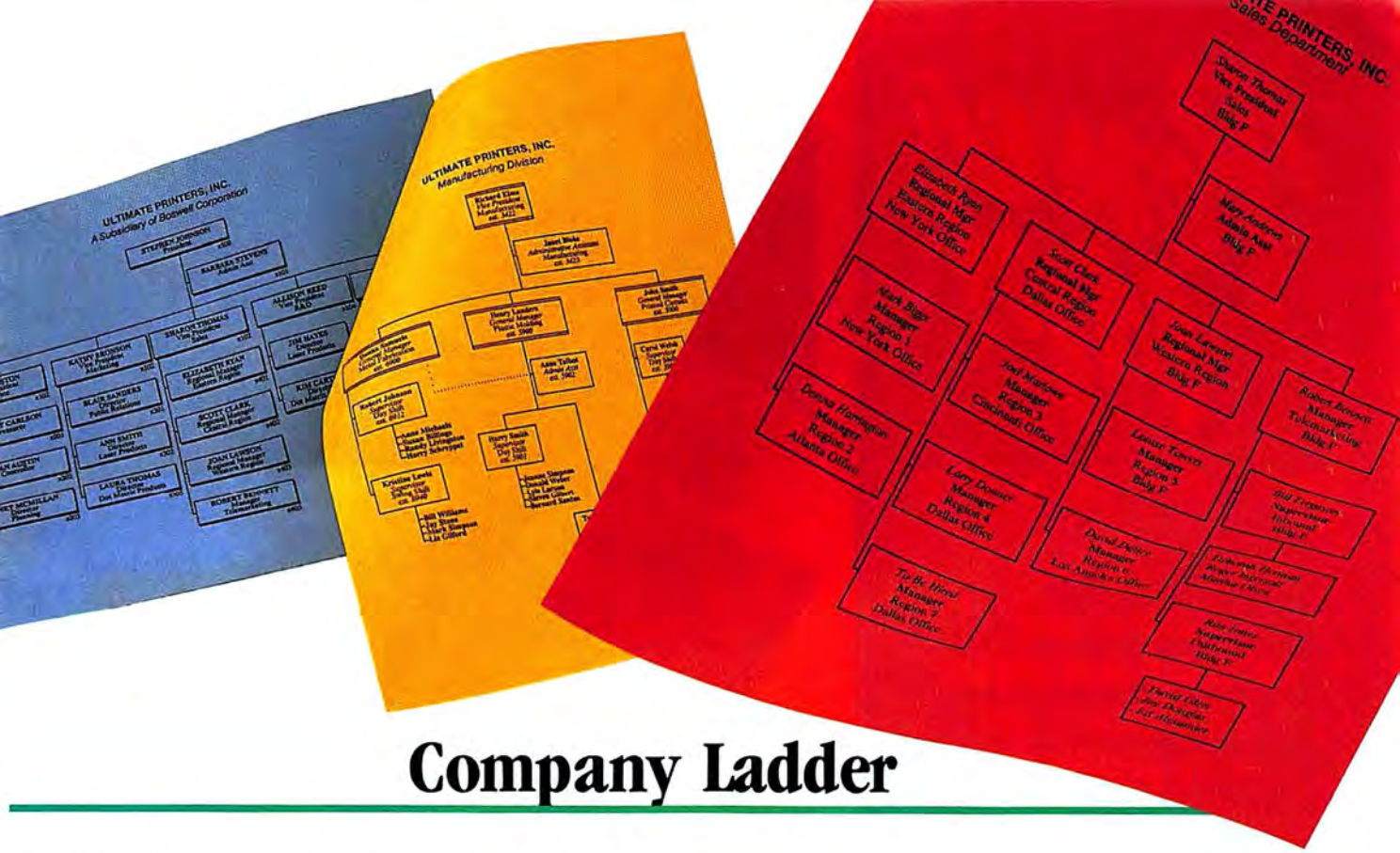
Working Hours

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	2460B	2460A	$99.95

*New version feature. Requires 320K of memory. Supports IBM Graphics, Proprinter, Epson (any model except lasers); Apple Imagewriter; HP LaserJet Plus or Series II; Okidata 84, 92, 93, 182, 192, 292, Laserline; C. Itoh Prowriter 8510; IDS Prism; Dataproducts 8050; NEC 8023; Toshiba P321, P351. No graphics card required. UPGRADES: Send original disk and $20 to Power Up Working Hours Upgrade, 2929 Campus Drive, San Mateo, CA 94403-7600.

FAX YOUR ORDER
1-415-345-5575

Order any time, day or night.
Our customers love this new service!



Company Ladder

NEW! Now you can make presentation-quality organization charts right at your desk. It's the fast, easy way to create and update your company tree.

Company Ladder creates organization charts and other tree-based diagrams of virtually any size—and gives you presentation-quality printouts in the bargain.

Just type in names, titles, salaries, comments, and more. Company Ladder draws perfect boxes and connecting lines, spaces the boxes automatically, and positions text exactly.

And what text! Company Ladder printouts set a new standard for quality, whatever your printer.

On lasers, Company Ladder uses your 10 and 14-point proportionally-spaced Helvetica and Times Roman fonts, portrait or landscape, plus monospaced Courier and line printer fonts. Boldface, italics, and underlining are all supported. Type prints at full, 300-dpi laser resolution. And Company Ladder provides super-sharp dot-matrix output, too.

Company Ladder accepts more than 2,000 employees per chart (on a 640K system). Chart height, width, number of levels, and people per level are unlimited.

Editing is simple, too. You can insert, delete, and move positions individually, by range, even by department. Lines, boxes, and spacing are automatically updated with each change.

Creates professional-quality org charts and tree diagrams

▼

Provides easy editing when your organization changes

▼

Tallies salaries, budgets, and other numbers

Developed by Power Up!

Choose among seven chart and six box styles. You can vary the box style in any part of a chart. And you can add auxiliary lines to show dual reporting relationships.

Add numeric data on any line. Company Ladder can count, sum, average, and more. You can show department budgets right on the chart.

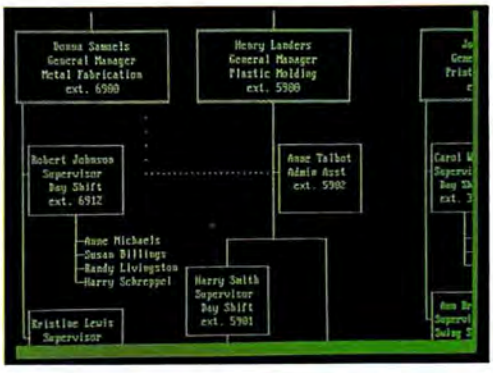
On charts that don't fit on one page, the program prints multiple pages for later paste up. Wide charts print sideways on laser and dot-matrix printers.

If you need an org chart, a product-cost roll-up—any kind of tree-based diagram, make it with Company Ladder. It's the newest, fastest, highest-quality, org-chart maker on the market today.

Company Ladder

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	2000B	2000A	$79.95

Requires 384K of memory. Supports most dot matrix, inkjet, and laser printers from Epson, Hewlett Packard, IBM, Tandy, Toshiba, Okidata, Panasonic, IDS, Dataproducts, NEC, Panasonic, C. Itoh—and true compatibles. No graphics card required.



Providing both text and graphic interfaces, Company Ladder makes it easy to create even the most complicated organization charts.

ORDER TOLL-FREE
1-800-851-2917

In California, 1-800-223-1479
7 AM - 5 PM Pacific Time, M-F

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SOFTWARE

Easy-to-use software that makes life simpler and more productive

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30-day, no-risk software guarantee

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Name That Disk

Instant, accurate diskette labels

Accurate labels are essential for keeping track of data on diskettes, and *Name That Disk* is the easiest way yet to produce them. Just insert a diskette in any drive, and Name That Disk reads the directory and prints a neatly lettered 5¼" or 3½" diskette label.

Each label shows the volume name, all filenames (sorted by name, extension, or date), the date the label was created, and disk space remaining. You can even add your own disk title. Before it's printed, all information appears in a window where you can edit the text and add a comment to any file.

You get three graphic formats: *multicolumn,* which shows 35 or more files per label; *single column,* which lets you add comments after filenames; or *single dated column,* which lists file creation dates.

Whatever format you choose, the program prints enough labels to list all files. You also can print labels numbered in sequence for hard-disk backups.

Name That Disk also prints DOS wildcards, using them as "filters" to save label space. For example, the single entry "BUDGET.*" might stand for 12 monthly budget data files.

Special soft-stick labels, included in the package, are easy to apply, remove, and reapply. You get 100 5¼" or 50 3½" labels. When you change the contents of a labeled diskette, it's easy to re read its directory and print a new label, then exchange the old label for the new one.

Nobody likes to fill out diskette labels by hand, particularly when there are many files to document. Nam That Disk puts these headaches in the past. Give it a try and let your computer and printer give your diskettes a whole new, more professional look.

Reads disks in any drive, then prints labels listing all files

▼

Prints sequentially numbered labels for hard-disk backups

▼

Add your own notes and comments

Developed by Power Up!

Name That Disk

Includes software and labels.

SYSTEM	5.25" DISK	3.5" DISK	PRICE
IBM	I139Y	I739Y	$39.9

Additional Diskette Labels

QUANTITY	SIZE	ITEM NUMBER	PRICE
200	5¼"	I1400	$9.9
100	3½"	I1480	$9.9

Supports IBM Graphics and Proprinter; Epson (all models); Okida 84, 92, 93, 182, 193, 292; C. Itoh Prowriter; Apple ImageWriter; Diab 635, IDS 460, 560, and Prism; Dataproducts 8050; NEC P5, P6, P 8023; Tandy DMP; Toshiba P321, P351.

Paul Mace
GRAPHIC SOFTWARE

NOW SUPPORTS CD ROM!

King of Arts

Studio-quality animation comes to your desktop PC with GRASP. Create slide shows, demos, interactive tutorials, and animated performances. Control art, text, color, sound, timing, mouse and keyboard. Use the animation techniques developed for arcade games and television production. Add multi-media effects to programs in C, Pascal, Basic, and Assembler. Shatter the limits with CD-ROM.

This new Grasp version includes both Pictor and Artools. Use Pictor's paint studio to create, assemble, and edit artwork. Capture text or graphics from other programs. Print images on laser or dot-matrix printers. Then use the animation generators in Artools to take the tedium out of animation. Create the in-betweens for effects like image warping, transformations, and cross-fades—automatically!

GRASP version 3.5—$199

"Grasp is clearly the hands-down winner in terms of sheer power, flexibility, and speed. Nothing else even comes close."

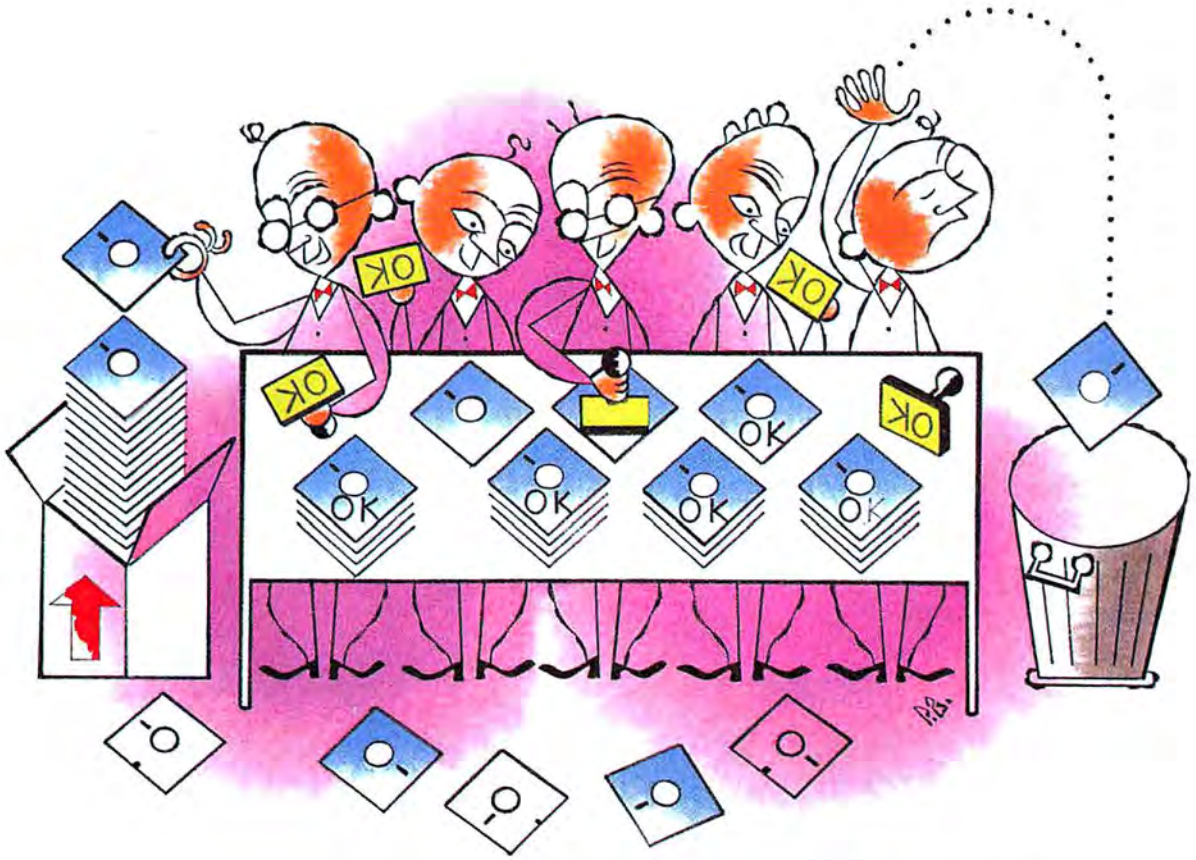
—PC Magazine

Paul Mace Software, 400 Williamson Way, Ashland, Oregon 97520 Phone 800-523-0258, 503-488-2322

Circle 235 on reader service card

TOP TOOLS

FOR HARDER-WORKING WORKSHEETS



MATT LAKE

DESPITE the considerable power built into spreadsheets such as *1-2-3*, *Quattro*, and *Excel*, third-party developers keep finding new gaps to fill. The result is a bewildering range of add-ins, templates, stand-alone utilities, and macro collections.

How do you separate the good from the bad? *PC World* went to some of the most respected user groups in the country to discover what spreadsheet utilities their members recommend.

WITH THE RIGHT UTILITY, YOUR SPREADSHEET CAN HANDLE JUST ABOUT ANY JOB. HERE ARE THE FAVORITE ADD-ONS AND ADD-INS FROM FIVE OF THE MOST INFLUENTIAL USER GROUPS IN THE COUNTRY.

ILLUSTRATIONS BY PHILIP ANDERSON

From the Boston Computer Society, the Capital PC User Group, the Sacramento PC Users Group, the Silicon Valley Computer Society, and the San Francisco PC User Group —a combined membership of over 40,000—we heard about a great many products that intermediate to experienced spreadsheet users are likely to find helpful.

Some of these tools make your spreadsheet easier to use, increase its speed, and improve the look of its printed output. Other utilities address more specific problems, letting you plan projects, maintain a payroll, manage data in *dBASE* format, or do word processing without leaving your spreadsheet.

Several macro and template collections are also included—surprising choices, given the power users we polled. But according to Hugh McLaughlin of the Boston Computer Society, "Writing macros yourself is like spending $1000 to save $400." For Bill Welch of the Silicon Valley Computer Society, development time is a luxury. "When you're constantly putting out fires, you don't get a chance to develop anything for yourself."

We have divided the recommended products into six categories:

Worksheet Construction Tools simplify the job of building your own worksheets. General-purpose macro collections, data verification tools, and error-checking programs are included in this category.

Print and Performance Enhancements speed screen display, spruce up printed output, and boost overall operations.

Financial Tools include templates and programs for handling taxes, financial planning, journals, and other bookkeeping duties.

Workplace Management Tools bring automated Gantt charts, critical path analysis, and other scheduling and costing features to your spreadsheet.

Data Management Utilities expand *1-2-3*'s and *Excel*'s data-handling talents and offer improved access to data in *dBASE*'s DBF file format.

Finally, there are **Miscellaneous Enhancements,** which range from word processing add-ins to file compression utilities.

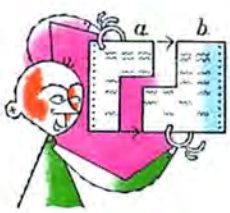
When considering any tool, make sure it will

work with your spreadsheet. Templates and macro collections intended for *1-2-3* generally work with compatible spreadsheets, but add-ins—utilities that integrate themselves directly into the spreadsheet's code—are product specific. And keep an eye on the RAM requirement of an add-in or a TSR; this limits available memory for worksheets. We've provided a compatibility key and—where appropriate—RAM-use information for the products listed.

Matt Lake is an editorial assistant for PC World.

Key to Compatibility

2.x *1-2-3* releases 2.0, 2.01, 2.2
3.0 *1-2-3* release 3.0
E *Excel*
Q *Quattro*
VP *VP-Planner Plus*



WORKSHEET CONSTRUCTION TOOLS

Cambridge Spreadsheet Analyst
Symantec

This stand-alone utility maps out your worksheet, tracing and analyzing the structure and syntax of your macros and formulas. It can detect up to 25 different types of errors.
List price: $149.95.
2.x
Reader service no. 610

DAVE 1.1
Goldata Computer Services

DAVE 1.1 is a 64K add-in that lets you superimpose data entry forms over worksheets. Data validation includes the ability to define input ranges and verify data against other worksheets. A mail merge feature is also provided.
List price: $99.95.
2.x
Reader service no. 611

Inside Lotus 1-2-3 Macros
by Richard W. Riddington and Scott Tucker
BRADY BOOKS

This introduction to writing your own macros contains many useful examples. A disk of macros, which range from label makers to full-fledged turnkey applications, is also available.
List price: book $29.95, disk $30, book and disk $49.95.
2.x
Reader service no. 612

101 Macros Plus
Individual Software

101 Macros Plus includes everything from simple keystroke savers to complex tools for automatically generating data bases, graphics, and tables. Among the highlights, the *1-2-3* collection includes word processing tools and a calculator, and the version exclusively for *Excel* provides a window manager.
List price: $69.95 each.
2.x E Q VP
Reader service no. 613

Worksheet Utilities
Funk Software

This collection of add-ins contains a search-and-replace tool, an adjustable auto-saver, and a formula editor that easily outdoes *1-2-3*'s. Other features include a file manager and a print enhancer.
List price: $99.95.
2.x
Reader service no. 614

For more information about all products in this section, circle reader service no. 902.

PRINT AND PERFORMANCE ENHANCEMENTS

Impress 2.0
PC Publishing

Similar to Funk Software's *Allways*, *Impress* enhances *1-2-3*'s screen and output capabilities. The 90K add-in offers features unavailable in *Allways*, such as accurate on-screen display of formatting, access to Bitstream fonts, and the ability to mix text with graphics without changing programs.
List price: $149.95.
2.x
Reader service no. 615

Look&Link 1.1
Personics

Look&Link consists of two add-ins. As you work on one worksheet, the 55K *Look* can open a window on a second for browsing or for cutting and pasting data. The 35K *Link* allows dynamic links with unopened worksheets and can sum values to produce summary worksheets.
List price: $99.95.
2.x
Reader service no. 616

Noteworthy
Funk Software

This 55K add-in lets you attach notes to specific cells; these remain anchored regardless of changes in the worksheet. You can copy data between notes and cells using the utility's text editor.
List price: $79.95.
2.x
Reader service no. 617

SeeMore 2.0
Personics

SeeMore is a 50K add-in that displays more of your worksheet on screen. Depending on the video board, you can view as many as 60 rows of 160 columns each. You can zoom, tile windows, and edit in any mode.
List price: $99.95.
2.x
Reader service no. 618

SideWays
Funk Software

This long-established utility prints worksheets vertically; on formfeed paper, you can print a very wide range in one piece. *SideWays* offers nine type sizes in normal, bold, italic, and expanded styles. You can install *SideWays* as a 50K add-in or as a stand-alone program that accepts WKS, WK1, and ASCII files.
List price: $69.95.
2.x 3.0 Q VP
Reader service no. 619

ILLUSTRATIONS BY PHILIP ANDERSON

3-2-1 Blastoff
Frontline Systems

This pseudocompiler speeds up *1-2-3* calculations, shrinks the size of your data files by as much as a third, and ensures that other users can't change the structure of your templates. (You will need *1-2-3* and the bundled 48K *Blastoff* add-in to run the compiled worksheets.) The standard version doubles speed or better; the premium version boosts speed by five to ten times.
List price: $99.95, premium version $249.95.
2.x
Reader service no. 620

3-2-1 Gosub
Frontline Systems

3-2-1 Gosub is a 3K add-in that lets you design custom *1-2-3* functions and subroutines. Sample functions for business, scientific, and statistical use are included.
List price: $99.95.
2.x
Reader service no. 621

For more information about all products in this section, circle reader service no. 903.

FINANCIAL TOOLS

Budget Express
Symantec

This 64K add-in offers an outliner, a goal tracker, and a tool for consolidating dissimilar worksheets. Other features include menu selection of common functions and automatic column naming. By storing off-screen ranges to disk, you can create larger worksheets than can fit in memory.
List price: $149.
2.x
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Computerized Classic Bookkeeping
Absolute Solutions

These macro packages bring standard accounting tools—general ledger, invoicing, and accounts receivable and payable—to *Excel*. Additional modules include nonstandard journals, active payroll, and job costing.
List price: $395, with nonstandard journal $995, full system $1295.
E
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PrepaTax
Tax Help

A series of tax templates for *1-2-3*, *PrepaTax* includes forms and worksheets for personal federal and state taxes; some are approved for IRS submission. Tax forms for 15 states are available. *PrepaTax Pro* adds templates for office-in-home calculations, depreciation, passive loss, and supporting statements.
List price: Basic federal $29, Basic federal and state $50, Professional federal $59, Professional federal and state $80.
2.x 3.0 VP
Reader service no. 624

Tax Templates
Heizer Software

Tax Templates for *Excel* fall into three categories: personal federal, personal state, and federal business. Its forms, when LaserJet or PostScript printed, are approved for IRS submission. The federal templates include tax depreciation worksheets.
List price: personal $35, state supplements $15, business $45.
E
Reader service no. 625

TaxTime 1040 Individual
Austin Scientific

These templates cover 20 federal tax forms and various IRS worksheets and supporting statements. A separate 1040 Master module includes 19 extra forms for tax shelter registration and IRA taxes. Both the Individual and Master modules offer LaserJet printing options. A third module covers taxes for 18 states.
List price: $95, 1040 Master $195, state return $50–$95.
2.x
Reader service no. 626

For more information about all products in this section, circle reader service no. 904.

WORKPLACE MANAGEMENT TOOLS

Project Calc
Frontline Systems

Project Calc is a 60K project-scheduling add-in that lets you access project dates, resource loading, and project costs from anywhere in a worksheet. Other features include "what if" projections, individual project calendars, and critical path analysis. The expanded version, *Project Calc/Resources*, also offers resource management.
List price: $179.95, Project Calc/Resources $279.95.
2.x
Reader service no. 627

Project Scheduler
Heizer Software

This $15 *Excel* utility brings Gantt charts to your worksheets. The $35 version includes critical path calculation, where dependent tasks are automatically updated as key tasks are rescheduled.
List price: $15, Project Scheduler with Critical Path $35.
E
Reader service no. 628

What-If Analyst
Frontline Systems

What-If Analyst works backward; supply the project goal, and the program determines what you must do to achieve it. The standard version works with one goal at a time, the premium version with up to ten. This add-in takes 33K for *1-2-3* release 2.*x* and up to 55K for release 3.0.
List price: $49.95, premium version $99.95.
2.x 3.0
Reader service no. 629

What'sBest
General Optimization

What'sBest finds optimal solutions to such linear problems as staff

scheduling. Three versions—Personal, Commercial, and Professional—can handle 250, 1500, and 4000 variable cells, respectively. This TSR takes from 181K to 556K.
List price: Personal $149, Commercial $695, Professional $995.
2.x VP
Reader service no. 630

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

DATA MANAGEMENT UTILITIES

@BASE 1.22
Personics
@BASE is a 72K add-in that lets you view and edit all or part of a DBF file. You can also create your own data files or export data from worksheets to the DBF format.
List price: $195.
2.x
Reader service no. 631

Deja 2.0
PC Publishing
This 64K add-in allows two-way data transfer between *1-2-3* and DBF files. By keeping the bulk of your data in DBF files, you can access it without swelling the size of your worksheet.
List price: $129.95.
2.x
Reader service no. 632

Q+E 2.1
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Q+E uses *Windows'* Dynamic Data Exchange (DDE) to query, view, and edit DBF data bases from within *Excel*. NDX and MDX index files are updated when related DBF files change. You can run the program as a standalone *Windows* application, but when *Q+E* is loaded with *Excel*, its features are available from the spreadsheet's own menus.
List price: $149; registered *Excel* users can buy *Q+E 2.1* from Microsoft for $49.99 or, if *Excel* bought after June 30, 1989, for $9.99.
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Reader service no. 633

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MISCELLANEOUS ENHANCEMENTS

InWord
Funk Software
InWord is an 85K add-in word processor. In addition to providing standard editing and formatting features, it lets you insert from or hot link to a worksheet range, as well as mail merge from a *1-2-3* data base.
List price: $99.95.
2.x
Reader service no. 634

SQZ Plus
Symantec
This 50K file compression add-in can shrink worksheets by as much as 90 percent. Other features include an auto-save feature, keystroke macros, and password protection.
List price: $99.95.
2.x
Reader service no. 635

Write-In 1.2
Blossom Software
This 95K add-in word processor allows you to mix text with *1-2-3* graphics. Worksheet ranges can be imported or dynamically linked, and *1-2-3* data can be mail merged.
List price: $129.95.
2.x
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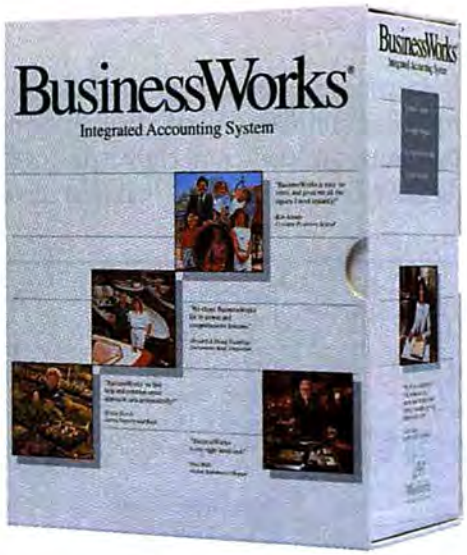

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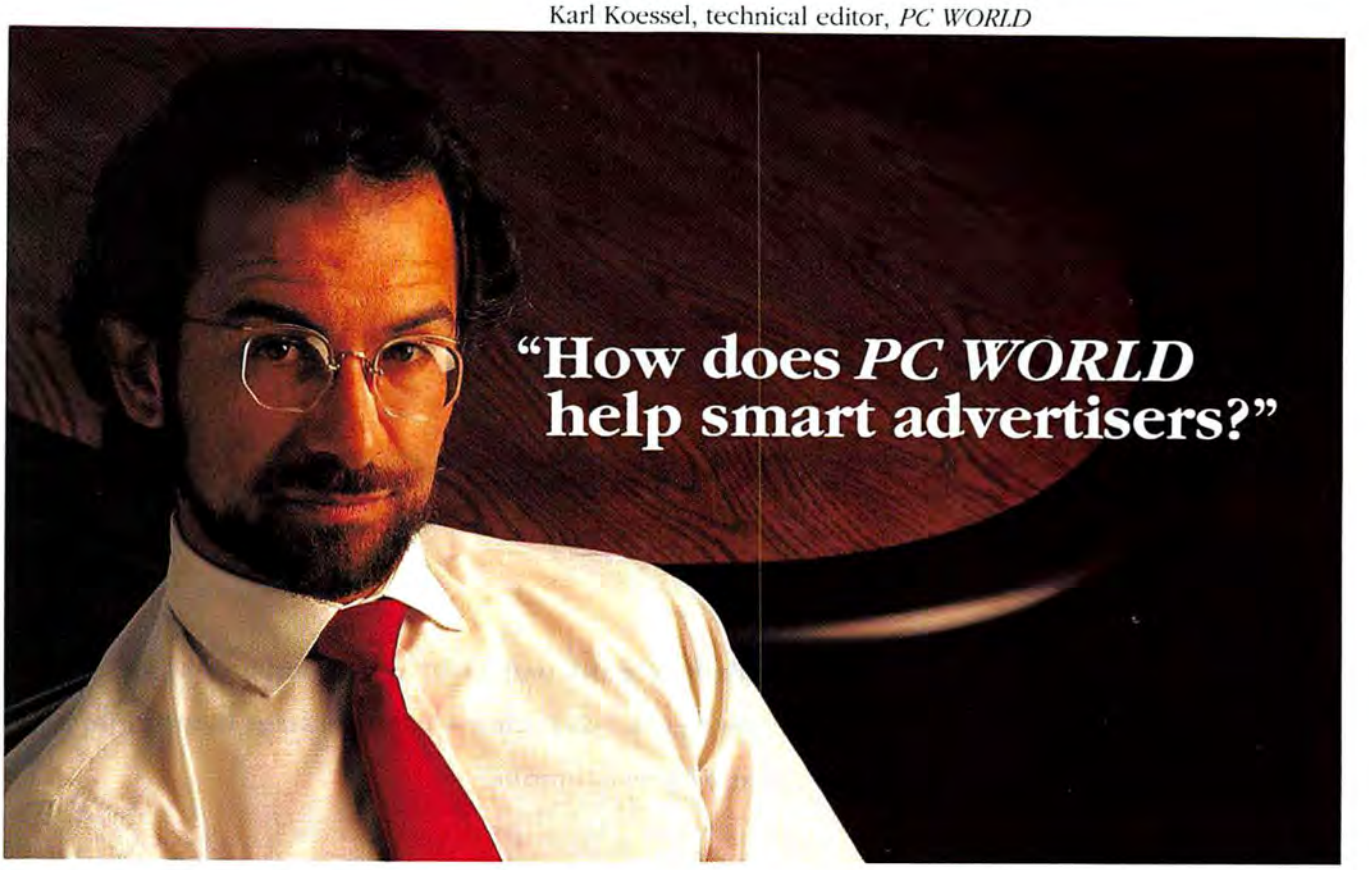
Karl Koessel, technical editor, *PC WORLD*



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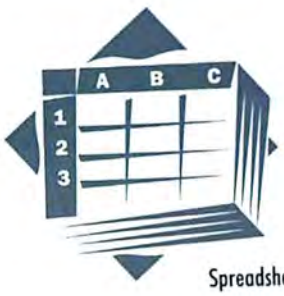
Business Graphics With Boardroom Appeal

Say goodbye to "quick and dirty" charts and graphs. Here's how to use 1-2-3 release 3 to turn sales figures into sophisticated presentations.



Spreadsheets

Evelyn Morrison

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When *1-2-3* arrived on the scene in 1983, its graphics were about as good as you could get on a PC. Unfortunately, the graphics capability of the world's most popular spreadsheet stagnated for six years, improving significantly only when release 3 appeared in 1989. Although still lagging behind the competition in some regards, *1-2-3*'s graphics have finally made the transition from merely functional to presentation quality.

Release 3 users can dress up their graphs with multiple fonts, a choice of colors and hatchings, and a choice of portrait or landscape orientation. More important, you can now easily dash off stock market graphs, area charts, mixed graphs, and even graphs with two *y*-axis scales.

The trade-off for this added pizzazz is a more complicated graphics menu system. But with practice, the menus will soon become second nature, and you'll be rewarded with graphs you can proudly display in a boardroom or include in a report.

This article explores some of *1-2-3* release 3's new graphics capabilities and walks you through the steps involved in generating a moderately complicated graph. The graph commands are a superset of release 2.01's, so familiar commands still work. Even release 2 macros designed for creating graphs will work in release 3.

In this example, you'll plot a company's monthly sales volume and show monthly performance

relative to preestablished goals. To follow along, set up the worksheet shown in **FIGURE 1**. Column B contains the monthly sales goals; actual sales figures appear in column C. The cells in column D contain a simple formula that calculates dollar volume as a percent of the goal. Enter the formula **+C6/B6** into cell D6, format it as a percentage, and simply copy it to the 11 cells below.

Drawing on the data in **FIGURE 1**, you'll create a "mixed" graph by plotting the actual sales figures as bars and the percent-of-goal data as a line. Because the scales for these ranges are drastically different, you'll also call upon *1-2-3*'s dual–*y*-axis capability to show your sales figures in thousands of dollars on the first axis and as the percent of your goal on the second.

If you have an EGA or a VGA display, you can split your screen vertically and display the graph beside your data. This way, you can watch the graph develop as you create it. In the READY mode, simply move the cell pointer to the middle of the screen (around column D or E) and issue a Worksheet Window Graph command. An empty white window will appear on the right half of your screen; as you proceed with the instructions below, the graph will take shape there, piece by piece.

Assign Data Ranges

The first step is to set the data ranges. In a mixed graph, release 3 plots bars from data assigned to graph ranges A, B, and C, and lines from data in ranges D, E, and F. Therefore, to graph the sales figures as bars and the percent of goal as a line, you assign them to ranges A and D, respectively.

1. In READY mode, select */Graph A* and enter **c6.c17** to specify the A range.
2. Select *D* and enter **d6.d17** for the D range.
3. To assign the column A month labels to the X range, select *X* and enter **a6.a17**.
4. To specify legends for the data ranges, select *Options Legend A* and enter **Sales**. Repeat the process for the data in graph range D, entering **Pct. of Goal** for the legend.

As long as you're still in the Options submenu, you can add a title. Rather than type the text, you can use a cell reference to pick up the label in cell A1. Select *Titles First* and enter **\a1**. (This technique, although available in earlier versions, has become practical only with release 3, which adjusts the reference when the cell is moved.)

Another release 3 enhancement lets you add footnotes of up to two lines. To add a footnote, select *Titles Note* from the Options submenu and enter **Prepared by Sales Management**. Footnotes always appear in the bottom left corner of the graph.

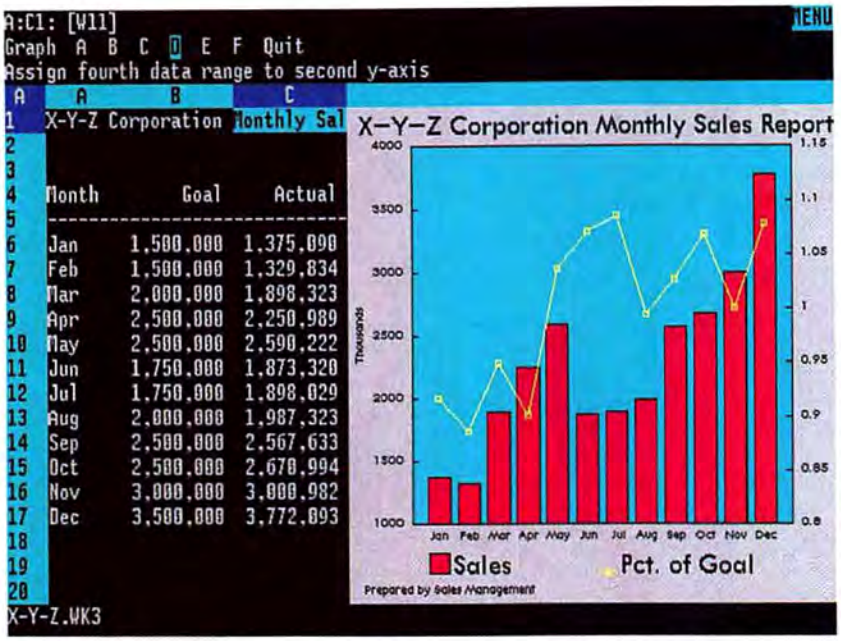
	A	B	C	D
1	X-Y-Z Corporation Monthly Sales Report			
2				
3				
4	Month	Goal	Actual	Pct. of Goal
5				
6	Jan	1,500,000	1,375,090	91.67%
7	Feb	1,500,000	1,329,834	88.66%
8	Mar	2,000,000	1,898,323	94.92%
9	Apr	2,500,000	2,250,989	90.04%
10	May	2,500,000	2,590,222	103.61%
11	Jun	1,750,000	1,873,320	107.05%
12	Jul	1,750,000	1,898,029	108.46%
13	Aug	2,000,000	1,987,323	99.37%
14	Sep	2,500,000	2,567,633	102.71%
15	Oct	2,500,000	2,670,994	106.84%
16	Nov	3,000,000	3,000,982	100.03%
17	Dec	3,500,000	3,772,093	107.77%

FIGURE 1: Enter this table in an empty 1-2-3 release 3 worksheet before creating your graph.

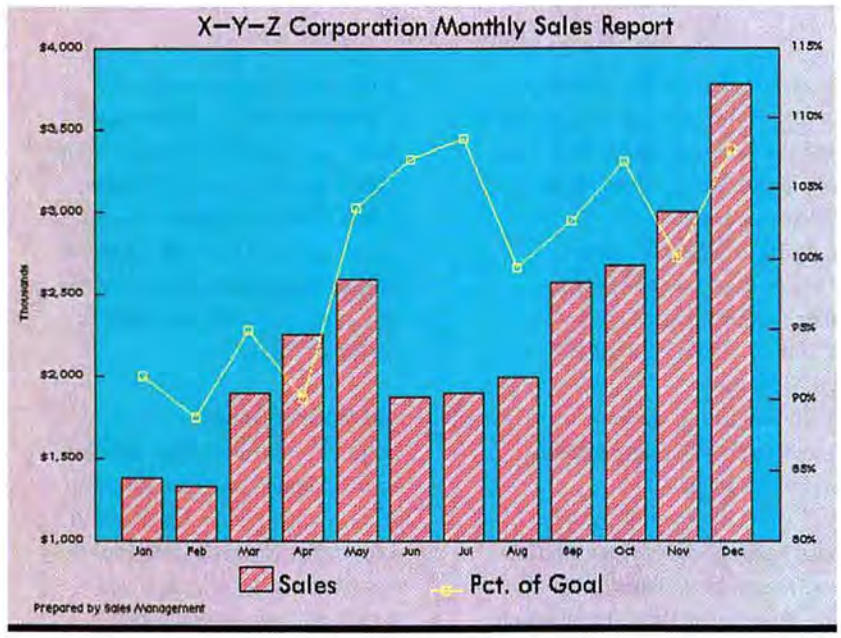
Set Up the Graph

So far, you've identified the data to be graphed, assigned legend names, and specified a title and a footnote. Now it's time to tell *1-2-3* what type of graph you want and how it should be formatted.

1. Press **<Esc>** to return to the main Graph menu.
2. Select *Type Mixed* to choose a mixed graph.
3. Select *Type Features 2Y-Ranges D*. This assigns data range D to the second *y*-axis, which will be scaled to show percentages.



SCREEN 1: Release 3 allows you to display a worksheet and a graph side by side on an EGA or a VGA screen.



SCREEN 2: The final graph shows properly formatted left and right axes and crosshatched bars.

4. Choose *Quit* two times to return to the main Graph menu.

If you haven't been watching the graph in split-screen mode, this is a good time to take a look at your progress. Select *View* or press <F10> to get a full-screen display of your efforts so far. At this point, your graph should resemble the right half of **SCREEN 1**, with a line laid over the bars. Pressing any key returns you to the worksheet.

Next, change the scale formats to improve the graph's appearance. You'll format the left *y*-axis as currency to correspond to the sales data in graph range A. The right *y*-axis will be scaled as percentages to handle the percent-of-goal data in range D.

1. From the main Graph menu, select *Options Scale Y-Scale Format Currency*.
2. Enter **0** for zero decimal places.
3. Press **<Esc>** to return to the previous menu.
4. To format the right *y*-axis, select *2Y-Scale Format Percent* and enter **0**.
5. Choose *Quit* twice to return to the main Graph menu.

Adding the Finishing Touches

Essentially, the graph is now finished (see **SCREEN 2**). However, to polish it for a presentation, you can customize it by specifying colors, fonts, and text sizes.

From the main Graph menu, select *Options Advanced*. This submenu lets you adjust the colors and hatchings of the graph elements and also select fonts, text size, and text colors. In this example, you'll change the bars from solid to crosshatched and then change the title's font.

1. Select *Hatches A* to adjust the A data range.
2. Cursor through the eight numbers to see each hatching option's description. Select *4* for 'Fine triple hatching'.
3. Select *Quit* to return to the Options Advanced menu.

To change the title's font to Font 1, select *Text First Font 1*, and then select *Quit* five times to return to READY mode. You'll notice that this has no effect on the display; although the menus offer eight fonts in nine sizes,

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1-2-3 can display text in only one typeface and, depending on your hardware, one to three sizes. So how does Font 1 look on your printer? Good question.

Relying on the screen when you're putting final touches on a *1-2-3* graph is a little like painting in the dark—you can't see what you're doing. Neither the menu prompts nor the displayed graph match the fonts and shadings that will be generated by your printer. Fortunately, release 3 provides a sample document, showing all possible typefaces and formatting options, which you can print out for reference. To print the sample, from READY mode select */Print Printer Sample Go*.

Printing the Graph

Release 3 lets you print or plot a graph without exiting the worksheet. To print the graph from the Print Printer menu, select *Go Quit Image Current*. You can continue to work while the graph prints in the background.

You can also print the graph below the data on a single page. One technique is simply to give the commands to print the worksheet range and the graph without issuing a page eject between them. However, a better method is to name the graph and issue a single command to print both.

1. Name the current graph "Sales" by selecting */Graph Name Create* and entering **Sales**.
2. Select *Quit* to return to READY mode.
3. Select */Print Printer Range* and enter **a1.d17;*sales**. The semicolon separates the two print ranges, and the asterisk tells *1-2-3* that the second range is actually a graph.
4. Select *Go Quit* to print the data and graph.

Lotus has improved *1-2-3*'s graphics capabilities considerably, but a number of presentation features are still missing. It would be handy to be able to add text and arrows anywhere in the graph, display two graphs side by side, or generate 3-D graphs. Still, release 3 is powerful enough to handle most graphics chores without forcing you to master a separate charting program.

TIPS & TECHNIQUES

Spreadsheets

Put It All Together With 1-2-3 File Links

For release 2.2 users, dynamic file links make for flexible, powerful worksheet consolidations. But watch out for some hidden traps.

What you need: 1-2-3 release 2.2

Sooner or later in your work with *1-2-3*, you'll need to pull information from one worksheet into another. In *1-2-3* release 2.01 you have to use the File Combine command. In release 2.2 there's a better way: dynamic file links.

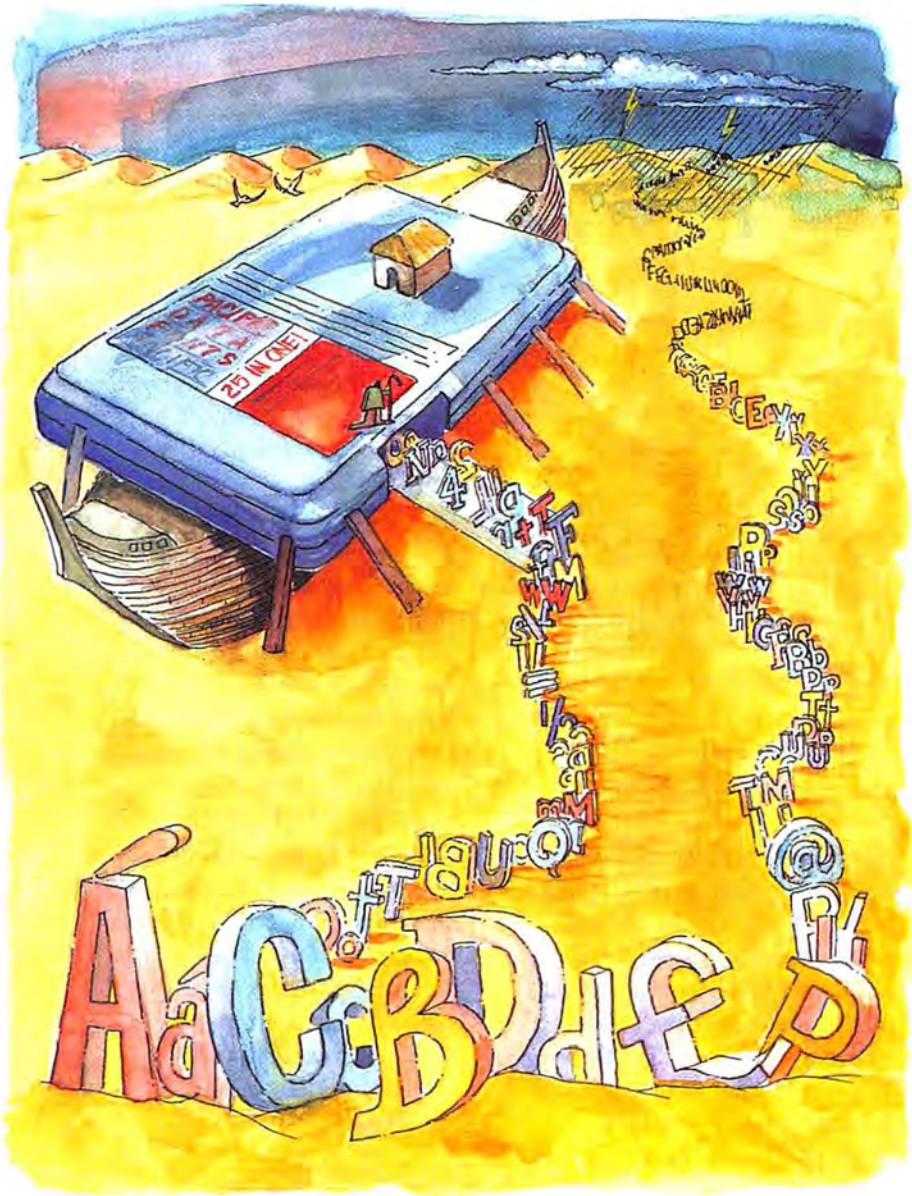
File links are one of *2.2*'s biggest advantages over earlier releases. Its "linking formulas" let you link a single cell of the active worksheet to the value of a single cell in a worksheet on disk. When you retrieve a worksheet containing linking formulas, *1-2-3* updates the value of the formulas to match the last calculated value of the referenced external cells. This is a big improvement over File Combine Copy, which simply copies the values of external cells into the active worksheet and must be repeated every time you want to update the information.

Links are most useful in consolidations; for example, when you generate a companywide earnings forecast from a set of departmental worksheets, or prepare an annual summary from 12 monthly reports. You can also use links to split spreadsheets too large to fit in memory into several manageable modules.

While file links are the most flexible way to extract information from external worksheets, File Combine Add macros still have their place when RAM is tight. Linking formulas use a lot more space—an additional cell for each value you extract. Using File Combine Add to total a 10-cell range from each of five external files involves only 10 cells in the active worksheet. Doing the same thing with linking formulas would take 60—10 for each file and 10 for the totals.

Forging a Link

Since release 2.2 can load only one worksheet at a time into RAM, a linking formula in the



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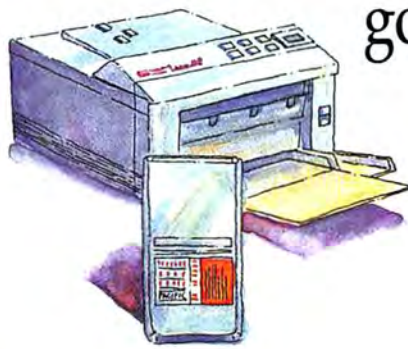

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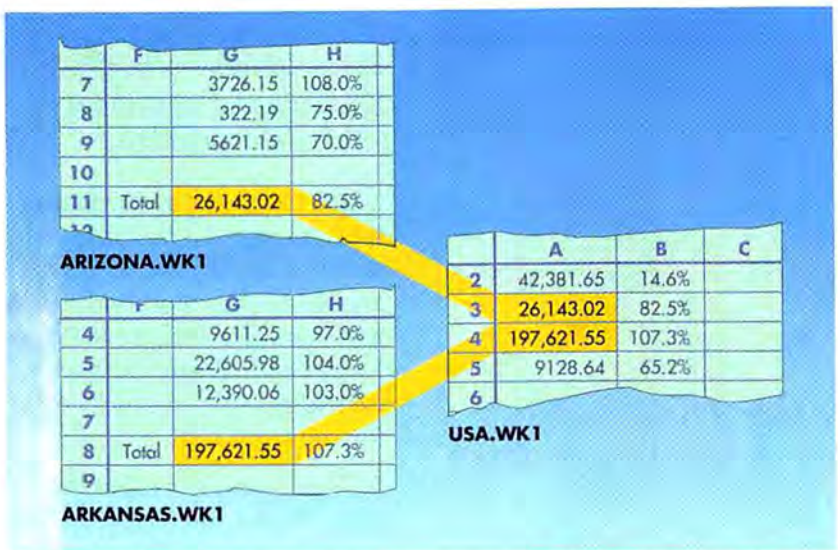

Column G totals from several source worksheets (two are excerpted at left) are consolidated by linking formulas in column A of USA.WK1.

current worksheet—which Lotus calls the target—references a source file on disk. To link to cell G16 of the external file TOPEKA.WK1, for example, you simply enter +<<TOPEKA>>G16 into a cell of the current worksheet.

If the disk-bound cell contains a value or label, the linking formula returns the contents of the cell. If the external cell is blank, the formula returns the value 0. When the external cell contains a formula or function, the linking formula returns only the result. For example, if the external cell contains the formula +1+2, the result of the linking formula is simply the value 3.

You can create as many links to as many disk-bound worksheets as you like. However, you can't just link a block of cells: If you enter +<<TOPEKA>>D4..G8, it will be truncated to +<<TOPEKA>>D4. This means you need a separate linking formula in the current worksheet for each cell you want to link to in the source. Nevertheless, since *1-2-3* adjusts a linking formula's source cell reference when you copy it, you can easily link a whole block of cells. If you copy A1 to A1..E8, A1..E8 will reflect the values of A1..E8 in TOPEKA.WK1. However, any absolute reference is left unchanged—copy +<<TOPEKA>>$A1 from A1 to B2, and B2 will contain +<<TOPEKA>>$A2.

As you can see, linking files is easy and straightforward. But traps await the unwary. Heed the following tips and you'll avoid erroneous results, tedious relinking, and other headaches.

Use External Data in Formulas

There's one major deficiency in *2.2*'s linking power: You can't directly refer to an external cell in a formula. You can work around this limitation by writing formulas referring to cells in the current worksheet that contain linking formulas, which in turn point to the desired source cells.

For example, suppose you want to multiply the value of cell B6 of the current worksheet by the value of cell G6 in TOPEKA.WK1. If you try to enter the formula +B6*<<TOPEKA>>G6, *1-2-3* will just beep at you and refuse to accept the formula. Instead, enter +<<TOPEKA>>G6 into an unused cell of the current worksheet, say K15. Then the formula +B6*K15 will produce the desired result.

Don't Change File Names

Avoid renaming files referenced in linking formulas—when you change the name of the source file, *1-2-3* loses the link. If you must change a file name, use Range Search Formulas Replace to update the linking formulas. To change the name of the source file from TOPEKA to SANTA_FE, you would use Range Search, enter a range large enough to include all the linking formulas, enter *topeka* as the string to search for, choose Formulas Replace, enter *santa_fe* as the replacement string, and choose All to change all references.

Include the Path When Changing Directories

Logging to a different directory can also break links. If you regularly change the default directory during a *1-2-3* session, always include the full path name of the source file in your linking formulas: for example, +<<C:\123\SALES\TOPEKA>>G16.

You must also include the full path in linking formulas when the source and current worksheets are in different directories. For instance, if your department has a LAN, you may need to link an active worksheet to source files on the server.

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Skip the Path When Moving Files

On the other hand, several people may need to work on the same set of linked worksheets. When they're passed from one person to the next, the files will likely end up in a directory with a different name, where linking formulas including the old path name won't work.

There are two ways to solve this problem. The simplest is to avoid using paths in the linking formulas and just put the files in your current default directory. If for some reason you must specify paths, update them with the Range Search Formulas Replace method discussed earlier.

Link to Named Ranges When Source Files Change

When you move data referenced by a linking formula from one cell to another, the linking formula still returns the value of the old cell—now incorrect. To avoid this problem, link to range names instead of cell references. Since range names are moved along with the cell entries to which they apply, you'll be sure to stay linked to the right data even when the external file is revised.

For instance, in the source file TOPEKA.WK1, you would use Range Name Create to name the one-cell range G16 "SALES." Then in the current file, you could replace the formula +<<TOPEKA>>G16 with +<<TOPEKA>>SALES. When you move the data in cell G16 of TOPEKA.WK1 to another cell, the range name moves along with it, and +<<TOPEKA>>SALES still returns the right value.

Note that when you link to a multicell named range, the linking formula returns the value of only the top left cell of the range—not the sum of all the values, as you might expect.

Recalculate Your Worksheets

In many cases, a linking formula may reference a source cell containing a formula or function. Unfortunately, *1-2-3* may not return the correct result if the source worksheet is set for manual recalculation—and you forget to recalculate after making changes.

You can easily avoid such problems by always recalculating worksheets before you save them. If your source files come from someone else, be on the safe side and retrieve, recalculate, and save every linked file.

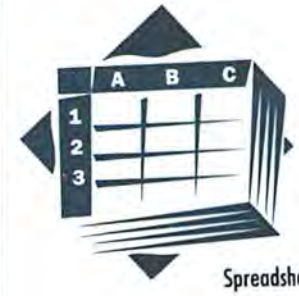
Even with automatic recalculation, false values can easily occur when you have a hierarchy of linked files. Say summary files for each county in Kansas are consolidated by linking formulas in KANSAS.WK1, which in turn contains source cells used by linking formulas in USA.WK1. If you update linked data in a county worksheet, data in USA.WK1 won't be current until you update the linking formulas in KANSAS.WK1 by retrieving, recalculating, and saving it.

Keep Links Up-to-Date on LANs

On a LAN, someone else can edit a source file referenced by linking formulas in your active worksheet. However, changes in the linked external data are not automatically reflected in your worksheet. Before you can update your active worksheet, the other user must first save the source file. Then you use the File Admin Link Refresh command to update the values of your linking formulas.

When 2.2 Just Won't Do

1-2-3 release 2.2's cell-linking facility is a great tool—up to a point. With *1-2-3* release 3 you can refer to external ranges directly in formulas and functions; if an external file is in memory, you can even specify an external range with pointing techniques. If you regularly consolidate large amounts of data, seriously consider the upgrade to *1-2-3* release 3. —*Steven Stewart Cobb*



Spreadsheets

Build Your Own Easy-to-Use Excel Functions

User-defined functions can take Excel to new levels of power and performance. Here's how to create and use function macros—and get a nifty financial tool in the process.

What you need: Microsoft Excel

Most spreadsheet users have to be satisfied with the 100 or so functions that come with their programs. But with *Microsoft Excel*, you can create your own custom functions using *Excel*'s macro language. These "function macros" quickly per-

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form calculations, saving time and eliminating typos.

A function macro is similar to a built-in function such as SUM(), except that the user defines its purpose. It accepts *arguments* (values or cell references), carries out the operations you've defined, and returns the results. You set up a function macro by opening a new macro sheet, naming the function, and typing in the desired parameters. Save the function macro, and it's placed in the Paste function menu along with *Excel*'s built-in functions.

With a built-in function, you can paste in the function and its arguments by first turning on the Paste arguments check box within the Formula Paste function dialog box. For example, for IF() you get IF(logical_test, value_if_true,_value_if_false). Pasting a function with its arguments in place is useful when you don't remember what they are or what their order is. If you follow the advice in the *Excel* manual, however, the function macros that you paste into a worksheet won't include their arguments. A second hassle: Every time you use a function macro in a formula, you must reference the name of the macro sheet that holds the function. Luckily, with two little-known tricks discussed here, you can iron out these wrinkles in no time flat and make function macros as easy to use as *Excel's* built-in functions.

How to Build a Function Macro

If you're new to function macros, check out this quick overview. If you already know how function macros work, go to the next section, "Setting Up the Sustainable Growth Macro."

Suppose you travel overseas and need to monitor the weather. You're used to reading temperatures in degrees Fahrenheit, but most places you visit use the Celsius scale. Here's a function macro that accepts your Celsius input (the argument), converts it to Fahrenheit, and then returns the result.

To set up this macro, you'll open a new macro sheet, name it, specify the argument using *Excel*'s ARGUMENT() function, type in a formula that uses the argument, name that formula cell, and use the RESULT() function to return the answer. Then you'll open a separate worksheet and actually use the macro.

1. Open a macro sheet by choosing *File New Macro sheet OK*.
2. In cell A2, type **Convert** (the macro's name), and press **<Enter>**. To name the function macro, select *Formula Define name;* the program will suggest *Convert*. Select *Function* at the bottom of the dialog box, and then *OK*.
3. In cell A3, type **=argument("Celsius")**. This function defines the function macro's argument, Celsius.
4. In cell A4, type the Celsius-to-Fahrenheit conversion formula: **=Celsius*9/5+32**.
5. In cell A5, type **=return(Fahrenheit)** to indicate that the macro will finish here and that it should return the value that is in the cell named Fahrenheit.
6. Go back to cell A4 and select *Formula Define name*. Type **Fahrenheit** and press **<Enter>** to name that cell.
7. Save the macro sheet and name it **temp**.
8. To use the macro, open a new worksheet, from any cell select *Formula Paste function*, and pick *TEMP.XLM!Convert()* from the bottom of the list.

Select *OK*, and *TEMP.XLM!Convert()* will appear in the formula bar. All you need to do now is type a number representing degrees in Celsius between the two parentheses. To see the function in action, type **20** and press **<Enter>**. The program will convert the Celsius number and return a balmy 68 degrees Fahrenheit.

Setting Up the Sustainable Growth Macro

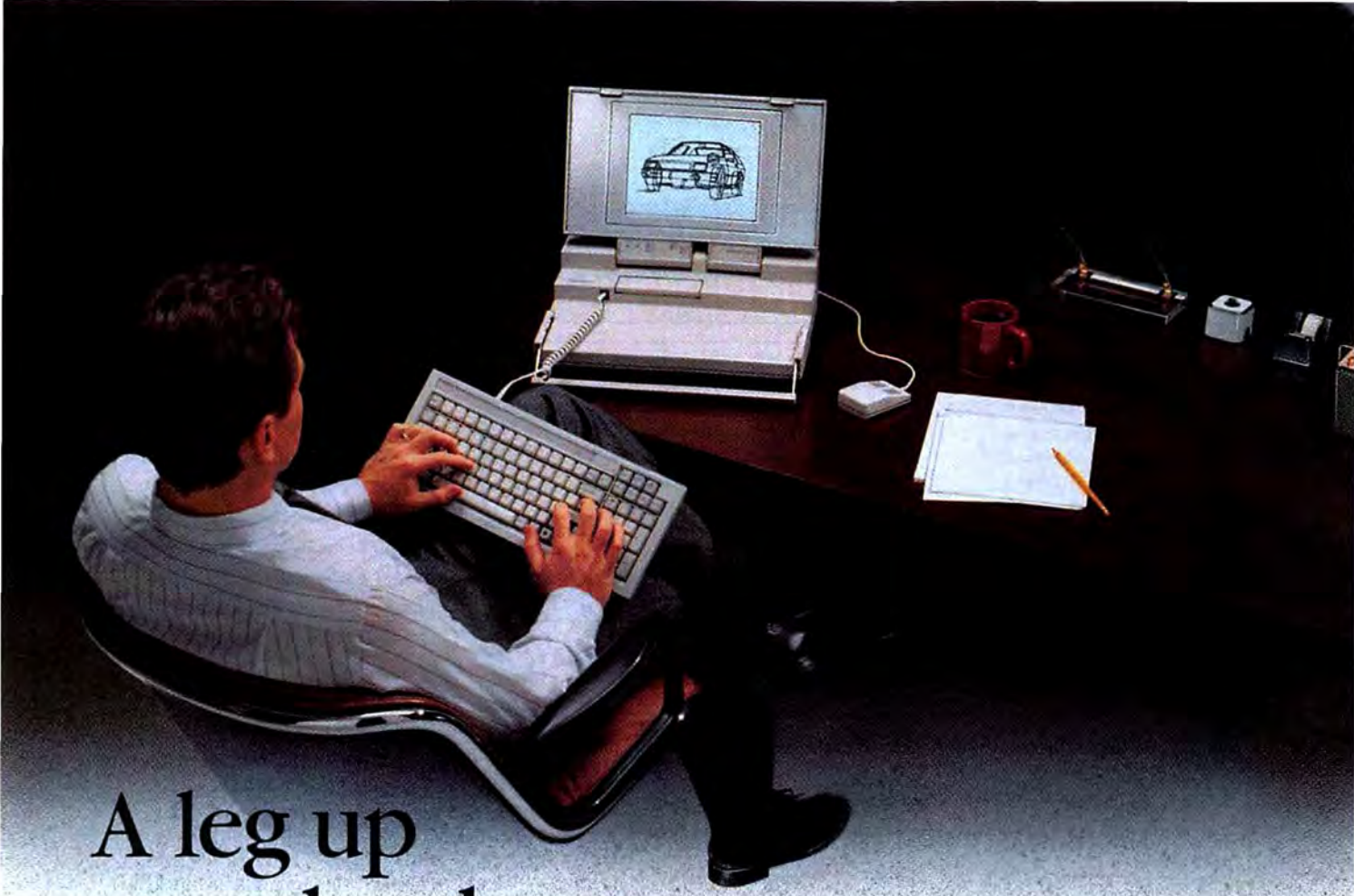
SCREEN 1 shows a macro sheet that performs a sustainable growth calculation and illustrates some of the function macro tricks hinted at earlier. Notice that **SCREEN 1** is actually composed of two sheets: a macro sheet at the top that contains the function macro, and a worksheet at the bottom that contains financial values and shows the function macro in use.

POWER TIP NO. 94

dBASE IV: Without Assistance

If, when you enter *dBASE IV*, you want to be at the dot prompt rather than the Control Center, either remove the line 'Command = Assist' from the CONFIG.DB file or put an asterisk in front of it. If you would like *dBASE* to start automatically with one of your own programs, add the line 'Command = do *program*' where *program* is the name of your PRG program file.

Joseph Ryan
Hilton, New York



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PROCESSOR/CLOCK SPEED	80286/16 MHz	80C286/12 MHz	80C286/16 MHz	80286/12 MHz	80286/12 MHz
STANDARD/MAX. MEMORY	1 MB/5 MB	640 K/3.6 M	1 MB/5 MB	1 MB/5 MB	1 MB/3 MB
MODEM (BUILT-IN)	YES	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
MOUSE—INCLUDED	YES	NO	NO	NO	NO
3.5" DRIVES	1.44	1.44	1.44	1.44	1.44
HARD DISK DRIVES	40	40	40	40	40
RESOLUTION	640×480	640×480	640×480	640×400	640×480
BATTERY CAPABILITY	YES	YES	YES	YES	YES
PC COMPATIBLE SLOT	YES	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
KEYBOARD KEYS	101	83	82	86	79
LIST PRICE	$3999	$5999	$5999	$5599	$5999

Besides being powerful enough to double as your desktop computer, you'll be impressed with Altima's speed. That's because there's no faster 286 laptop on the market.

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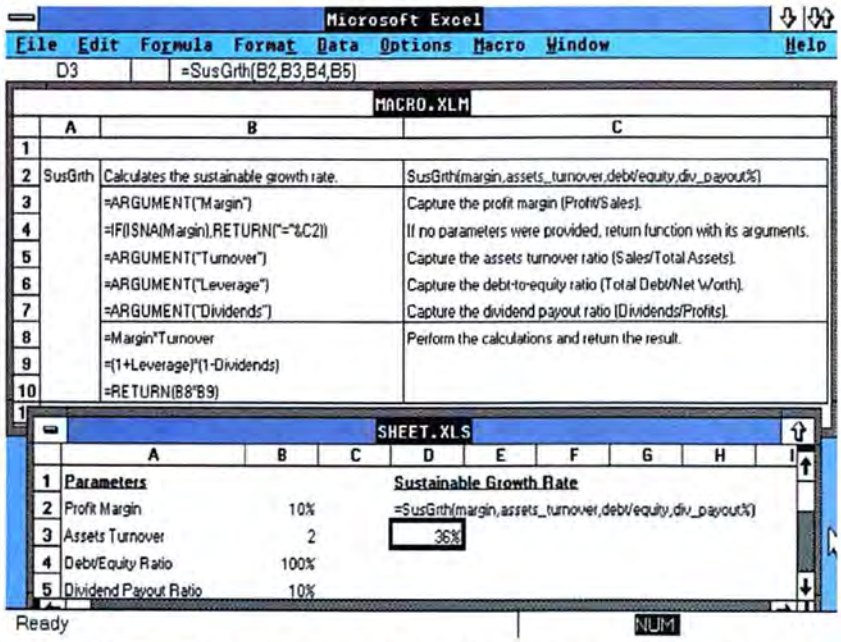

SCREEN 1: The sustainable growth calculation illustrated here can help you expand your business while keeping the debt-to-equity ratio constant, and it demonstrates two nifty function macro tricks to boot.

The function macro calculates the sustainable growth rate, the maximum growth rate a business can maintain without increasing its debt-to-equity ratio. The growth rate is equal to the firm's return-on-equity ratio (calculated by the first three arguments shown on the screen: Margin, Turnover, and Leverage) as reduced by the fourth argument, Dividends (the dividend payout ratio). The calculation is based on the assumption that over the long term, you want sales, assets, and liabilities all to grow at the same pace. The calculation shown in cell D3 of the worksheet will tell you at what rate you can increase sales and have liabilities grow at the same rate.

To set up this application, you'll type in the function macro shown at the top of the screen, perform some basic formatting operations, and name the macro. Then you'll type in the function macro's steps shown in column B, which use ARGUMENT() functions to gather values, a couple of formulas that include those values, and the RETURN() function to send back the calculated result.

The first trick is in cell B4. The formula here enables you to paste the function macro with its arguments. You can use this formula in your own function macros by replacing *Margin* with the first argument you plan to use and replacing the function macro and its arguments in cell C2 with your own.

Next, you'll create the worksheet at the bottom of the screen, entering in cells B2 through B5 the values that the macro will use in its calculations. You'll use the function macro in cell D3 and see the results of the sustainable growth calculation there. Finally, you'll test the paste-with-arguments trick.

1. To open a new macro sheet, choose *File New Macro sheet OK*.
2. Turn off its grid lines by choosing *Options Display*, deselecting *Gridlines*, and selecting *OK*.
3. Select *Format Font 1 Fonts Helv 8 OK* to change to a smaller font so you can see everything. Type the macro label **SusGrth** into cell A2. Then adjust the column widths as shown.
4. To name the macro, go to cell B2, and choose *Formula Define name*. *Excel* will suggest the name *SusGrth*. Select *Function* at the bottom of the dialog box, and then *OK*.
5. Enter the description of the SusGrth macro's purpose as shown in cell B2, and enter the macro with its arguments as shown in cell C2.
6. Enter the formula shown in cell B3. This formula assigns the value of the first argument to the range name *Margin*.
7. Enter the formula shown in cell B4: **=if(isna(Margin),return("="&c2))**. This is the formula that pastes the function macro with its arguments into your worksheet. The formula tests for arguments by checking whether the first argument, Margin, is present. If you omit the arguments when you enter or paste in the function macro, *Excel* will assign the error value NA to the name *Margin* and return an equal sign and any text—in this case, the macro function with its arguments—present in cell C2.

Later, you'll test this formula by pasting *=MACRO.XLM!SusGrth()* into the worksheet, deliberately omitting the arguments. The program will obligingly supply *=SusGrth(margin,assets_turnover,debt/equity,div_payout%)*.

8. Enter the formulas shown in cells B5 through B7; those for-

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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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Documentation	(100)	Excellent	Good	Excellent	Satisfactory	Very Good
Ease of learning	(100)	Very Good	Satisfactory	Excellent	Good	Very Good
Ease of use	(100)	Satisfactory	Satisfactory	Very Good	Satisfactory	Good
Error handling	(75)	Good		Good	Satisfactory	Good
Support			Satisfactory	Very Good	Poor	Poor
Support policies	(50)	Satisfactory	Very Good	Excellent	Good	Good
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mulas capture the remaining arguments required to calculate the sustainable growth rate.

9. Enter the macro's formulas in cells B8 through B10. These formulas calculate the sustainable growth rate.

10. Next, enter the documentation shown in cells C3 through C8.

11. Finally, to add borders, highlight the range A2 through C10 and select *Format Border Outline Left Right OK*. Highlight the area B8 through C10, and select *Format Border Outline OK*. Then highlight cells *B2* and *C2*, and choose *Format Border Outline OK*. Save the macro sheet as **macro.xlm**.

Setting Up the Sustainable Growth Worksheet

Now that you've finished setting up the macro, you'll create the worksheet containing the values the macro will work on, use the macro, and see the result of its calculation.

1. Open a new worksheet and size it to fit under the macro sheet.

2. Set the font to Helv 8 as you did for the macro sheet, and enter the labels in column A at the bottom of the screen.

3. Format cells B2, B4, B5, and D3 for percent using *Format Number 0%* and then enter the values shown in cells B2, B3, B4, and B5. These are typical examples of financial data that the macro will use to perform its calculations.

4. In cell D1, type in the label **Sustainable Growth Rate**.

5. Now paste in the function without its arguments. Go to cell D2 and select *Formula Paste function*. Pick *MACRO.XLM!-SusGrth()* from the bottom of the list. Select *OK*, and the function macro, minus arguments, will appear in the formula bar. Press **<Enter>**, and the function macro and its arguments appear in cell D2 as shown.

6. Instead of picking the function from the list, you can simply type it in. Go to cell D3 to do so, but this time include cell references for the arguments by typing **=macro.xlm!susgrth(b2,b3,b4,b5)**. Press **<Enter>**, and the result of the function macro, *36%*, will appear. Apparently, this business can grow at a very healthy rate.

7. Finally, select *Options Display* and turn off the grid lines in your worksheet. Select cells *A1* and *D1*, and add formatting enhancements by selecting *Format Font 2 Fonts Helv 8*. In the Style box, select *Underline*, and if the Bold check box doesn't contain an *X*, choose *Bold*. Then select *OK* and save the worksheet as **sheet.xls**.

Function Macros Meet Formulas

The finishing touch is to eliminate the need to supply a macro sheet reference when you use function macros in formulas. The trick is relatively simple: Just define the name of each function macro within your worksheet. Once that's done, you won't have to enter *=MACRO.XLM!-SusGrth(B2,B3,B4,B5)* to use the SusGrth macro, but only *=SusGrth(B2,B3,B4,B5)*.

With the pointer on a blank cell in SHEET.XLS, choose *Formula Define name*. At the Name: prompt, type **SusGrth**; at the Refers to: prompt, type **=macro.xlm!SusGrth** and select *OK*.

Having assigned this name in your worksheet to the name of a function macro, you can use it just as you would any standard *Excel* worksheet function. As a test, go to cell D2, press **<F2>** to edit the formula, and delete *MACRO.XLM!*, leaving behind *=SusGrth(B2,B3,B4,B5)*. Press **<Enter>**, and the same result, *36%*, pops into the cell.

Now your function macro is indistinguishable from a built-in *Excel* function. But to avoid confusion, use uppercase and lowercase letters in your function macro names.

POWER TIP NO. 95

Run Windows Apps Inside Desqview/386

If you are a *Desqview/386* user, you can still run *Windows*-based programs. To run an application in its *Windows* run-time version, simply set up a *Desqview* task that calls the program by its executable file name, such as EXCEL.EXE. To run *Windows/286* within *Desqview*, call WIN.COM. The problem with *Windows/386* is that both it and *Desqview/386* want to control the 80386's virtual 8086 mode. The solution? Bypass WIN386.EXE, which controls the virtual 8086 mode, and set up a *Desqview* task that runs the program WIN86.COM. You can then run *Windows* applications inside *Windows/386* and DOS programs in *Desqview* simultaneously.

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Substituting References for Arguments

When you eliminate the function macro's file name from formulas, you gain an additional benefit. Suppose you've forgotten which arguments a function macro requires. You can remind yourself by pasting in the arguments and then using *Excel*'s Point mode to substitute the desired cell references for the arguments. To see what I mean, follow these steps:

1. Enter **=SusGrth()** into cell D3 of SHEET.XLS, and press **<Enter>**. The macro will return the text value *=SusGrth(margin,assets_turnover,debt/equity,div_payout%)* in that cell, but the formula bar shows only *=SusGrth()*.
2. To display the SusGrth() function's arguments, turn on *Excel*'s edit mode by pressing **<F2>**, then press **<F9>** (Calculate All).
3. Now you can easily replace each argument with its appropriate cell reference. Highlight the argument *margin* in the formula bar (mouse users can do so by simply double-clicking the argument), then click on cell *B2*, which contains the value for the profit margin. *Excel* will replace *margin* with *B2*, the cell that contains the value you want.
4. Substitute the cell for the remaining arguments, *assets_turnover*, *debt/equity*, and *div_payout%*. Highlight the arguments in turn, and click cells *B3*, *B4*, and *B5*, respectively.
5. Finally, press **<Enter>**, and *Excel* returns the completed formula, as shown in the formula bar at the top of **SCREEN 1**.

As you can see, function macros are a powerful tool for turning a generic power spreadsheet into a tailor-made analytical tool. And with these tips, your function macros will be easier to create, use, and remember.

—*Charles Kyd*

Spreadsheets

Excel Q&A: Ten Common Problems (and How to Solve Them)

With the help of Microsoft's technical support staff, an Excel master offers expert answers to ten perplexing spreadsheet problems.

What you need: Microsoft Excel

Excel may be the most intuitive yet powerful spreadsheet in the universe, but it can still throw novice and expert spreadsheet users a curve. Answering even basic questions can require hours of intensive sleuthing in the *Excel* manual.

After consulting Microsoft's technical support crew—and after reflecting on my years of helping people use *Excel*—I pulled together ten of the questions most commonly asked by *Excel* users. The queries range from the simple to the complex, but chances are most *Excel* users have wrestled with a couple. If you're struggling with formatting, formulas, printing wide worksheets, or just sluggish macros, read on.

Q. *How do I round cell values to the nearest multiple of 5 in* Excel?

A. Create a formula that divides the value by 5, then rounds that number to the nearest integer. Finally, multiply that value by 5. The formula would take the following form:

=ROUND(*formula*/5,0)*5

Q. *When I create an area chart,* Excel *plots all numbers as absolute values, so negative numbers show up as positive. How can I remedy this?*

A. To display the negative values on the chart (so the series markers dip below the horizontal axis), you must change the formatting of the chart as follows:

With the chart in the active window, select *Format Main chart*. Then uncheck the *Stacked* box under the Format section, and click *OK*.

Q. *I have a worksheet containing very large numbers (like $60,185,350,000) that I need to round to millions of dollars for display purposes. Yet I also need to reference the exact values in other formulas. How can I get rid of the unwanted digits?*

A. You can't use the ROUND function, because it would change the actual values. The only solution is to create a custom number format—in this case, #,##0,,.

Highlight the desired cells in the worksheet, select *Format Numbers*, pick *#,##0* from the list of formats, and add two commas on the Format: line. Click *OK*, and the custom format is applied. By not placing any # or 0 to the right of the trailing commas, you're telling *Excel* to show only significant digits in the millions place. Thus 16,568,974 would be displayed as 17.

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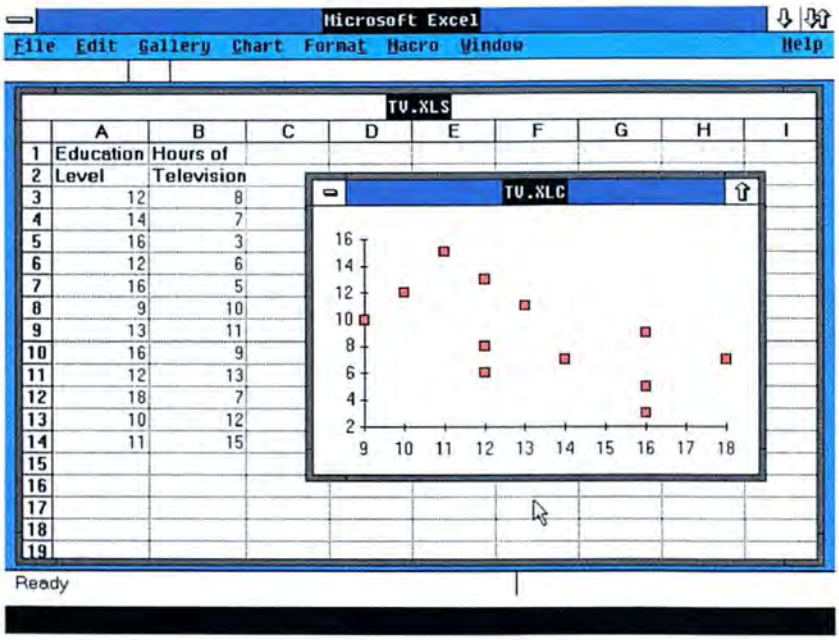

	A	B	C	D	E	F	G	H	I
1	Education	Hours of							
2	Level	Television							
3	12	8							
4	14	7							
5	16	3							
6	12	6							
7	16	5							
8	9	10							
9	13	11							
10	16	9							
11	12	13							
12	18	7							
13	10	12							
14	11	15							
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19									

SCREEN 1: It's easy to create a scatter chart with Excel. Select the data in a worksheet (such as TV.XLS), select a few commands, and pick the chart you want from a gallery of examples.

Q. *I work hard to make my worksheets presentable before I show them to my boss. But sometimes I'm too rushed to properly format part of a worksheet. Is there a quick way to copy formats from one cell to another?*

A. Yes. Select the cell with the desired formatting, select *Edit Copy*, highlight the target cell or range you want to copy the format to, and select *Edit Paste special*. Check off *Formats* in the Paste box, click *OK*, and you're done. You can also copy other elements, such as formulas, values, and notes.

Q. *I have some survey results, and I need to plot one variable against another. How can I do this in* Excel?

A. By creating a scatter chart, otherwise known as an *x-y* plot.

Let's suppose you surveyed people concerning their years of education and the number of hours per week they spent watching television, and you received the responses shown in TV.XLS in **SCREEN 1**. To create a scatter chart from this data, type the data into the range A3:B14 in a new *Excel* worksheet. Then

1. Select the range A3:B14.
2. Choose the *Edit Copy* command.
3. Select *File New* and then *Chart* from the dialog box, and click *OK*.
4. Select *Edit Paste special*.
5. Check the *Categories in first column* box, and click *OK*.
6. Choose *Gallery Scatter*, and select the first example scatter chart in the top left corner. Click *OK*, and the scatter chart will pop onto the screen. At this point you can save the chart, add labels, and further manipulate it.

Q. *Once I've designated a portion of a worksheet as the print area using* Options Set print area, *I can't seem to reset the print area for the entire worksheet. What am I doing wrong?*

A. When you choose *Options Set print area*, *Excel* assigns the name 'Print_Area' to the selected portion of the worksheet. To reverse the settings, simply select *Formula Define name*, highlight 'Print_Area' in the subsequent dialog box, and click *Delete*.

Q. *I've got a really wide month-to-month sales worksheet that compares current- and last-year figures. I'd like to print a condensed version for management that contains only summary figures and omits the detail. However, the Options Set print area command won't let me define a print area consisting of two or more discontinuous ranges. What do I do?*

A. The simplest approach is to hide the columns you don't need. Display the entire worksheet on screen by reducing the font size to 6 points (see **SCREEN 2**). Let's say you want the summary to contain only 1989 and 1988 totals, along with the percentage increase or decrease.

Select the columns between the labels and the totals (in this case, C through H), and reduce the column width to zero (see **SCREEN 3**). Then simply choose *File Print*.

To restore columns C through H to normal width, move the cursor to column C (the cursor will seem to disappear). Press <F8> (the Extend key), then press <Cursor Right> five

(continues)

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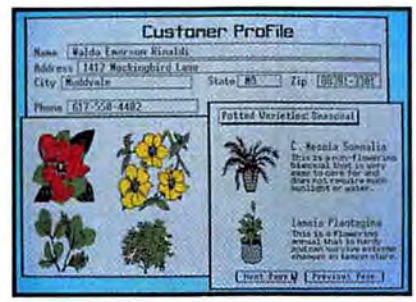

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File Edit Formula Format Data Options Macro Window Help

L1

	A	B	C	D	E	F	G	H	I	J
1					MONTHLY SALES				Second Half	Same P
2			Jul 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89	1989 Sales	Last Y
4	Northeast Region									
5		Fruit Crunchies	2,552,025	2,714,425	2,813,475	2,804,900	2,907,275	3,020,500	16,812,600	14,6
6		Cocoa Whizzes	1,589,350	1,561,525	1,530,725	1,630,825	1,679,650	1,702,050	9,694,125	9,2
7		Honey Hearts	2,425,675	2,383,675	2,393,125	2,402,750	2,361,275	2,370,725	14,337,225	13,8
8		Oat Bran Daffies	3,281,775	3,300,325	3,245,725	3,317,825	3,262,175	3,271,100	19,678,925	18,8
9		Wheat Germ Delights	475,650	496,475	551,087	705,392	951,873	1,157,834	4,338,311	3,3
10										
11	Southeast Region									
12		Fruit Crunchies	1,898,998	1,880,931	1,888,390	1,870,489	1,877,948	1,960,047	11,276,801	10,4
13		Cocoa Whizzes	1,083,011	1,052,844	1,111,354	1,115,829	1,120,304	1,124,780	6,608,121	6,2
14		Honey Hearts	1,432,080	1,452,467	1,447,329	1,425,450	1,454,622	1,488,104	8,700,052	8,2
15		Oat Bran Daffies	2,281,549	2,303,594	2,387,132	2,495,698	2,481,278	2,565,810	14,515,059	13,0
16		Wheat Germ Delights	506,366	528,411	676,366	714,863	915,025	1,171,232	4,512,263	3,2
17										
18	Midwest Region									
19		Fruit Crunchies	2,797,031	2,770,843	2,801,175	2,857,199	2,830,513	2,887,199	16,943,960	16,0
20		Cocoa Whizzes	1,453,462	1,503,518	1,557,387	1,623,356	1,703,579	1,757,447	9,598,748	8,6
21		Honey Hearts	2,615,867	2,624,486	2,634,928	2,645,536	2,656,144	2,604,430	15,781,389	14,9
22		Oat Bran Daffies	2,911,067	2,832,005	2,755,097	2,680,178	2,607,413	2,536,638	16,322,397	16,6
23		Wheat Germ Delights	787,478	817,148	947,891	981,765	1,256,659	1,608,524	6,399,465	5,3
24										
25										
26										
27										

Ready

SCREEN 2: Need to turn a jumbo worksheet into a summary statement? The trick is reducing the width of unneeded columns (such as C through H) to 0. The result...

Microsoft Excel - RGNSALES.XLS

File Edit Formula Format Data Options Macro Window Help

O1

	A	B	I	J	K	L	M	N
1			Second Half	Same Period	Percentage			
2			1989 Sales	Last Year	Change			
4	Northeast Region							
5		Fruit Crunchies	16,812,600	14,623,103	15.0%			
6		Cocoa Whizzes	9,694,125	9,206,976	5.3%			
7		Honey Hearts	14,337,225	13,899,118	3.2%			
8		Oat Bran Daffies	19,678,925	18,804,571	4.6%			
9		Wheat Germ Delights	4,338,311	3,325,475	30.5%			
10								
11	Southeast Region							
12		Fruit Crunchies	11,276,801	10,481,257	7.6%			
13		Cocoa Whizzes	6,608,121	6,205,650	6.5%			
14		Honey Hearts	8,700,052	8,205,818	6.0%			
15		Oat Bran Daffies	14,515,059	13,073,274	11.0%			
16		Wheat Germ Delights	4,512,263	3,201,479	40.9%			
17								
18	Midwest Region							
19		Fruit Crunchies	16,943,960	16,026,989	5.7%			
20		Cocoa Whizzes	9,598,748	8,628,336	11.2%			
21		Honey Hearts	15,781,389	14,988,915	5.3%			
22		Oat Bran Daffies	16,322,397	16,680,415	(2.1)%			
23		Wheat Germ Delights	6,399,465	5,312,250	20.5%			

Ready

...is shown here in SCREEN 3. The detail columns are suppressed, and only the summary information is displayed.

times. Select *Format Column width*, and enter the desired width.

Q. *I recorded a macro that enters a large number of formulas and values into various sections of a worksheet. But the extensive cell movement bogs down macro execution. Is there any way to speed things up?*

A. When you record a macro, *Excel* generates a list of macro commands in a macro sheet. Every time you move to a cell and enter a value, a formula, or a cell reference (hereafter collectively referred to as *formulas*), both a SELECT() function and a FORMULA() function are added to the list, as, for example:

=SELECT("R1C1")
=FORMULA("Employee")
=SELECT("R2C1")
=FORMULA("Number")

Each individual function increases the time it takes to complete a macro. SELECT() functions, which move the cell pointer, are especially time consuming.

Fortunately, you can speed things up by editing the macro so that FORMULA() "pokes" formulas into specific cells without using SELECT(). Simply open the macro sheet and replace each SELECT()/FORMULA() pair with a single FORMULA() function that includes the target cell's reference as the function's second argument. The previous example would then read:

=FORMULA("Employee", "R1C1")
=FORMULA("Number", "R2C1")

If you want to specify the target relative to some other cell (the active cell, say), you can include an OFFSET() function as the second argument of the FORMULA() function, as in:

=SELECT("R1C1")
=FORMULA("Employee",OFFSET(ACTIVE.CELL(),0,0))
=FORMULA("Number",OFFSET(ACTIVE.CELL(),1,0))

OFFSET()'s last two arguments specify the number of rows (down) and columns (across) from the first argument, which in this example is the ACTIVE.CELL() as defined by SELECT().

(continues)

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Q. *We have a few Macintoshes running* Excel *in our office, and we need to move worksheet files between the PCs and the Macs. How do we do this?*

A. You can pass PC and Macintosh files via a common directory on a server if your systems are networked, or via floppy disks if one of your Macintoshes has a drive that can read PC disks (Dayna Communications' DaynaFile is one example). Or, if you have a recently manufactured Macintosh IIcx or IIci and Macintosh Operating System version 6.0, you can use either of those systems' SuperDrive floppy disk drive and the Apple File Exchange facility to read PC disks.

Just remember that both PC and Mac *Excel* files must be saved in the SYLK format using *File Save as Options SYLK OK*. Also, PC *Excel* uses a different date system than its Mac counterpart. Before you enter any dates in your DOS *Excel* worksheets, you must select *Options Calculation* and turn on the *1904 date system* check box. When you move Mac *Excel* files saved in the SYLK format to the PC, the 1904 date system is automatically set for you.

Q. *A financial template I've developed for my staff incorporates formulas that divide existing worksheet values by values the user enters. Unfortunately, when you first load the template, it displays numerous #DIV/0! error messages, indicating an attempt to divide a number by zero. Some new users find the error messages disconcerting. Is there any way to suppress them but still display the computed values once the template is filled in?*

A. The trick is to display a space whenever a cell returns any of *Excel*'s error values. For example, if you were dividing 5 by the value of cell B11, you'd use the formula =IF(ISERROR(5/B11), " ",5/B11).

The second argument in the ISERROR function, a space enclosed by quotes, ensures that a space is displayed if an error is returned. Once a value is entered in cell B11, the result of 5 divided by the value of cell B11 will be returned. —*Ralph Soucie*

Evelyn Morrison is a marketing manager for a retail clothing chain headquartered in the San Francisco Bay Area. Steven Stewart Cobb is a senior author for The Cobb Group, a publisher of books and journals about microcomputer software. Charles Kyd is a writer and consultant in Lynnwood, Washington, and the author of the forthcoming Complete Guide to Excel Macros *(Microsoft Press, Redmond, Washington). Ralph Soucie is a contributing editor for* PC World *and the author of* Learn Microsoft Excel Now *(Microsoft Press, 1990).*

USER GROUP TIPS

Helpful hints from members of the nation's user groups

Listing Your Files by Date

Although a list of files in order by date is useful for checking revisions and doing an audit of your directories, DOS has no direct way of creating one. Luckily, there's a workaround using the SORT command. The following command typed at the DOS prompt produces a list in ascending date order:

dir ¦ sort /+24 ¦ more

Make sure that SORT.EXE and MORE.COM are in a directory on your path before using this command.

The +24 starts DOS's sort at the 24th column of the screen, which is where the date begins in a directory listing. Unfortunately, this technique doesn't sort by year. Replacing +24 with +31 will sort by year but not by month or day. You can also sort by file extension using +10 or by file size with +13. The MORE command shows long listings one screen at a time. Adding /r before the /+ will reverse the sort.

Don't forget that you can specify a subset of files; for example, all files that begin with *A* (dir a*.*). It is also possible to print the list by substituting > PRN for ¦ MORE. The following command prints a list of all the files with the extension DOC in the default directory by date:

dir *.doc ¦ sort/+24 > prn

Jim Walters
Tucson Computer Society

Seeing Fewer Stars: A Shorter DOS Wild Card

Keyboard contortionists may be happy typing *.*, but most people would avoid it if they could. Fortunately, it is possible with most commands. Simply omit the asterisks with commands such as COPY and COMP. To copy all files to the A: drive, enter COPY . A:, making sure to type the correct target drive. This trick will not work for some commands, how-

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PRUNE/GRAFT	✓		✓	✓
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COLLAPSE DIRECTORIES	✓			
HIDE/UNHIDE DIRECTORIES	✓			✓
FORMAT DISKS	✓			
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REVERSE FILE SPECS	✓		✓	
COPY ORIGINAL DIRECTORY STRUCTURE	✓			
DATE/TIME STAMP FILES	✓			
PRINT DIRECTORY TREE	✓	✓		✓
CHANGE FILE ATTRIBUTES	✓			✓
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```
Japanese Kana
Charset: 11
Contains: Characters for Hiragana or
          Katakana (the type is
          determined by the typeface).

11,0 ぁ Japanese Phonetic small a
11,1 ぃ Japanese Phonetic small i
11,2 ぅ Japanese Phonetic small u
11,3 ぇ Japanese Phonetic small e
11,4 ぉ Japanese Phonetic small o
11,5 っ Japanese Phonetic small tu (tsu)
11,6 ゃ Japanese Phonetic small ya
11,7 ゅ Japanese Phonetic small yu
11,8 ょ Japanese Phonetic small yo
11,9 ゔ Japanese Phonetic small vu
```

FIGURE 1: WordPerfect's CHARACTR.DOC (small portions shown here) lists the program's extended character sets, showing the characters' numeric codes.

ever: Using ATTRIB to change attributes for a block of files still requires asterisks.

If you forget to include a destination with your COPY command, DOS is supposed to produce the error message 'File cannot be copied onto itself'. Unfortunately, with some versions of DOS, this doesn't happen with a COPY . command. Instead, DOS attempts to copy the files onto themselves, corrupting any that exceed 64K. Check with a test file on a floppy disk to see if your version is "safe."

Lynn Bettencourt
Modesto PC Users Group

WordPerfect's Special Characters Versus ASCII's

WordPerfect can produce an extraordinary range of characters, far outnumbering the extended ASCII character set. Accented letters, foreign characters, and typographical symbols are among those available. If a character isn't supported by your printer's character set, you won't be able to print it at all using *WordPerfect 5.0;* version 5.1 will print it as a graphic.

These special characters are grouped into sets, such as mathematical symbols or the Japanese alphabet. To call up a special character, you could press <Ctrl>-V, enter the set number, a comma, then the character number. For example, to get a lower case *n* with a tilde (~) over it, you could type <Ctrl>-V1,57<Enter>. However, many characters can be composed at the keyboard, obviating the need to remember obscure set and character numbers. To enter ñ, simply press <Ctrl>-Vn~ and the character appears. *WordPerfect* cannot display every special character. It displays only ASCII, extended ASCII, and, with the proper video setup, special characters from its FRS screen font files; others are represented by square bullets.

The characters and their associated codes can be found in a file called CHARACTR.DOC that is probably in your *WordPerfect* directory. If you print this document—all 12 sections and 33 pages of it—you will have a ready checklist of what characters your printer supports and what codes call them up [see **FIGURE 1**].

Bob Levine
NYPC 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.* ●

POWER TIP NO. 96

Speeding Up ProComm-to-MCI ASCII Transfers

Does *ProComm Plus* seem a little sluggish when it uploads ASCII files to MCI Mail? *ProComm*'s default ASCII transfer setting inserts a 1-second pause at the end of each transmitted line. However, MCI Mail doesn't require a pause to receive data. To alter transfer settings, press <Alt>-S to display the settings menu and select ASCII Transfer Options. Now set character pacing to 5 milliseconds and press 5 to set line pacing to half a second. You'll be pleasantly surprised by the speed improvement.

George Beinhorn
Nevada City, California

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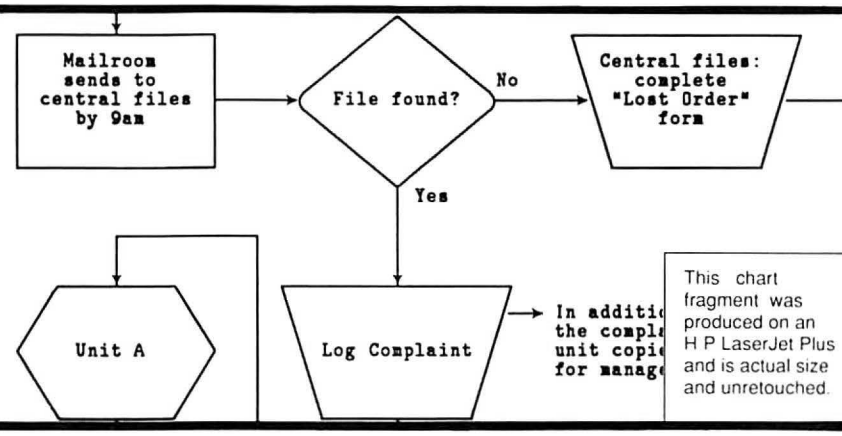

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Run a QuickBASIC program that creates batch-file menus, execute AUTOEXEC.BAT commands once and only once a day, use a script to print Paradox table structures, and learn how NUL can detect files and directories.

Edited by Tom Swan

Menus by the Batch

I've always been impressed by the shaded-window menus frequently found in commercial software, and I wanted similar results from my batch file menus. So I wrote a *QuickBASIC* program, MAKEMENU.BAS [see **LISTING 1**], to produce batch files that display up to eight menu items. You then edit the batch files to add the commands for each item.

Jim Dawson
Ormstown, Quebec, Canada

ANTHONY RUSSO

Editor's note: To create a menu batch file, run MAKEMENU-.BAS with QuickBASIC. *Answer the prompts for a menu title, the number of selections (from 1 to 8), and the text to display for each selection. When MAKEMENU asks for an output file name, press <Enter> to create MENU.BAT, or enter a different name.*

You'll also need a program called CHOICE.COM, which the MAKEMENU.BAS batch files use to position the cursor and return ERRORLEVEL responses. To create CHOICE.COM, run the DOS DEBUG utility, and type the commands listed in **FIGURE 1** *(minus semicolons and comments).*

Before running a MAKEMENU batch file, check that CHOICE.COM is in a directory in the current path and that CONFIG.SYS contains the line DEVICE = d:\path*ANSI-.SYS, where* d:\path *is the optional drive and path for ANSI.SYS. Use a text editor to place appropriate commands after the :CHOICE*n *labels in the menu batch file, leaving the GOTO START commands in place.*

Another Day, Another Boot

The commands in 1ADAY.BAT [see **LISTING 2**] let AUTOEXEC-.BAT determine if it has run more than once on the same day.

(continues)

```
cls : screen 0 : defint a-z : dim ch$(8), m$(15), shadow$(2)
'---- Get title, menu choices, and file name
getname: input  "Menu title (up to 40 characters): ", t1$
if (len(t1$) = 0) or (len(t1$) > 40) then
   print "ERROR: No name, or name too long." : goto getname
end if
getchoice: input "Number of menu choices (1 to 8): ", choices
if (choices < 1) or (choices > 8) then
   print "ERROR: Number out of range." : goto getchoice
end if
name$ = " === " + t1$ + " === "
for i = 1 to choices
   print "Enter text for selection #"; ltrim$(str$(i)); ": ";
   input "", ch$(i) : ch$(i) = str$(i) + " - " + ch$(i)
next i
input "Enter file name [default = MENU.BAT]: ", batch$
if len(batch$) = 0 then batch$ = "MENU.BAT"
'---- Prepare display and batch-file string constants
prompt$ = "Enter selection number, or press Esc to quit:"
echo$ = "echo " : cls$ = "cls" : shadow$(1) = string$(2,177)
shadow$(2) = string$(53,177) : blank$ = string$(42,32)
```

(continues)

LISTING 1: Run MAKEMENU.BAS to create batch-file menu programs.

```
m$(1) = string$(54,219) : m$(3) = string$(6,219)
m$(4) = m$(3) + blank$ + m$(3) + shadow$(1)
m$(5) = m$(1) + shadow$(1) : nn = len(name$)
if (nn mod 2) = 1 then name$ = name$ + chr$(219)
t1$ = left$(m$(1), 27 - nn / 2)
m$(6) = t1$ + name$ + t1$ + shadow$(1)
m$(7) = m$(3) + blank$ + m$(3)
'---- Create menu selection names
for i = 1 to choices
   t1$ = left$(m$(4), 7) + ch$(i)
   t2$ = right$(m$(4), (49 - len(ch$(i))))
   m$(i + 7) = t1$ + t2$
next i
'---- Create batch file and write starting commands
open batch$ for output as #1
print #1, "@echo off"
print #1, ":start"
print #1, cls$
print #1, "echo."
'---- Write menu display echo statements
print #1, echo$; spc(12); m$(1)
print #1, echo$; spc(12); m$(6)
print #1, echo$; spc(12); m$(5)
for i = 1 to choices
   print #1, echo$; spc(12); m$(i + 7)
   print #1, echo$; spc(12); m$(5)
next i
print #1, echo$; spc(12); m$(5)
print #1, echo$; spc(15); shadow$(2)
print #1, echo$; chr$(27); "[24;18H"; prompt$
'---- Write menu selection statements
print #1, ":getchoice"
print #1, "choice"
print #1, "if errorlevel 27 goto end"
print #1, "if errorlevel"; str$(choices + 1); " goto getchoice"
for i = choices to 2 step -1
   n$ = ltrim$(str$(i))
   print #1, "if errorlevel "; n$; " goto choice"; n$
next i
'---- Write dummy commands for each selection
for i = 1 to choices
   n$ = ltrim$(str$(i))
   print #1, ":choice"; n$
   print #1, cls$
   print #1, echo$; "Choice #"; n$
   print #1, "pause"
   print #1, "goto start"
next i
'---- Print final lines and close the file
print #1, ":end"
print #1, cls$
close #1
print : print : print
print "Your menu batch file, "; batch$; ", has been saved."
```

LISTING 1 ***(continued)***

This allows AUTOEXEC.BAT to issue a subset of its DOS commands and run programs the first time you boot without letting it repeat them if you reboot later on. You might use this to check an electronic mail box every morning or run a daily diagnostic.

1ADAY.BAT uses the DOS ECHO and DATE commands to store the current date in a temporary file called 1ADAY.$$1. It then tests whether TODAY.DAT exists from a previous boot. If so, the program uses MS-DOS's commands FC and FIND to compare TODAY.DAT with 1ADAY.$$1. If the files match, FIND writes the first line of FC's output (fc: no differences encountered) to a second temporary file, 1ADAY.$$2. Otherwise, that file will be empty, stopping COPY from creating a third temporary file, 1ADAY-.CHK (COPY won't copy a zero-length file).

If 1ADAY.CHK exists, the date in TODAY.DAT must be current, and the batch file jumps to NEXTBOOTS, leaving the BOOT environment variable blank. If the date is not current, 1ADAY.$$1 is renamed TODAY-.DAT, and an environment variable BOOT is set to "FIRST," letting an IF statement determine if this is the first boot of the day.

Lee Foster
Houston, Texas

Editor's note: If your DOS version has COMP.COM instead of FC.EXE, replace the batch file's fifth line with the two lines **echo N ¦ comp today.dat 1aday.$$1 ¦ find "ok" >1aday.$$2** *and* **cls**. *The CLS erases COMP.COM's 'Compare more files' prompt.*

Test the batch file by running it twice. The first time, you'll see a welcoming message. The next time, you won't—proving that the batch file has correctly determined that it's already run today.

Copy the batch file commands into AUTOEXEC.BAT after your PATH command. Make

(continues)

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```
nchoice.com          <Enter>    ; name output file CHOICE.COM
a                    <Enter>    ; start DEBUG assembly mode
mov ah,02            <Enter>    ; set register ah = 2
xor bh,bh            <Enter>    ; set bh = 0
mov dh,17            <Enter>    ; load row number (23) into dh
mov dl,3f            <Enter>    ; load column number (63) into dl
int 10               <Enter>    ; call BIOS cursor-position routine
xor ah,ah            <Enter>    ; set ah = 0 (BIOS get-key routine)
int 16               <Enter>    ; get key press; ignore <Ctrl>-C
cmp al,1b            <Enter>    ; does the key = <Esc> ?
jz 011c              <Enter>    ; yes, jump to exit
cmp al,31            <Enter>    ; compare key with ASCII '1'
jb 010a              <Enter>    ; get another key press if < '1'
cmp al,38            <Enter>    ; compare key with ASCII '8'
ja 010a              <Enter>    ; get another key press if > '8'
sub al,30            <Enter>    ; convert ASCII key to integer
mov ah,4c            <Enter>    ; set ah = 4C hex (DOS exit funtion)
int 21               <Enter>    ; end program
<Enter>                         ; stop DEBUG assembly mode
rcx                  <Enter>    ; edit register cx
20                   <Enter>    ; set program length to 20 hex
w                    <Enter>    ; write CHOICE.COM to disk
q                    <Enter>    ; quit DEBUG and return to DOS
```

FIGURE 1: To create CHOICE.COM, start DEBUG and enter this script, ignoring the semicolons and comments on the right.

```
@echo off
set BOOT=
echo.| date | find "Current" > 1aday.$$1
if not exist today.dat goto FIRSTBOOT
fc today.dat 1aday.$$1 | find "fc: no" > 1aday.$$2
copy 1aday.$$2 1aday.chk > nul
if exist 1aday.chk goto NEXTBOOTS
:FIRSTBOOT
if exist today.dat del today.dat
rename 1aday.$$1 today.dat
set BOOT="FIRST"
:NEXTBOOTS
if exist 1aday.chk del 1aday.chk
if exist 1aday.$$2 del 1aday.$$2
if exist 1aday.$$1 del 1aday.$$1
if "%BOOT%"=="" goto CONTINUE
echo Welcome to the first boot of the day!
rem -- Insert one-a-day commands here
:CONTINUE
```

LISTING 2: Save this batch file as 1ADAY.BAT, or insert the lines into AUTOEXEC.BAT to execute commands only once a day.

sure the path includes the directory containing the FIND and FC (or COMP) DOS utilities. Replace the REM statement with the commands to execute once a day.

Printing Paradox Table Structures

I use a *Paradox 3.0* PAL script, PRSTRUCT.SC [see **LISTING 3**], to print reports of my tables' structures. This script is more convenient than bringing up a table's structure using *Tools Info Structure Table*, entering a table name, and hitting <Print Screen>. It also produces a neater report.

Paul M. Whitted
Boise, Idaho

Editor's note: To enter PRSTRUCT from Paradox's *main menu, select* Scripts Editor Write, *and specify* **prstruct** *as the name of the new script. As you type in the script, be careful not to mix up the braces { } and parentheses (). After entering the script, press* **<F2>** *to save the file and quit the editor. To print a table structure, select* Scripts Play *from the main menu, type* **prstruct**, *and press* **<Enter>**.

NUL Method

In "C Directory/File Detector" [*Star-Dot-Star*, November 1989], Edwin J. Tobias presents a C program, CHECKFOR, that determines whether a specified name refers to an existing file or directory. But a little-known feature in DOS lets WHATIS.BAT [see **LISTING 4**] perform that same job for those who don't have C

(continues)

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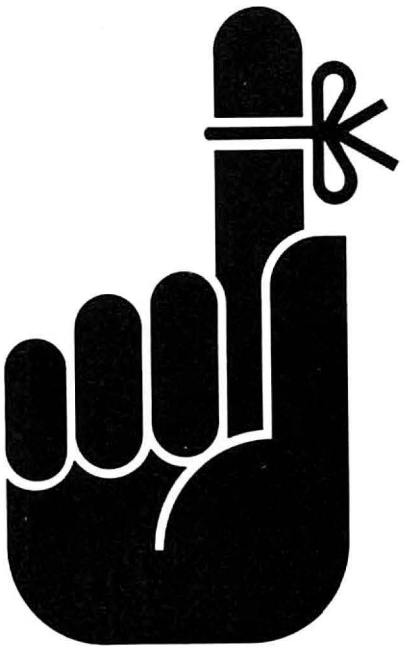

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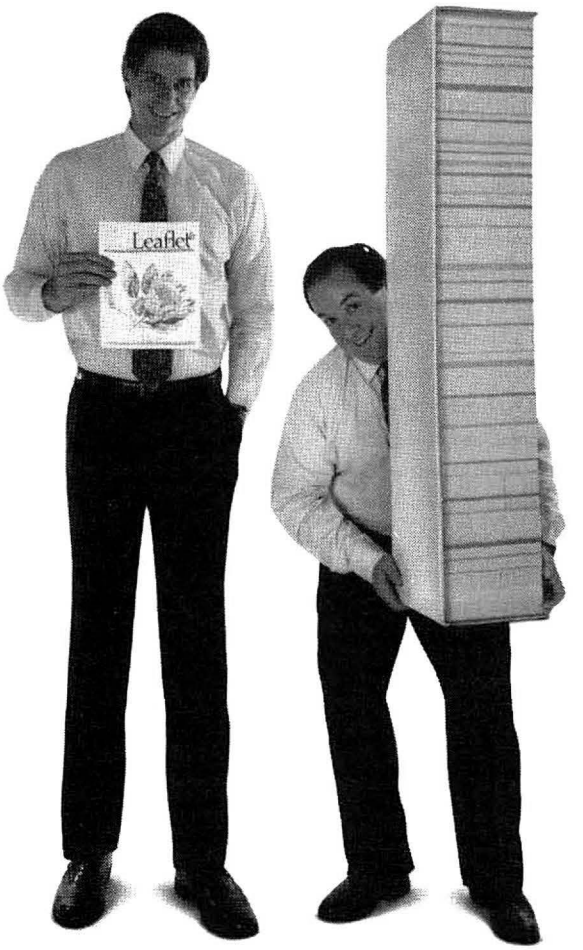

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DEVELOPER'S TOOLBOX

Feasting on a Package for Pros

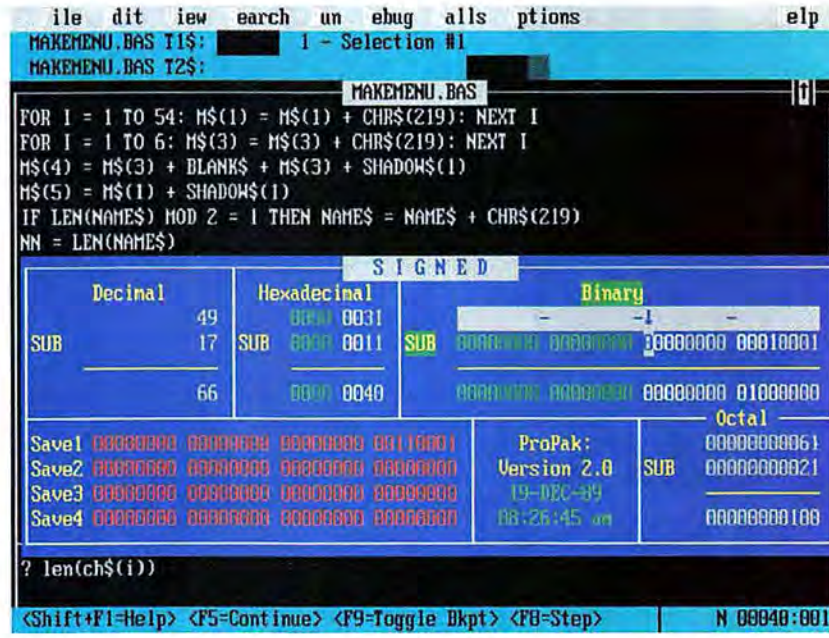
I want tools that are easy to use, don't cost too much, and increase my productivity. A tall order? Maybe, but it's the rare tool kit or utility that has enough ingredients to fill my plate.

Take programmers' calculators. In the past, I've used *SideKick's*, but I never could remember which function keys to press for hexadecimal digits A through F, and I disliked the small window that showed results in only one format at a time. So I went back to using my trusty $10 Sears desk calculator—that is, until I received a copy of Bob Falk's outstanding *ProPak 2.02*.

In addition to its pop-up integer calculator, this tool kit includes a keyboard reference that shows BIOS scan codes and dBASE INKEY() function results in binary, hexadecimal, and decimal. It also features an ASCII character chart that lists color attribute combinations plus extended ASCII line, box, and math symbols. And a keystroke recorder saves commands for later playback—great for creating program templates and constructing simple keystroke macros.

Falk Data Systems' *ProPak* includes three versions of the program: two 70K resident versions—one of which can be loaded *after* the original *SideKick*—and an 85K stand-alone model that's compatible with multitasking software such as *Desqview* and *OmniView*. If you have EMS memory to spare, *ProPak* can store its overlays there to conserve system RAM and improve performance.

ProPak's main course is its calculator, which simultaneously displays signed and unsigned results in decimal, hexadecimal, binary, and octal. Easy-to-learn commands let me enter expressions with common arithmetic operators as well as Boolean logic AND, OR, NOT, and XOR binary shift functions and operators. And I can use a unique "change-bits" feature to toggle individual digits in a 32-bit binary integer—especially handy for testing out I/O port register values and other packed bit-field structures. Somebody has finally written a programmer's calculator with features I can really use.



ProPak's integer calculator, shown here editing a QuickBASIC program, shows decimal, hexadecimal, and binary results.

What's more, supplied with *ProPak* are 11 programs licensed from Turbo-Power Software's *Turbo Professional 5.0* tool kit ("Developer's Toolbox," *Star-Dot-Star*, January 1989). These include MARK and RELEASE, which remove TSRs from RAM; WATCH, for monitoring a TSR's activity; and DEVICE, which reports on currently loaded device drivers.

All of these tasty tidbits make *ProPak* a feast of plenty. But I'd buy it just to get the calculator and keyboard reference. The rest is pure gravy.

I welcome your comments. My MCI Mail handle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swan*

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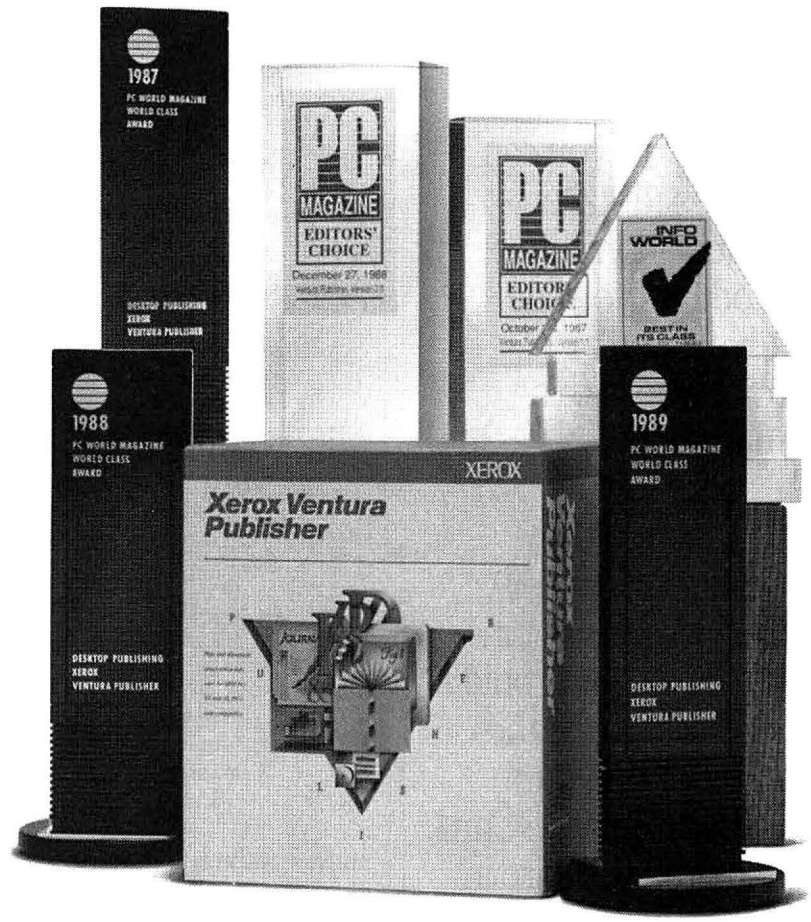

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```
IF ISTABLE ("Temp") THEN DELETE "Temp" ENDIF SHOWTABLES ""
"Select table for which the structure is to be printed"
TO Filename
Menu (Tools) (Info) (Structure) SELECT Filename
RENAME "Struct" "Temp"
Menu (Report) (Change) (Temp) (R) (Standard Report)
DeleteLine Down DeleteLine DeleteLine DeleteLine DeleteLine
FOR x FROM 1 to INT(9-LEN(Filename)/2) Right ENDFOR
"Structure of " TYPEIN UPPER(Filename) Down
CTRLHOME Right Right Right Right Right Right Right Right
"as of " Menu (Field) (Place) (Date) (1) mm/dd/yy) Enter
CTRLHOME Ins Down Enter Down Down "      " TAB
Del Del Del Del Del Del Up "Field" Down Down Del Del Del Del Del
CTRLHOME Down Down Down DeleteLine DeleteLine DeleteLine
DeleteLine Down DeleteLine
INSTANTREPORT Do_It!
DELETE "Temp"
```

LISTING 3: Use PRSTRUCT.SC, a Paradox 3.0 script, to print the structure of a selected table.

```
echo off
if "%1"=="" goto HELP
if exist %1 goto AFILE
if "%1"=="\" goto ADIR
if exist %1\nul goto ADIR
echo %1 does not exist
goto end
:AFILE
echo %1 is a file
goto end
:ADIR
echo %1 is a directory
goto end
:HELP
echo Enter WHATIS xxx to
echo identify xxx as a file,
echo a directory, or
echo non-existant
:END
```

LISTING 4: WHATIS.BAT tests whether a name is a file or a directory, or does not exist.

compilers. That feature is NUL, which DOS recognizes as a phantom file that exists in every directory, even though the NUL file occupies no disk space and does not show up in DIR listing.

The batch file first tests if parameter %1 is blank. If not, it checks if %1 refers to an existing file or to the root directory (\). If neither is true, the fourth IF statement checks if %1\NUL exists. If it does, %1 is a subdirectory of the current directory. Otherwise, the parameter is neither a file nor a directory.

Gary Coker
Dothan, Alabama

*Editor's note: This batch file and the original C version operate identically, except for one minor difference. The batch file allows the use of *.* and other wild card specifications. The C program does not. To use WHATIS.BAT, type* **whatis**name, *and the program will tell you whether* name *exists as a file or a directory.*

Tom Swan is the author of Mastering Turbo Pascal 5.5, *(Howard W. Sams, Indianapolis, Indiana, 1989).*

Share your tips and discoveries with PC World *readers; see How to Contact PC World, page 4.* ●

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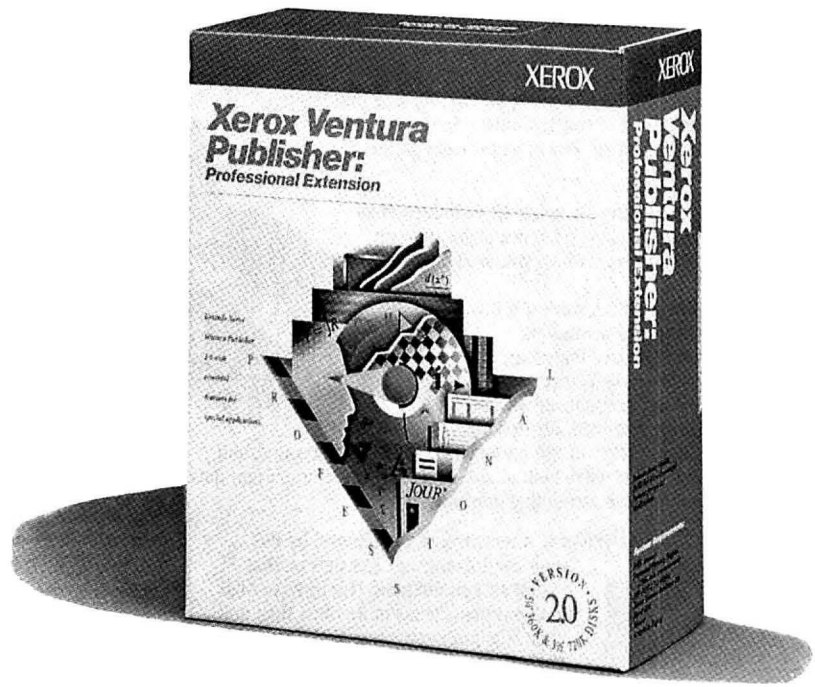

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NETWORK Q&A

Tips and strategies for departmental networking

Three detailed scenarios will help you provide remote dial-in access to your LAN. The newest of these, featuring Novell's NetWare Access Server, may save you nearly $14,000.

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 *to access 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. The short answer is, Yes indeed! We addressed dial-out options in last month's column. This time we'll look at the dial-in part of your question.

Keeping It Simple: The Stand-Alone Host

The "stand-alone host" approach you're currently using (in which a remote user dials in to a dedicated PC on the network) is certainly workable. After logging on, the remote user employs a program like *Carbon Copy Plus* or *PC Anywhere III* on his or her laptop to run applications on the host PC. Screen changes and keystrokes are relayed over the telephone line.

As long as the number of remote users is relatively small, this system is fine—but costs escalate fast as the remote population increases. Obviously, different LANs have different requirements, but a good rule of thumb is to have one host PC for every 3 remote users. Hence, seven hosts can probably handle the needs of 20 salespeople. Even so, this is an expensive solution, as indicated in **TABLE 1**. Total cost: $32,716.

A Better Solution: Clustered Hosts

You can achieve substantial savings using "clustered hosts." In this scenario each user still logs on to a dedicated local host, but these hosts are implemented either on adapter boards (like Cubix's QuickLink) that fit into a file server or bridge, or on a separate chassis (like J & L Information Systems' Chatterbox). A single QuickLink board, for ex-

(continues)

TABLE 1

Stand-Alone–Hosts Solution

This model is simple and presents the fewest software compatibility problems, but it's relatively expensive.

7	host ATs at $1500	$10,500
7	network adapters at $500	$3500
7	network cables and installation at $300	$2100
7	2400-bps Hayes modems at $599	$4193
7	modem cables at $30	$210
7	copies of dial-in software at $199	$1393
7	copies of DOS at $120	$840
20	2400-bps internal modems for remote users at $300	$6000
20	copies of dial-in software for remote users at $199	$3980
TOTAL		$32,716

TABLE 2

Clustered-Hosts Solution

This solution is similar to the stand-alone–hosts model, but the hosts are implemented on expansion boards instead of on individual computers.

AT host to contain QuickLink boards		$1500
1	network adapter	$500
1	network cable and installation	$300
4	QuickLink 2286 boards at $2455 (each board has 2 CPUs)	$9820
7	2400-bps Hayes modems at $599	$4193
7	modem cables at $30	$210
7	copies of DOS at $120	$840
7	copies of dial-in software at $199	$1393
20	2400-bps internal modems for remote users at $300	$6000
20	copies of dial-in software for remote users at $199	$3980
TOTAL		$28,736

TABLE 3

Access Server Solution

Using an access server is relatively economical, but software conflicts are likelier than with the other models—and performance degrades when more than five users dial in simultaneously.

386SX PC (1 floppy, no hard disk, 7MB RAM, monochrome display)		$4000
1	network adapter	$500
1	network cable and installation	$300
1	copy of NetWare Access Server software	$1995
2	WNIM+ communications boards at $895	$1790
7	2400-bps Hayes modems at $599	$4193
1	copy of DOS	$120
20	2400-bps internal modems for remote users at $300	$6000
TOTAL		$18,898

ample, can provide two 80286 CPUs (or four slower 8088 CPUs). **TABLE 2** shows the cost of a typical clustered hosts installation: $28,736. That's a saving of nearly $4000 compared with the stand-alone host model. You can save even more if you use 8088 CPUs.

Latest and Greatest: Access Server

Novell's NetWare access server, which consists of special multitasking software running on an 80386 or 80386SX PC, is an important new option for NetWare users. Using *PC Anywhere*, up to 15 remote users can dial in to one of these units simultaneously; however, you'll still need a separate modem for every incoming phone line. If you want to install more modems than there are serial ports in the access server, you'll also need one or more multiple-port expansion boards (such as Novell's WNIM+).

TABLE 3 shows a cost breakdown for the access server scenario. The total is only $18,898—nearly $14,000 cheaper than the stand-alone host version, and almost $10,000 less than the clustered hosts model.

Things to Consider

Graphics. All these remote dial-in schemes handle screen updates via the phone line, and this can be slow. Updating a graphics screen requires the transfer of massive amounts of data—and if the modem is poky, remote users may be stuck twiddling their thumbs. If your applications use graphics, you may want to spend the money for high-speed error-correcting, data-compressing modems such as Hayes's new Ultra Smartmodem 9600; with effective data transfer rates of up to 38,000 bps, they can improve response time by an order of magnitude. Reinstalling your applications for CGA, where possible, will speed screen updates as well.

Software Compatibility. Some applications—particularly TSRs, but also software that runs under *Windows*, uses a mouse, or requires expanded or extended memory—may not run well via remote control. Stand-alone local hosts are least likely to have problems, and clustered hosts are next best; the *NetWare Access Server* setup seems to have the most difficulties. In each case, dial-in software takes up space on the host, so beware of RAM cram.

How to Decide

Cost may not be the only factor worth considering; expandability may be just as important for a

growing company. If you're sure you'll never need more than three dial-in ports, the stand-alone host approach is probably best. Beyond that number, clustered hosts allow easy growth at reasonable cost. For NetWare LANs the access server offers a high 15-user capacity and low cost per user, but performance degrades badly when more than 5 users dial in simultaneously.

By all means do a pilot installation to check compatibility, the kind of modem you'll need, and so on. And plan for success—more often than not, you'll find that demand for dial-in access increases.

David Ferris is the president of Ferris Networks, a San Francisco–based consulting firm specializing in networks.

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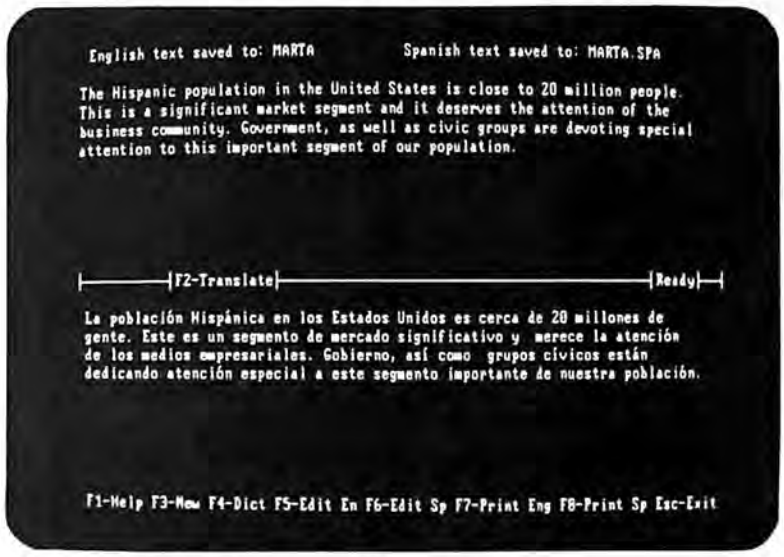

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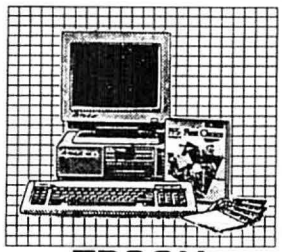

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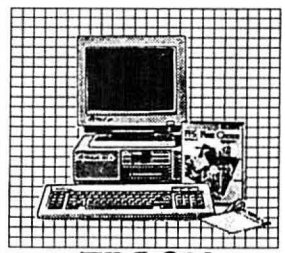

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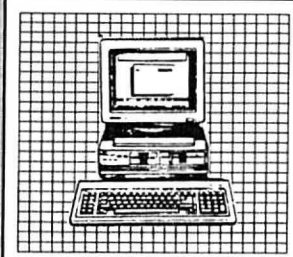

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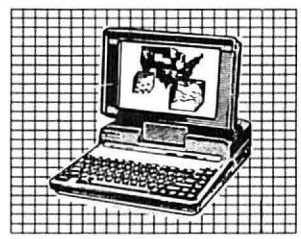

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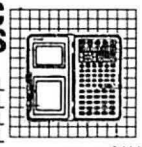

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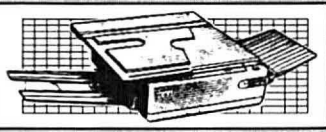

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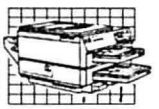

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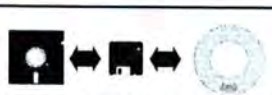

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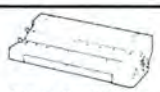

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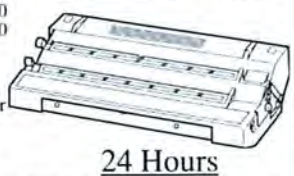

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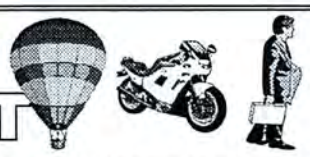

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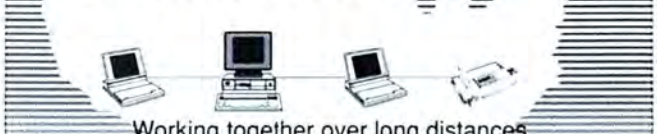

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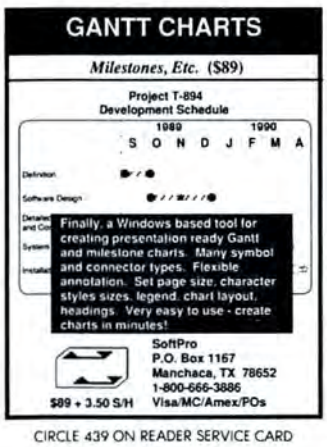

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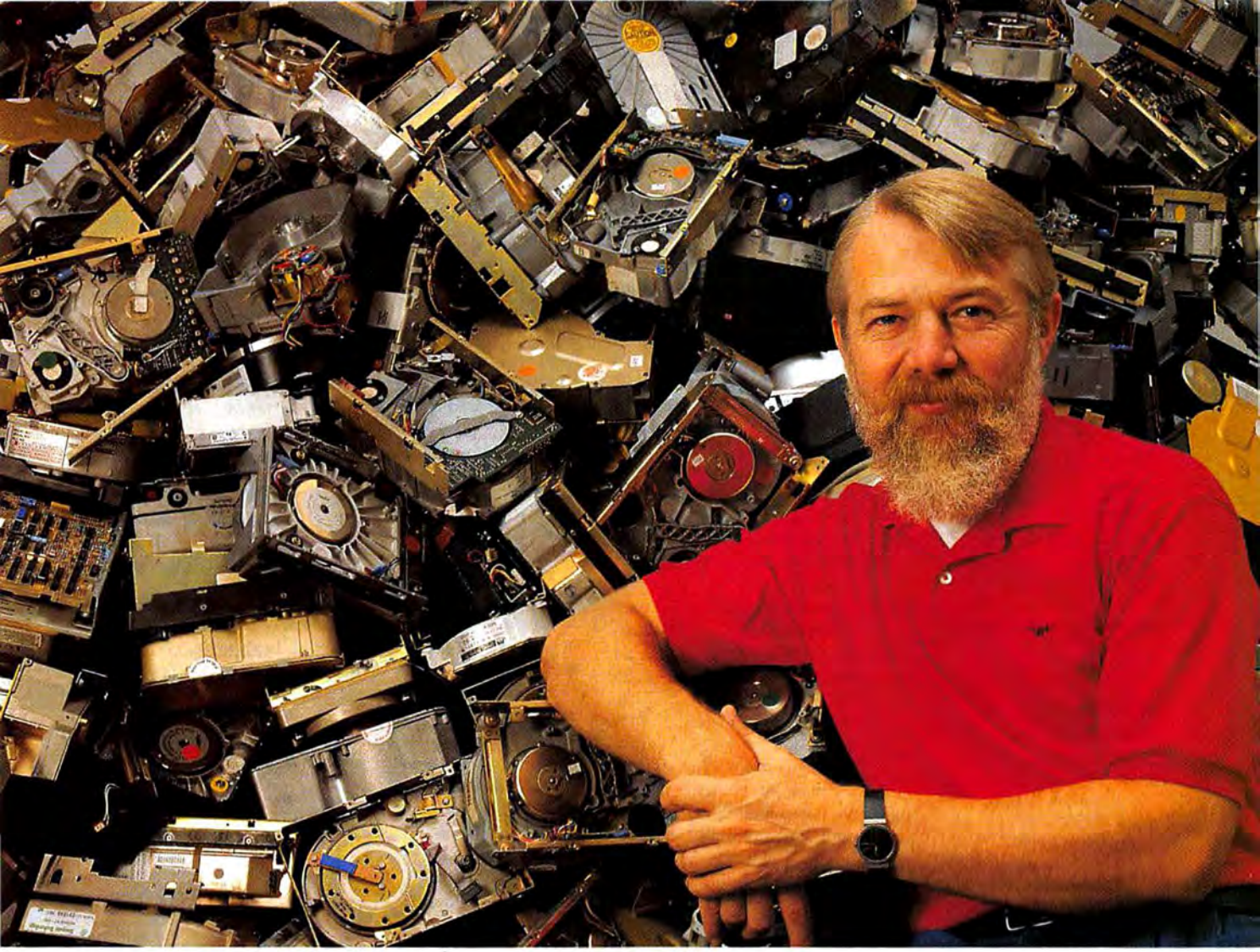

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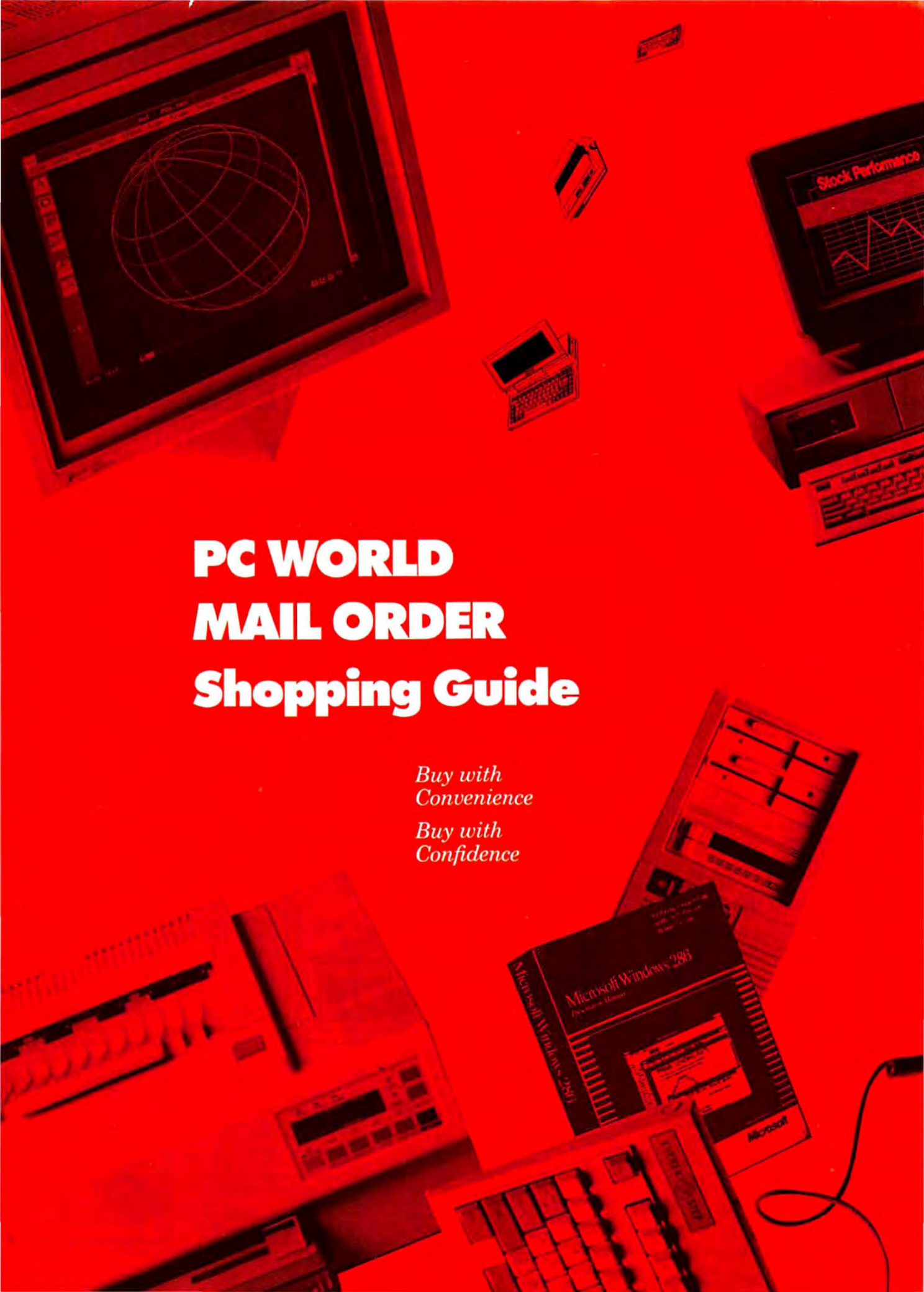

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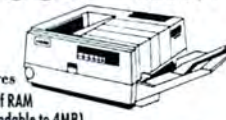

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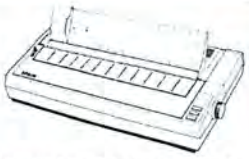

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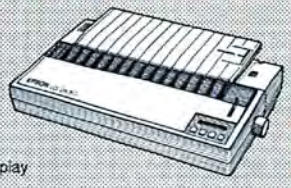

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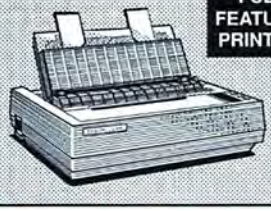

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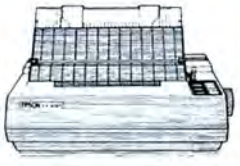

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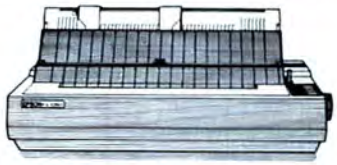

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- Epson's SmartPark™
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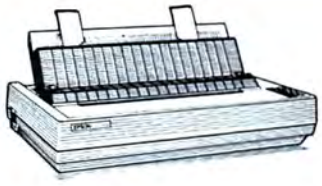
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters



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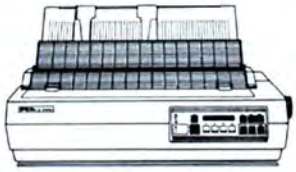

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TAKING IT HOME

The practical guide to home/office computing

A 286 or a 386? Buy what you need today.

Lawrence J. Magid

Getting ready to buy a new PC for your home office? If you've been following the computer press lately, you may have the impression that XTs and ATs are obsolete. Industry leaders are pushing Intel's 386SX chip as the minimum computing platform because anything less just won't run all that great 32-bit software that's supposed to arrive "real soon now."

IBM and Microsoft want you to have at least a 386SX with 2MB of memory, a 40MB hard disk, and *Windows*. But the dealer price on a name-brand system with that configuration easily tops $4000. Some of you may need that kind of power or just want to get in early on what will, after all, be the basic hardware platform of the nineties.

Unfortunately, few companies will pick up the tab for an employee's home system. You may be able to get by with less hardware at home, especially if you have a more capable system at the office. For most people, a 286 system with 1MB of memory and a 40MB hard disk will do the trick. Dealers in my area sell a brand-name clone, the Epson Equity II+, configured that way for $1700—$500 less than Epson's 386SX equivalent and $2300 less than the industry ideal.

There's no question that we're moving toward 32-bit processors; the question is, when do you buy? IBM, Intel, and Microsoft want you to "invest for the future" today with a CPU capable of running OS/2, *Windows*, and the more powerful DOS applications.

If you're excited about multitasking under one of these environments or if you use a heavy-duty application like the 32-bit version of *Paradox*, you may save money in the long run by spending the extra $500. But if you're like most people, who use their home machine to polish documents, modify spreadsheets, or log on to electronic-mail services, I recommend buying only what you'll need for the next year or two and then putting the rest in the bank.

By the time the "future" arrives, your cheap 286 will have paid for itself many times over in productivity gains and tax savings, and 386 prices will have fallen to the range of today's 286s. Then you could use the savings from your 286 purchase—plus interest—to buy a new 386 motherboard like Orchid's Privilege 386-20, which turns an AT into a 20-MHz 386 for about $800.

Personally, I don't skimp on home hardware, but I prefer to put my dollars in a $600 VGA or multiscan monitor and the largest hard disk storage system I can afford. My copy of *WordPerfect 5.1* occupies 2.8MB!

The September and December 1989 issues of *PC World* contain comparisons of 12- and 16-MHz ATs and 386SX systems—all pricier than the 12-MHz system I recommend. Whichever CPU you prefer, get both 5¼- and 3½-inch disk drives so that you can easily move data from any other PC; you should also invest in a modem so you can transfer files between home and office and use on-line information services.

There are plenty of other places to spend precious dollars getting set up at home. You'll be paying for a printer, software, furniture, maybe a fax board or a laptop—all subjects of future columns—and, probably, future shopping trips.

Lawrence J. Magid is a nationally syndicated computer columnist. ●

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Now you can take your business anywhere your business takes you. Mass storage, communications, backup and internal expansion slots allow virtually any configuration, including compatibility with DOS, OS/2 and UNIX. A built-in inkjet printer/plotter is also standard. In short, everything you need is ready to go and ready to run. Yet the ProPortable weighs less than 20 lbs., and can be easily carried in a single shoulder bag.

And, because good engineering need not preclude good industrial design, the Pro-Portable is as elegant outside as it is inside...the first transportable truly at home in the executive suite.

We spared no expense, yet we did not ignore manufacturing efficiency. The result: exceptional price/performance, putting more power and flexibility within your reach than ever before.

Put the limits of the past behind you, and the future in front of you. The Darius ProPortable.

For further information, please call 1-800-677-7477.

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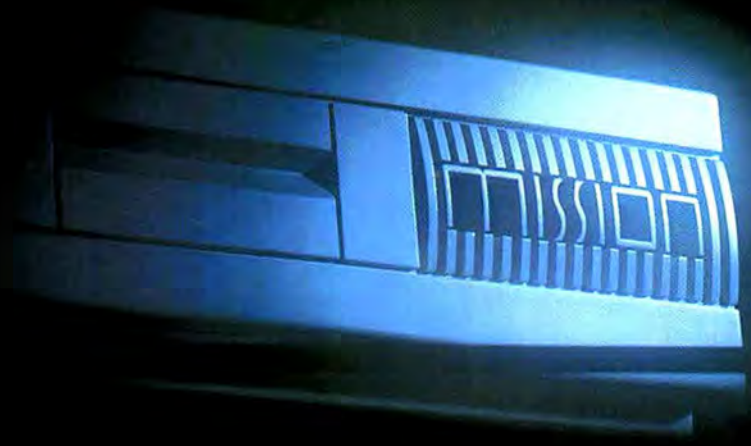
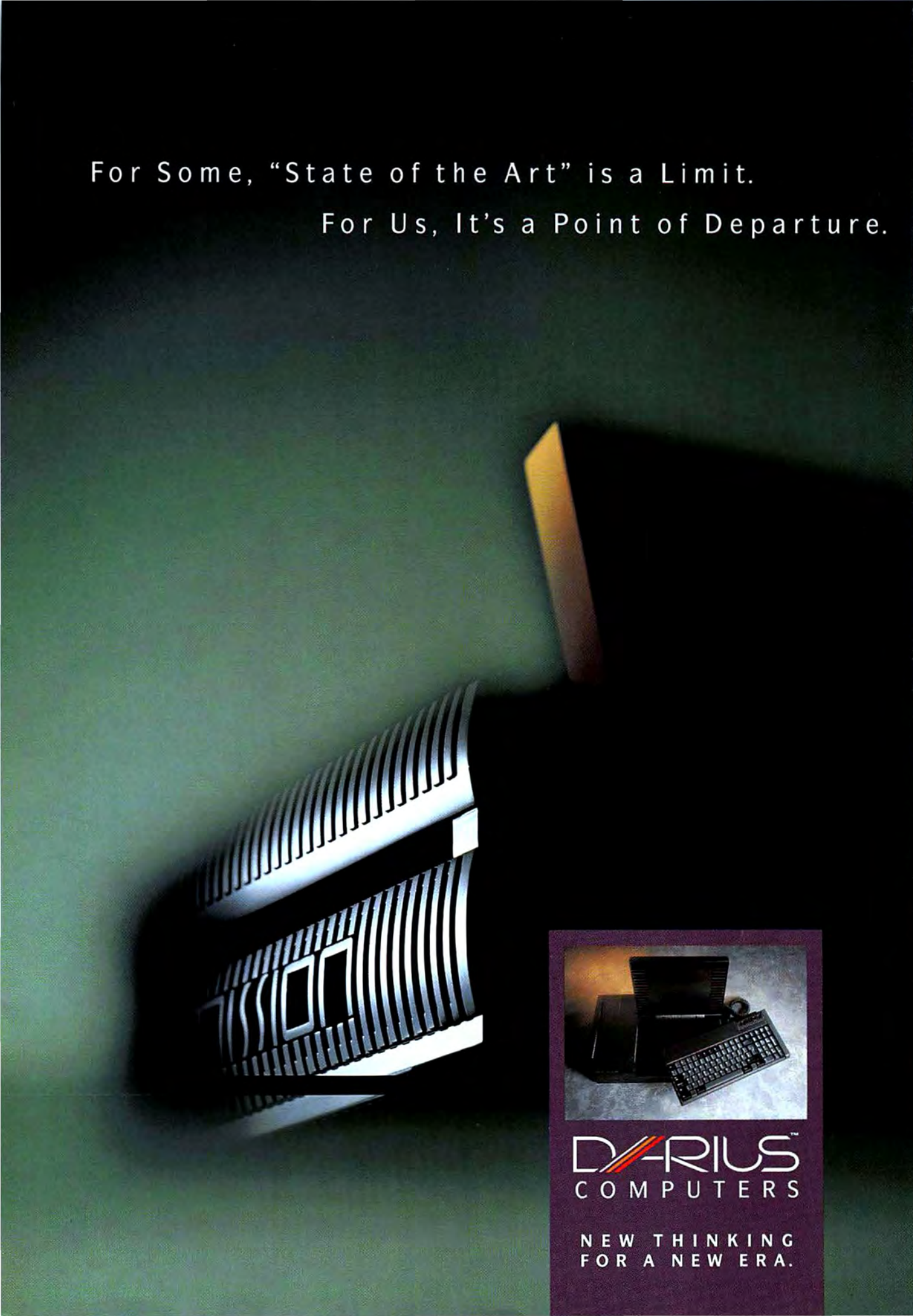


Circle 112 on reader service card

For Some, "State of the Art" is a Limit.

For Us, It's a Point of Departure.



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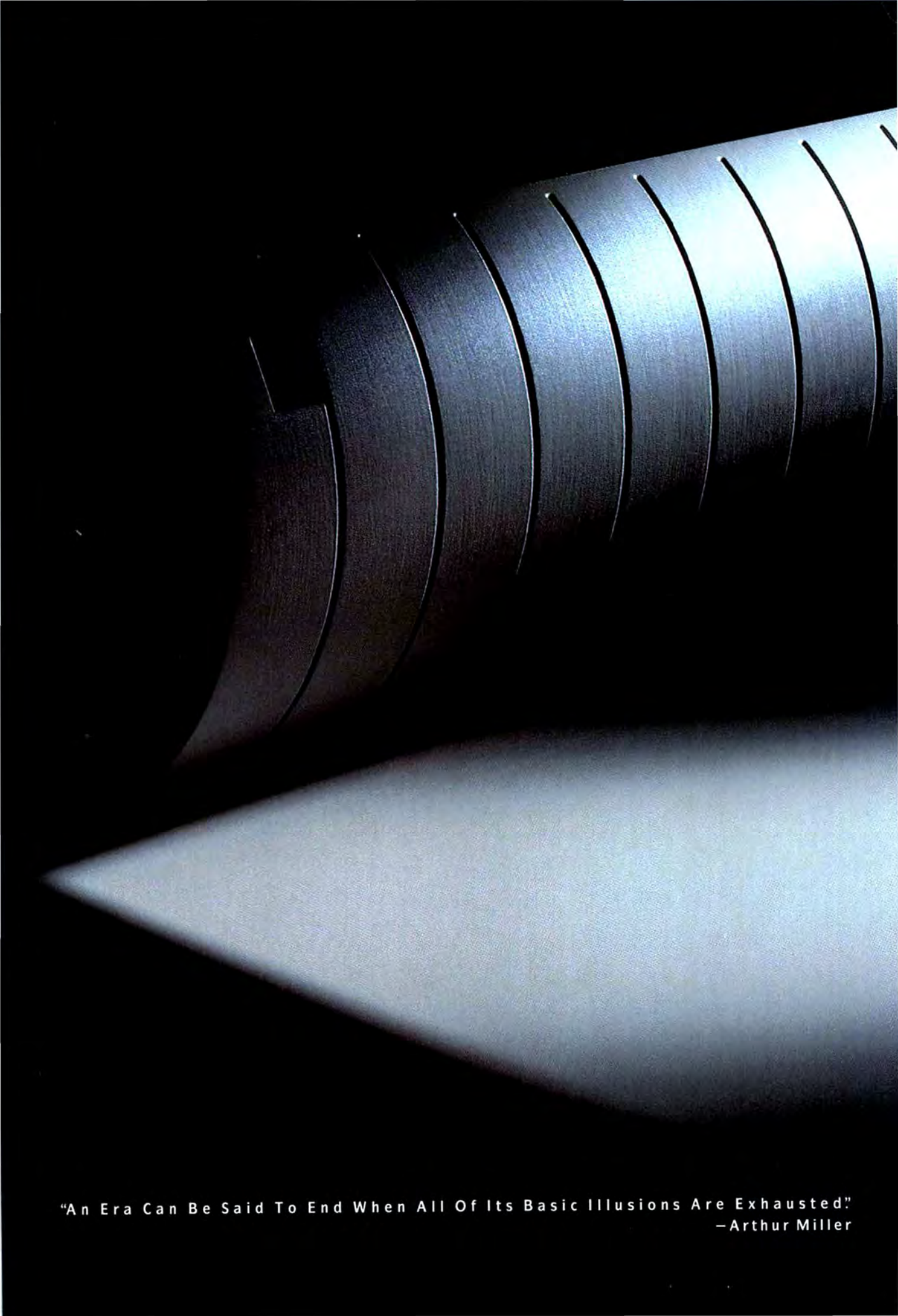
NEW THINKING
FOR A NEW ERA.



"An Era Can Be Said To End When All Of Its Basic Illusions Are Exhausted."
—Arthur Miller

A Radical Departure

From Conventional Wisdom.

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