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# PCWORLD

NOVEMBER 1988 \$2.95 CANADA \$3.95

## SMALL AND BEAUTIFUL

COMPAQ BRINGS VGA TO LAPTOPS WITH THE SLT 286

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PC Around



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Than Ever

FIND THAT FILE!  
Five Text-Search  
Packages

386 MULTITASKING  
ENVIRONMENTS  
How Easy to Use?

# Paradox 2.0, the top-rated Network, 386, and



Paradox® is both the first family in DBMS and the top-rated relational database. Software Digest has ranked Paradox #1 for the past 2 years; PC Magazine gave Paradox its "Editor's Choice" award and InfoWorld named it 1987 "Product of the Year" for Database Systems.

## Now there's OS/2

Paradox OS/2 is the newest member of the Paradox family—more are on the way and they're all 100% compatible with each other.

Paradox OS/2 allows you to take advantage of powerful OS/2 features such as addressing up to 16 megabytes of memory and running concurrent sessions. And Paradox OS/2 even lets you start new OS/2 sessions from within Paradox.

## Harness the power of 386

Paradox 386 is powerful new DOS software for your powerful new hardware and it's designed exclusively for 80386-based systems. It also lets you ignore the old 640K limits and races through your data 32 bits at a time instead of just 16. It's a perfect solution for anyone faced with very large tables (tens of thousands of records or more) and/or large applications.

“As proof of Borland's commitment to delivering compatibility across diverse hardware and software environments, Paradox 386 and Paradox 2.0 can share the same databases and applications on a network.

*Giovanni Perrone, PC Week*

Paradox . . . it's the PC database-management system equivalent to turbo-charging an M-series BMW.

*Giovanni Perrone, PC WEEK* ”

## The Paradox Network really works

Network users, you need Paradox's multiuser capabilities. The network runs smoothly, intelligently and so transparently that multiusers can access the same data at the same time—without getting in each other's way. (But safeguards prevent multiple users from altering the same data at the same time.) And with screen refresh you get real-time data updates on your screen.

“[Paradox is] a true network application, a program that can actually take advantage of a network to provide more features and functions, things that can't be done with a standalone PC.

*Aaron Brenner, LAN Magazine*

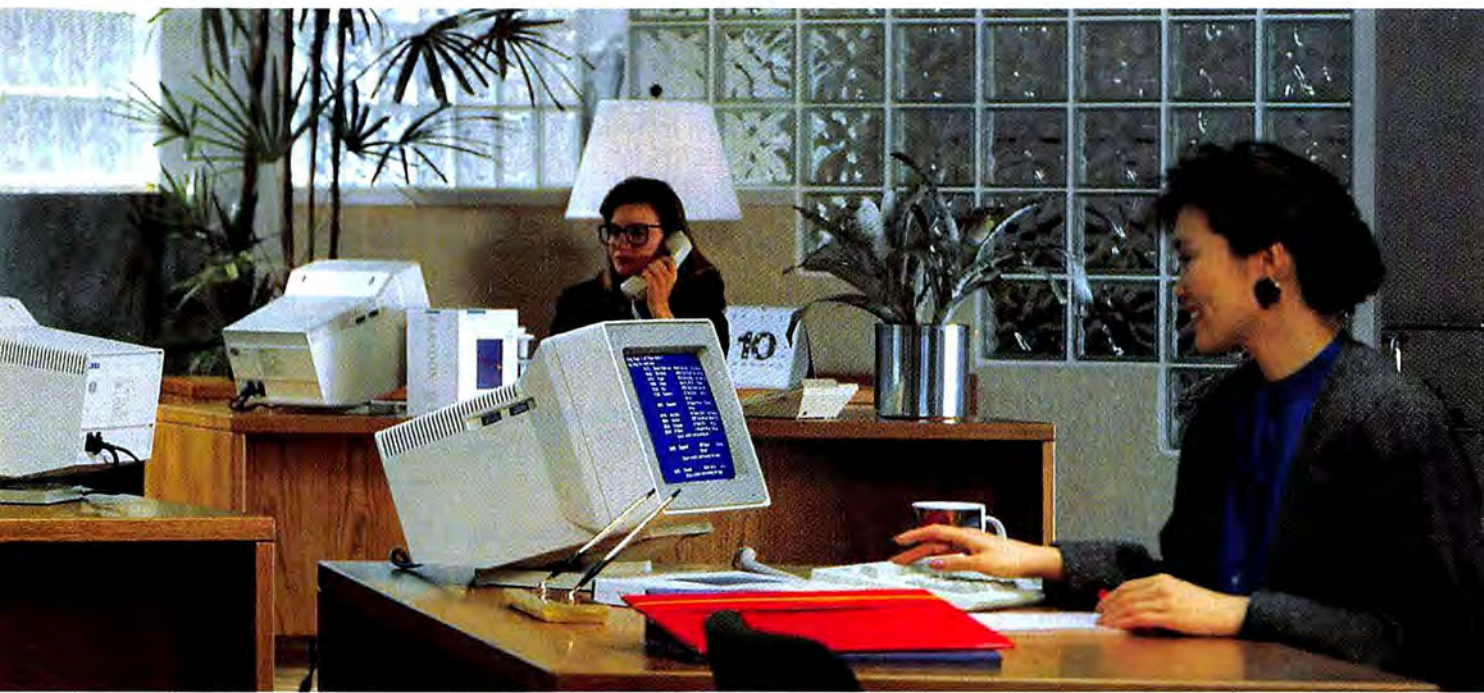
[Paradox] elegantly handles all the chores of a multiuser database system with little or no effort by network users.

*Mark Cook and Steve King  
Data Based Advisor* ”

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# relational database, has now OS/2 versions!



"Query-by-Example" gives you the right answer, right now

Our "Query-by-Example" (QBE) technique is just one illustration of the technological leadership offered by Paradox for the past 2 years.

QBE is fast and simple to use. Simply call up a form and check off the information you want.

/? F63 to include a field in the QBE; F53 to give an example

SALES	Stock	Customer	Init	Street
1	1	1	1	1

PRODUCTS	Stock	Description	Price	Quantity
1	1	1	1	1

RESERVED	Customer	Init	Description	Price
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1

Without having to write a line of code, you can, for example, get answers to queries like: *Find all the items we sold for more than \$1000 and tell me who ordered them.*

An artificial intelligence technique called "heuristic query

optimization" gives Paradox's QBE the ability to figure out not just the right answer, but also the fastest way to get the right answer.

QBE makes high-speed links between one piece of data and another and quickly sees the relationships your question calls for.

## PAL:™ A powerful programming language

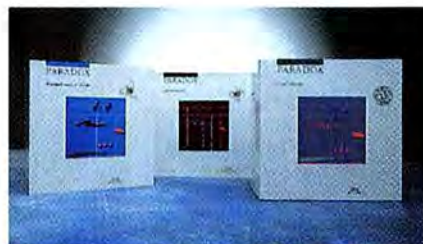
PAL, the Paradox Application Language, is a full-featured, high-level, structured database programming language that lets you write sophisticated Paradox programs (scripts) and applications. It includes such powerful features as looping constructs, arrays, branching, procedures, and a full set of functions.

“Most people we meet who give Paradox a try, end up switching to it . . .

Mark Cook and Steve King  
Data Based Advisor ”

There's a Paradox 2.0 version for you

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Compaq's new laptop: capable and compact, page 98

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George Beinhorn

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Woody Liswood

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### 150 Multitasking Without OS/2

Michael Goodwin

Forget OS/2—*Windows/386*, *Desqview*, *VM/386*, and *PC-MOS/386* deliver multitasking now.

### 162 The Hardware Shelf

Edited by Michael Goodwin

- Micro 1's 20-MHz 386 powerhouse is a steal for under \$3500
- Grab images from any video source with Aldus's *SnapShot*
- HP's briefcase-size *PaintJet* features splashy color and fast text printing
- The Zoom HC 2400 internal modem: as smart as a Hayes and a lot cheaper
- Panasonic's KX-P4450 laser printer blazes through text but blunders on graphics

Hunt down elusive data on your hard disk, page 138



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Mike Hogan

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- IBM launches 286-based Model 30
- New LaserJet handles paper like a pro but doesn't do PostScript
- Ashton-Tate gives *dBASE IV* a compiler and translator

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Edited by Eric Bender

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- Businessland's novel billion-dollar strategy
- Intel and DCA promote high-level CAS interface

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- Compaq's 12-MHz SLT 286 laptop—with the sharpest laptop screen available—could be a contender for your all-purpose computer

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Mike Hogan

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- Boost PC communications with Intel's Connection CoProcessor fax/modem board
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- *Accpac Plus Windowing System Manager, LanPak*
- *Media Master 5.0*
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- A second look at *VP-Planner Plus* bears out its first-class rating
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- Symantec's virtuoso outliner *GrandView* doubles as a project planner
- Gain without pain in *EasyCAD 2 2.05*: speed, versatility, and a low price
- *HB-Browser* views *dBASE* files from within other applications

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*Eric Bender*

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*Ralph Soucie*

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Cover photograph by Tony Carlson

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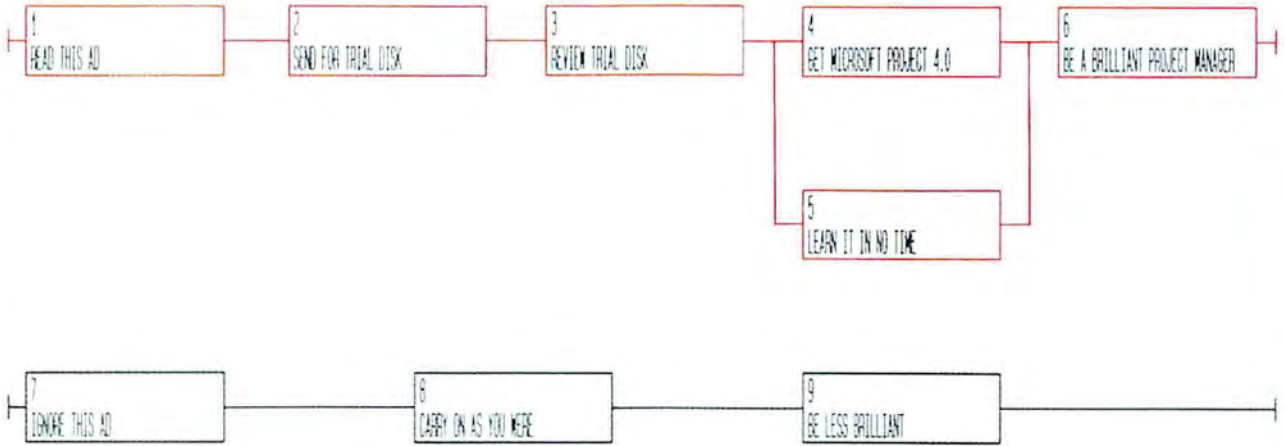
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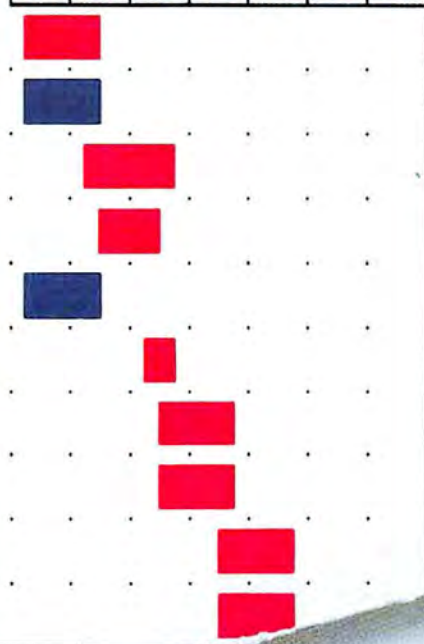


Noncritical  Critical   
 Project: AD2 Date: Feb 15, 1988 12:00 AM

February 15, 1988

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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1	Gantt Chart: Easily View Schedule
2	PERT Chart: View Activity Relationships
3	Resource Calendars: Model Availability
4	Resource Histograms: View Workloads
5	Resource Views: Adjust Schedules/Resources
6	Resource Leveling: Balance Workloads
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9	Custom Reports: Control Format/Content
10	Plotter Support: High Quality Charts*



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## A Taste for Accounting



**Ralph Soucie applied his accountant's wiles to this month's Buyers' Guide.**

**F**or most of us, dealing with financial matters ranks on a par with going to the dentist or getting a speeding ticket. Contributing Editor Ralph Soucie understands. In 11 years as an accountant (the last 8 as a CPA), he's helped hundreds of small and medium-size businesses get their finances in order.

Since 1983, Soucie has earned a reputation as *PC World's* expert on spreadsheets and accounting applications. This month, he prepared our buyers' guide to vertical accounting packages, "Accounting Tools of the Trades."

"Most businesspeople have little patience for dealing with the details of accounting," Soucie says. "I try to make the process go a little smoother, but I can never totally relieve my clients of the record-keeping burden. That's where the right software is invaluable."

What makes vertical applications different? "General accounting software is designed for the back office—the general ledger, payables, and receivables," Soucie explains, "while vertical software takes into account how an individual business runs. A medical application, for example, might let you prepare an invoice before the patient leaves the office, which means you have a better chance of getting paid."

JOHN MAHER

What happens if you choose the wrong package? "A lot of money just disappears. A vertical package is a risky investment, because its tentacles extend into every aspect of your business. But the potential payoffs are so great, it's worth taking a chance."

The more information you have, the more likely you are to make the right product choice. That's why *PC World* provides reader service cards: Using the postage-paid cards, you can request product information directly from a manufacturer. Beginning this month, we've made it easier for you to find reader service numbers by printing them at the end of every "Product Outlook" item, every review, every buyers' guide listing—everywhere you're likely to find a product lead worth pursuing.

Also in this issue: We review software that helps you find a word or phrase on a crowded hard disk ("In Search of Forgotten Text"), tackle the big jobs ("Project Management—for Professionals Only"), run half a dozen DOS applications at the same time ("Multitasking Without OS/2"), or improve communications on your local area network ("LAN E-Mail: Power to the Work Group"). And check out our Feature section, where East Coast Editor Eric Bender offers an early glimpse of OS/2 Extended Edition and an update on Lotus's *Notes* and other groupware packages. ●

*Ed Bott*

Ed Bott  
Managing Editor



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a simple point and click  
with the Microsoft Mouse.*



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*With Windows/286,  
you could have been seeing things much more clearly.*



*With Windows/386,  
you could have been seeing a lot more things much more clearly.*

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# TOP OF THE NEWS

## Cloners Challenge IBM

*Vendors of  
Compatibles  
Band Together  
to Support a  
Bus That  
Compares  
With MCA*

In a widespread revolt, dozens of system and peripherals vendors have pledged support for a new bus design that they claim offers the same functionality as IBM's much-touted Micro Channel Architecture (MCA). A nine-member core group spearheaded by Compaq Computer has proposed a bus specification challenging IBM's attempts to move customers from the AT-style input/output standard to its proprietary Micro Channel. The rebel group's specification extends AT compatibility, providing 32-bit data paths for add-on boards and peripherals, and arbitrates conflicts among multiple intelligent devices such as disk controllers and network cards. The key element in the compatible makers' strategy is that unlike MCA, the Extended Industry Standard Architecture (EISA) won't sacrifice compatibility with existing peripherals to get these benefits. EISA-equipped systems

are not expected to ship until year-end 1989, when Intel Corporation will offer a supporting chipset. A typical EISA configuration is likely to expand upon the dual-bus architecture commonly found in 80386 computers today. One bus will provide direct links between 32-bit memory and the central processor, while the I/O bus will manage the system requests of today's AT-style peripherals and an upcoming crop of 32-bit I/O devices. IBM, which was invited to join the consortium but declined, claims it deserves royalty payments for patents held on the AT bus. Compaq president Rod Canion maintains that EISA's design raises no new legal issues. In the face of the EISA challenge, IBM executives reaffirmed the company's commitment to the Micro Channel and contended that the new specification only validates their 18-month-old claim that the AT bus has run out of gas.

## Model 30 286 Released

*New CPU  
Raises Questions  
About  
IBM's Support  
of Micro  
Channel*

Apparently softening its determination to eradicate advanced systems with AT-style bus architecture, IBM has introduced an 80286-based Model 30 PS/2 based on just such an architecture. IBM abruptly stopped shipping its best-selling PC AT in the summer of 1987 in order to move advanced system buyers up to PS/2 models equipped with the Micro Channel. Industry analysts cite that action as the reason for IBM's loss of market share to competitors' PCs equipped with AT-style bus architectures. Perhaps indicating IBM's ambiva-

lence on the subject or its desire to protect sales of MCA-equipped 286-based designs, the Model 30 286 joins the hotly contested 286 race somewhat handicapped. Its base configuration includes a 10-MHz one-wait-state processor, a mere 512K of memory, three 8/16-bit slots, and a single 3½-inch floppy for \$1995. An optional 20MB hard drive offers only an average access time of 80ms. Citing past promises to upgrade the Model 30, IBM president William Lowe insisted, "We are not abandoning the Micro Channel."

## LaserJet Upgraded

*State-of-the-  
Art Paper  
Handling  
Available, but  
Not PostScript*

The Hewlett-Packard LaserJet family is likely to acquire PostScript printing someday soon, but that capability is conspicuously absent from the newest release of the printer. Instead, declaring that it wants to set a new paper-handling standard, HP has launched the LaserJet IID with three much-requested capabilities. Equipped with the Canon SXD engine, the LaserJet IID gains a second 200-sheet paper-feeding bin, the ability to print on both sides of the paper from either or both bins, and a separate 50-unit envelope-feeding option. HP grabbed early market leadership in March 1984, introducing a \$3495 LaserJet eight months before Apple launched its \$7000 LaserWriter. While Apple has emphasized desktop publishing, HP has positioned the LaserJet as an economical

general office printer. That meant passing up PostScript licensing, which Product Marketing Manager Cathy Lyons says would boost the IID's price from \$4229 to around \$6000. HP and PostScript developer Adobe Systems have been discussing the issue for years, she adds, and PostScript is likely to appear as an upgrade option sometime in the near future. The LaserJet IID also lacks the video I/O port that QMS's JetScript PC board uses to send PostScript files to the Series II. Lyons wouldn't say why HP felt compelled to eliminate this port, the most popular way of adding PostScript to the LaserJet, but added that "HP is looking at another solution that will let more than one user share the capability."

## Ashton-Tate Releases Compiler, Translator

*Seeks to Bring  
Fallen-Away  
Developers  
Back to Its  
Language*

**M**oving to stem competitors' inroads into its *dBASE* franchise and bring errant developers back into the fold, Ashton-Tate has introduced both a dialect translator and a full native-mode compiler for *dBASE IV*. *dBASE Professional Compiler*, which will be included free in a first-quarter 1989 update of *dBASE IV Developer's Edition*, compiles applications to executable binary code. The unmodifiable applications can then be distributed to an unlimited number of users, none of whom need a copy of *dBASE IV*. Before year-end, Ashton-Tate also will ship *STEP IVWard*, an \$89.95 translator of applications in the *Clipper*, *Foxbase*, and *Quicksilver* dialects into *dBASE IV*. The \$1295 *dBASE IV Developer's Edition* version 1.0

and the \$795 *dBASE IV*, both of which began shipping September 30, already include an interpreted compiler which produces hexadecimal code and still requires the base program to run. The two compilers have complementary attributes. *dBASE Professional Compiler* was designed by former Ashton-Tate programmer Jeff Cooper, now of Apex Software, who began work on a similar product in 1983. Fear of losing *dBASE* sales prevented Ashton-Tate from releasing it, admits President Ed Esber. Since then, however, competitors have shipped between 100,000 and 180,000 compilers and an untold number of *dBASE* clones. Esber says that Ashton-Tate now recognizes that it can tap the compiler market without hurting *dBASE* sales.

## Compaq Shifts Emphasis

*Profiles Get  
Smaller,  
Prices  
Cheaper*

**C**ompaq's recent introductions of a long-awaited laptop and a new small-footprint desktop computer (see the Compaq preview in this issue) represent not only new technology but also a tilt in the balance of the Compaq line toward downsized, more affordable computers. The new Deskpro 386/20E, a 20-MHz 80386 computer, has the same 15-by-16-inch footprint of Compaq's 80386SX-equipped boxes introduced in August. Both save slots and inches by putting serial ports, parallel ports, and graphics and disk controllers on their motherboards. Because of these products, Compaq has decided to discontinue the large form-factor Deskpro 386 and Deskpro 386/20, offering the 386S and 386/20E for about \$1500 less, respectively, than the larger machines. The Deskpro 386/25 will maintain

its larger footprint for customers whose applications require more slots and more internal storage. Meanwhile, Compaq's new 12-MHz 286-based SLT 286 may be the first laptop that does double duty as a small desktop without compromising functionality. Attacking the problems common with portables—poor display and limited expandability—the SLT 286 sports a VGA-compatible LCD screen and optional desktop subsystems for additional drives and expansion boards. Vice President Mike Swavely says Compaq decided to use a 286 processor and sell the accompanying desktop subsystems separately in order to keep the weight under 14 pounds, hold the price under \$5500, and reach "the mainstream."

## Introducing Xerox Presents

*Desktop Presentation Tool  
Is First to Migrate From  
the Mac*

**X**erox began shipping the first of several products resulting from agreements with leading Macintosh graphics provider Cricket Software. *Xerox Presents* is billed as a full-feature graphics system for business presentations. While Technical Manager Walter Schwartz maintains that the product provides full-feature drawing, chart-building, and word processing modules, he adds that the principal added value in *Xerox Presents* is its ability to simplify the organization and management of visual materials such as 35mm slides. The package can create sophisticated slide shows on a PC, and by

taking advantage of the multifile and clipboard capability of *Microsoft Windows*, *Xerox Presents* lets the user create fresh presentations by combining parts of others. The program can import ASCII text, data from most spreadsheets including 1-2-3, and graphics files in various formats, including TIFF, PCX, and EPS. Since few presenters have graphic arts backgrounds, *Xerox Presents* ships with more than 200 customizable style sheets that offer professional advice on choosing fonts, colors, and layouts.



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## Ami Beats Microsoft Word

*First Full-  
Function Word  
Processor Un-  
der Windows  
Comes From  
Samna*

This month Samna Corporation is shipping its *Ami* word processor, which may well turn out to be one of the most significant applications to run under *Microsoft Windows*. Although Microsoft reports there are 650,000 *Windows* units installed worldwide, the long list of programs running under the environment is dominated by graphics-intensive specialties from obscure vendors. Conspicuously absent from that list is Microsoft's *Windows* version of *Word*, whose ship date has not been announced. In the meantime, Samna's *Ami* fills the gap for the most popular application on a

PC. Priced at an aggressive \$149 until the beginning of February and \$199 after that, *Ami* capitalizes on the *Windows* interface to provide an intuitive menu system for quick learning and <Ctrl>-key combinations for advanced users. Users get a WYSIWYG preview of printer output and can use either their own or one of Samna's 25 preformatted style sheets for advanced page formatting without slowing data entry. Users also can place a "frame" for a scalable graphic within a document, and text will automatically flow around or even behind the graphic.

## Adobe Illustrator Ships

*Top Mac  
Graphics  
Program  
Demands a  
Hefty Hard-  
ware Platform*

Adobe will bring its best-selling graphics program for the Macintosh to PC compatibles, but the software will require an 80286 machine or better with more than 1MB of memory. A DOS version of *Adobe Illustrator* will be available by year-end, says President John Warnock. The company, whose flagship is the PostScript page description language, has decided to gamble that the graphic artists, CAD users, and desktop publishers *Illustrator* targets will invest in 80286 or 80386 computers with expanded or extended memory and a hard disk. Warnock says that company research indicates that the program is likely to sell a lot of 80386-based computers. "The productivity in-

crease is so great that cost justification is a no-brainer," claims Warnock. "*Illustrator* on the Mac was able to take on \$100,000 CAD/CAM packages." Even so, bringing the functionality of the Macintosh version to the PC is like "fitting an elephant in a shoe box," he says. Adobe has provided virtually the same functionality by tapping the *Windows* graphic user interface and employing a data-swapping scheme that exploits conventional memory, expanded memory, and virtual disk storage in order to manage graphics files that typically range between 50K and 300K.

## Intel Revamps AboveBoard

*Expanded  
Memory  
Board Line  
Gains More  
Memory and  
Multitasking  
Capability*

More than a year after announcing software support for multitasking in expanded memory, the Intel Personal Computer Enhancement Operation (PCEO) has begun to provide the hardware required to make it all possible. New models of the AboveBoard support multitasking and more memory for slightly higher prices. The \$795 AboveBoard Plus is an add-on memory card that supports the multitasking feature outlined in the August 1987 introduction of the Lotus/Intel/Microsoft Expanded Memory Specification version 4.0. With this board, users of Quarterdeck's *Desqview 2.01* can load and execute multiple applications simultaneously. Users of *Microsoft Windows/286* can load multiple DOS applications into memory, but run only one at a time; however, multitasking is achieved with applications written specifically for

*Windows*. Intel has a PS/2-compatible version of AboveBoard Plus and one with additional I/O ports. The new boards, notes Intel PCEO co-general manager Rich Bader, bring DOS users the same multitasking capability found in OS/2, a capability that AST's Advantage expanded memory board line has provided since 1986. The Advantage family has outsold Intel's AboveBoard line by roughly 2 to 1, claims AST executive vice president Tom Yuen, and roughly 150,000 of those units were shipped since EMS 4.0 debuted. Additionally, Intel, Lotus, Microsoft, and AST will make available to software vendors a new eXtended Memory Specification (XMS) driver that will give owners of 286- and 386-based PCs with more than 1MB of memory another 64K of extended memory. ●

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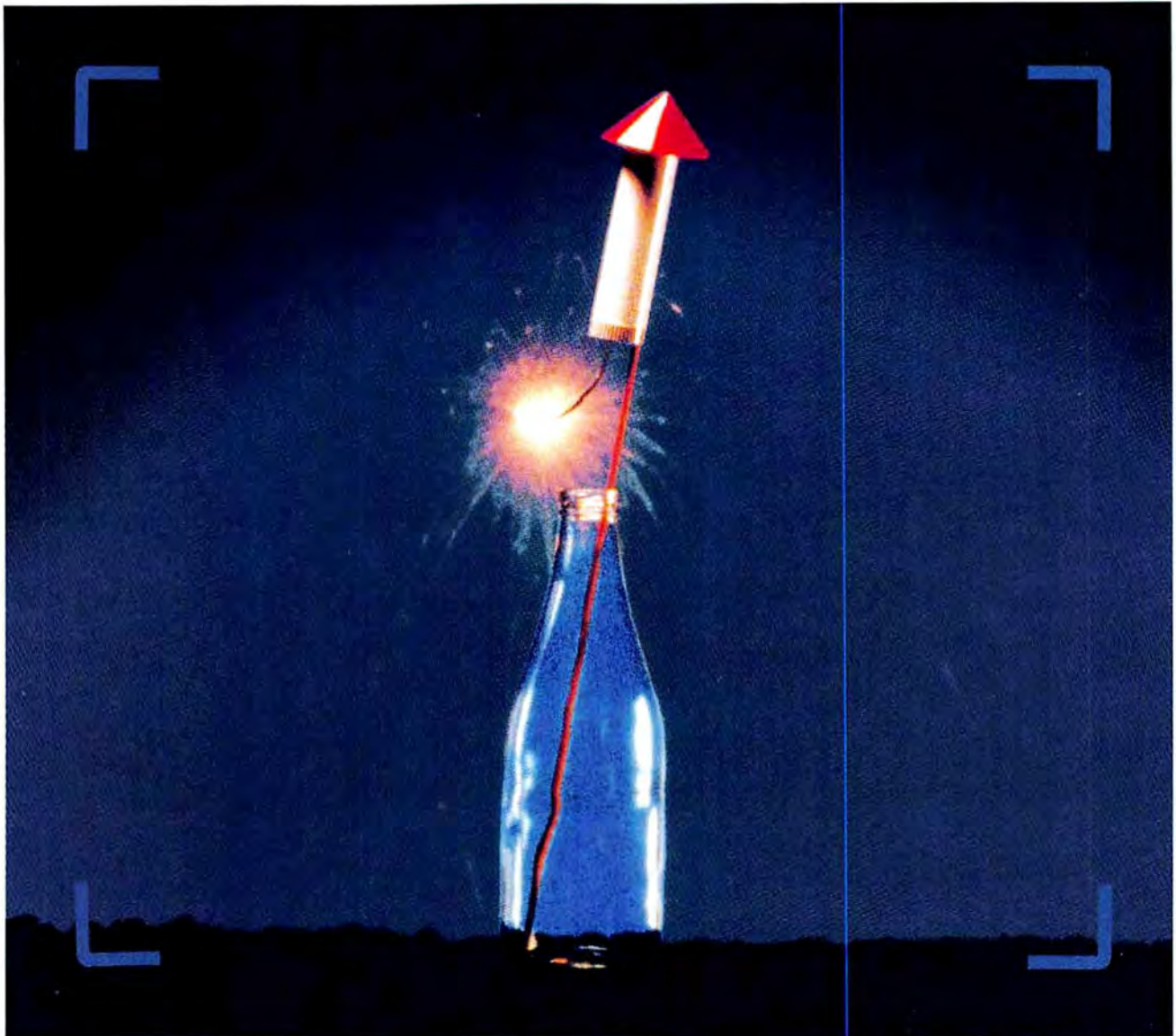
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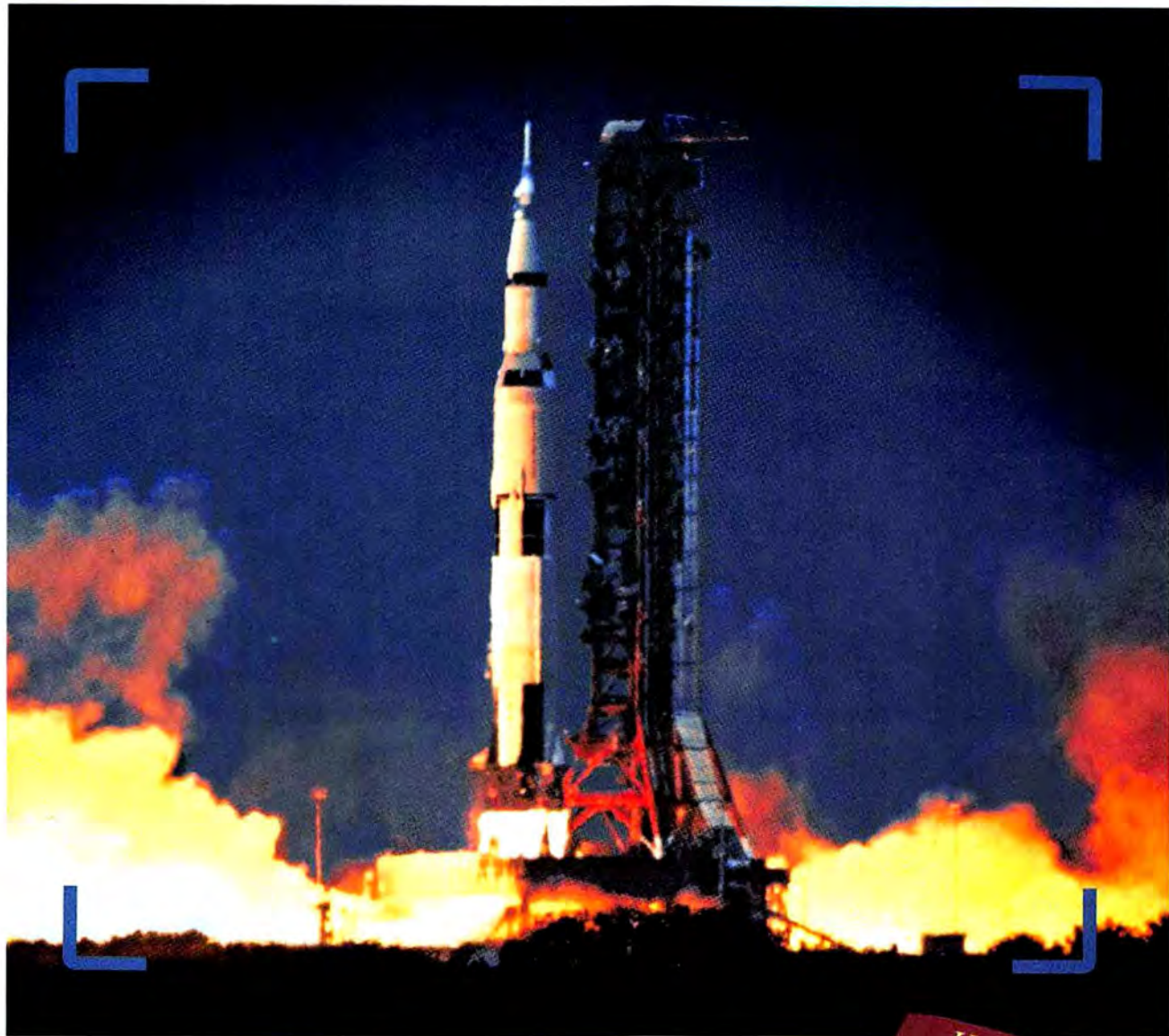
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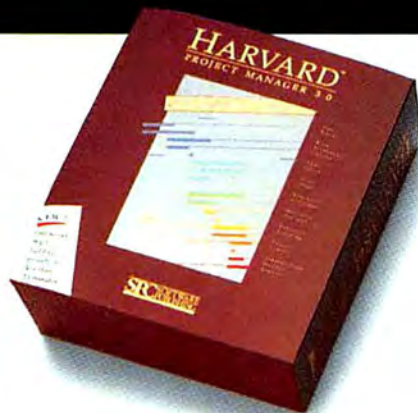


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# EISA: IBM's Canary in a Cage

The EISA bus standard is a warning to IBM that users are fed up with proprietary technology and trickle-down innovation.

Will Big Blue get the message—or is it too late already?



*Richard  
Landry*

Everyone knows the old trick miners used to avoid the dangers of odorless but deadly coal gas: Bring a caged canary down into the shaft with you. If the canary dies, that means it's time to clear out—and fast.

IBM's got its own canary nowadays—the new EISA bus standard proposed by AST, Compaq, Intel, Tandy, Zenith, and a host of other PC manufacturers (see *Top of the News* in this issue). But Big Blue doesn't seem to appreciate the service those companies have performed by underscoring the fatal flaws in its own PC strategy. Too bad. By doling out new technology in bits and pieces, and by offering competitors the choice of paying exorbitant license fees or facing a long legal battle, IBM is ensuring itself a place in the history books reserved for those who lost big by not playing smart.

EISA represents the first time that PC clone manufacturers have challenged IBM's right to set the standards for personal computers, but it's not the first time they've led Big Blue in thoughtful innovation. Companies like Compaq, Dell, ALR, and Everex have all discovered a way to wring high performance from the AT bus while maintaining compatibility with it.

Meanwhile, either through incredible oversight or by deliberate design, IBM has developed a knack for releasing products that offer too little, too late. In 1985, IBM was one of the last companies on the block to produce an 8-MHz 286-based system. Despite its intimate knowledge of Intel's plans for the 386, 386SX, and 486 chips, Big Blue insisted that Microsoft design OS/2 for the 286 platform. Finally, with the Micro Channel, IBM devised an architecture that's incompatible with users' previous hardware investments and expensive for add-on developers to implement, while lacking the power or peripherals to really make it hum.

All this is even more baffling when you consider that OS/2 was designed to usher in an era of innovation in PC architectures. Because it insulates application software from the underlying hardware, OS/2 promises to run on many different kinds of systems. PC manufacturers will be free to produce machines that differ significantly in the way they handle both memory and peripherals. The smartest companies—like Compaq and Sun—  
*(continues)*

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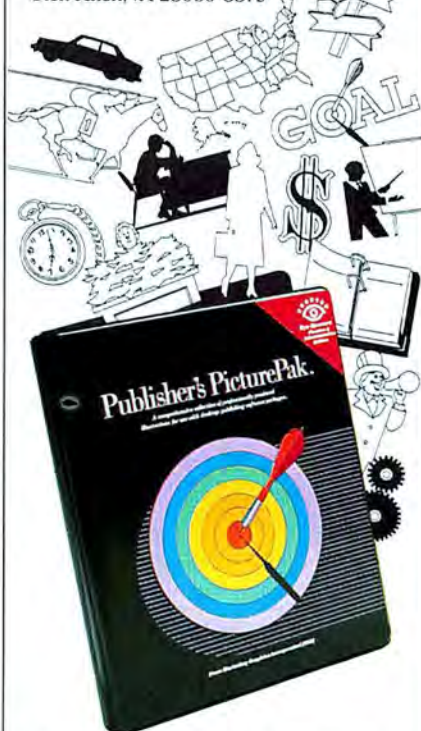
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will stay within industry bus standards while innovating in those other areas to gain a performance edge. That's been the case with UNIX-based engineering workstations for several years, and it's coming to pass in the PC arena now.

Furthermore, most users don't stand to benefit in the short term from any bus architecture that fractures the AT standard. As Compaq's chief engineer Gary Stimac readily acknowledges, neither the Micro Channel nor the AT bus is being stretched to its limit by the current generation of software and peripherals. Microsoft has plans for a multi-user, multiprocessing version of OS/2, but those are taking a backseat to its efforts to support the 386 chip first. Meanwhile, Intel's Connection CoProcessor is proof that the AT bus—and DOS—is capable of handling intelligent peripheral devices.

EISA—and perhaps the Micro Channel—will come into its own only in an era when PCs can truly replace minicomputers and mainframes as the cornerstones of office computing. When that time comes, it won't matter if you bought an old-fashioned AT compatible or a newfangled PS/2 Model 50 Z today. You won't be shuffling your old add-in cards into the new system. You won't be stuffing your old box with new multiprocessing cards, either. You may find yourself wondering why you bought a low-performance PS/2 when a high-performance, industry-standard machine was available for about the same price.

The Micro Channel isn't mythical technology. The performance gains it can potentially provide

are great. But lately IBM hasn't focused on proving the Micro Channel's benefits to users who might be willing to suffer some inconvenience and pay more for world-class power. Instead, the company's been sticking vendors for up to 5 percent of revenues as the price they must pay to produce Micro Channel clones. Once it's complete, the EISA specification will be placed in the public domain, basically free for the taking. No wonder all the major PC manufacturers managed to sit down at the table and hammer out a common design.

The Micro Channel's not dead yet. The first EISA products won't roll off the assembly line until sometime in late 1989. IBM, meanwhile, is the best-endowed computer company in the world, with a global army of distinguished scientists and engineers. If the company has the guts, it can validate its claims for the Micro Channel in the nine-month lead time its competitors have provided. But it's time for IBM to stop treating users simply as pawns in a war between vendors and to start delivering true next-generation power at a competitive price. Only that will keep the market from slipping through Big Blue's fingers. Legal maneuvering will reap the scorn it richly deserves.

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



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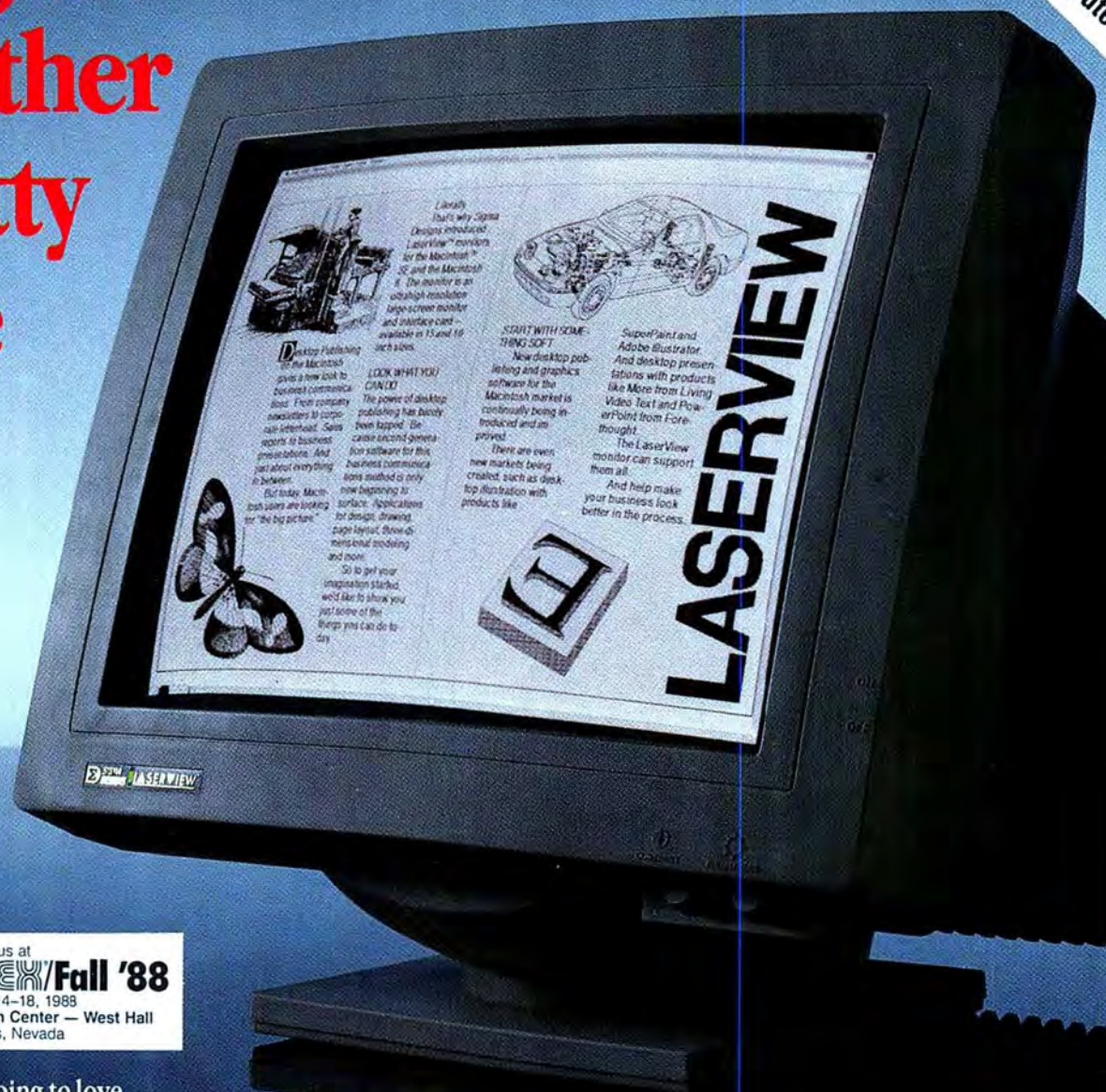
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S I G M A D E S I G N S



## LETTERS

### Reactions and responses from the PC World community

#### IBM Royalty Rap Off Base

Regarding David Bunnell's recent column ["IBM's Imperialism: Boon or Boomerang?" *PCW*, August 1988], I'm not sure I heard it right: IBM should let anybody use its patents any way they want, for free, so that U.S. personal computer users won't be deprived of "the right to choose the kind of system they want to buy"?

I suppose people can voluntarily give away their intellectual property, but there are reasons why we have intellectual property laws. The point here is not whether IBM has a market-share "birthright," but rather that the company has specific legal rights and is exercising them. Surely Mr. Bunnell would be unhappy if people started distributing his column as their own.

Alan S. Hejnal  
Upland, California

*The point of my column was that IBM is cross-licensing PS/2 technology to American companies while demanding retroactive royalties from Asian companies on old PC technology. Users should be aware that the result of this tactic could be higher prices for personal computers—and fewer choices. —David Bunnell*

#### The Future Is Here

I read with interest Stewart Alsop's column ["A Manifesto for

the Future," *PCW*, August 1988] calling for a computer that "actually does something new, instead of just doing the same old thing even faster." I searched for a computer using criteria similar to Mr. Alsop's and to my surprise found that such a computer exists today. It delivers 256 colors from a palette of 16 million (or 256 gray levels if you prefer) in 640 by 480 resolution, and has a built-in stereo audio chip that produces high-quality digitized sound. It communicates easily with PCs, minis, and mainframes; it's easy to network; and its operating system has most of the features promised by OS/2.

The computer? The 15.7-MHz Apple Macintosh II.

Hisham A. Almufti  
Bethlehem, Pennsylvania

#### Best of Shareware: Addendum

It's unfortunate that George Campbell missed a real gem in his "Best of Shareware" buyers' guide [*PCW*, August 1988]. I'm speaking of *QEdit*, a feature-rich ASCII-file editor available from SemWare, 730 Elk Cove Ct., Kennesaw, GA 30144.

After reading the August *Star-Dot-Star*, I would also recommend the program to Tom Swan ["Developer's Toolbox"] in lieu of his recommendation, the \$195 *Brief*. I think he might find (*continues*)

it an equally effective tool for programmers.

Robert M. Clark  
Danville, California

### The User's Best Friend

It's always nice to see a write-up of shareware in a major computer publication such as yours. However, the article failed to mention one of the best places to obtain shareware: the local user group.

Although the user-group library may be smaller than those of the commercial suppliers you mentioned, the advantages of obtaining shareware and public-domain programs from such a group include lower costs, a

chance to talk with someone who has used the program, and local support services. User groups offer a lot to both novice and experienced users, and to everyone in between. Please don't ignore us just because we're small.

Richard Curry  
President  
Columbus Computer Society  
Columbus, Ohio

### Still Afraid of 1984

Although I am an avid PC user, I have always feared that the widespread use of computers would ultimately rob us of our ability to think. Your review of the AST Premium/386 [*The Hardware Shelf*, PCW, August 1988] has convinced me that my fears are well grounded.

Specifically, you state on page 135 that the AST I/O bus runs at 8 MHz, while the IBM PS/2 Model 80-111's runs at 10 MHz, thus giving the IBM a 20 percent edge.

Where did you guys go to junior high school?

A 20 percent improvement over an 8-MHz speed would be 9.6 MHz. In actuality, the 10-MHz IBM bus is 25 percent faster than the AST's. I realize that this is a small point, but it reflects a bigger problem.

Mark E. Bradley  
Stoneham, Massachusetts

*Good eye. That's what we get for doing all our figgerin' in hexadecimal. —Ed.*

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	Vehicle fleet management	13
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## Stuck With PagePerfect's Imperfections

I didn't listen: In spite of your admonitions ["PagePerfect," *PCW*, July 1988], I went out and bought a copy of IMSI's *PagePerfect*. It is the single worst program I have ever used—and I've used a lot of programs.

It is clumsy, slow, and so full of bugs that it crashes with unbelievable frequency; all data is lost and you are left at the DOS prompt with an indecipherable error message. And instead of downloading fonts to my LaserJet, it leaves them on disk, turning the printing of a single page into a 10-minute operation.

I've learned my lesson.  
*Harry I. Shuman, M.D.*  
*Tampa, Florida*

## A Trustworthy Trinity

The August 1988 *Hardware Shelf* states that the Epson LQ-1050 is "possibly the perfect 24-pin dot matrix printer," but went on to criticize the "unreliable sheet feeder" and "occasional paper jams."

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*Leslie R. Morris*  
*Niagara University, New York*

## .OBJectionable Review

Your review of Turbo Pascal 4.0 [*The Software Shelf*, *PCW*, Au-

gust 1988] states incorrectly that the compiler is not yet compatible with Microsoft .OBJ-format files. Not only does Turbo Pascal 4.0's linker work well with .OBJ files, it can also handle *near* or *far* calls contained in those files. The compiler's manual does an excellent job of explaining how to link .OBJ files into programs.

*Joseph E. Crouch*  
*Balch Springs, Texas*

*In fact, Turbo Pascal's linker works well only with .OBJ files produced by assembly and C compilers. Other compilers don't follow Turbo Pascal's segment-naming conventions, and so their .OBJ files cannot be linked into Turbo Pascal programs. This important distinction was mistakenly edited out (continues)*

# Rapid letters. Rapid File.

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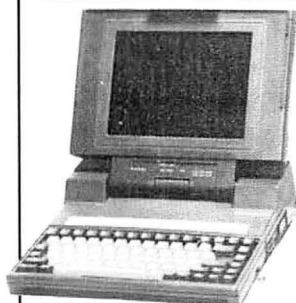
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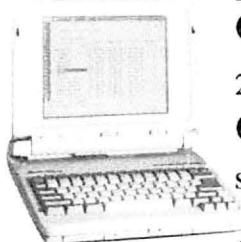
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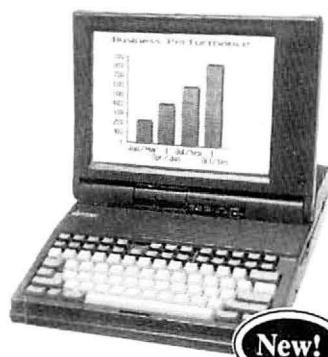
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Circle 177 on reader service card

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## Thank You.



## LETTERS



Polaroid Palette

*of Michael Covington's manuscript, and we regret the error.*  
—Ed.

### Corrections

Those readers who aren't color blind may have noticed that our review of the Xtron MF147 monitor ("Viewers' Choice: 13 Monochrome Monitors," PCW, August 1988) contained an editing error; obviously, we reviewed the amber and not the paper-white version of the monitor. We also mistakenly reported that the unit was manufactured in Korea, when in fact it was manufactured in Taiwan. We apologize to Xtron for the mistakes.

Further, although Xtron claims that it does not ship a monitor with a 17-MHz bandwidth (a statement supported in MF147 documentation from several dealers), the author, TJ Byers, reports that a 17-MHz rating was printed in our review unit's documentation. In any case, we stand by the author's qualitative judgment of the monitor.

A review of the Polaroid PalettePlus (*The Hardware Shelf*, PCW, March 1988) stated unfairly that the PalettePlus offers "few discernible improvements in image quality" over the original Palette. The authors based their analysis on tests that failed to



Polaroid PalettePlus

fully implement the PalettePlus's EGA capability, as shown in the comparative screens that accompanied the review. In fact, the PalettePlus offers improved resolution with programs that use the PalettePlus driver on EGA-equipped systems. The accompanying screens show a comparison of the same *35mm Express* file captured on the Palette and the PalettePlus. PC World regrets the error.

In our August 1988 review of five XT clones ("XTs for Bargain Hunters"), we mentioned that all the machines (except the Maxum Turbo XE) were equipped with an 85ms Seagate ST-225 hard drive. In fact, the ST-225 is rated at 65ms. We also said that all the machines have 135-watt power supplies; while that's true of the Maxum and the Plain Vanilla PC, the others come with 150-watt power supplies. PC World regrets these errors.

Last, the telephone number for Blackship Trading Company in the Where to Buy listing of August's "Business Class ATs" works only within California. Outside California you can reach Blackship at 415/952-7955.

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

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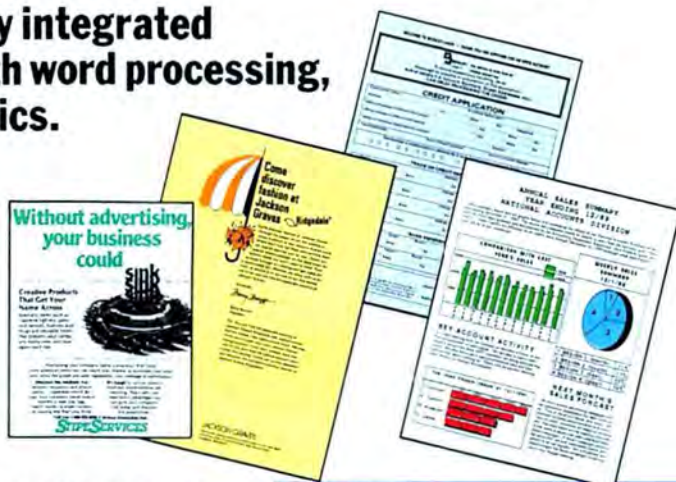
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QIC 286-10	286-10	0	6	2	0		512K	1MB	192W	\$2,099	\$1,760	\$1,390
QIC 286-10	286-10	1	6	2	0		512K	1MB	192W	\$1,995	\$1,609	\$1,239
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# 'Til Death Do Us Part?

Has our relationship with software companies matured as much as our understanding and use of computers has?

Can this marriage be saved?



David  
Bunnell

Three or four years ago, PC users everywhere were reluctant players in a drama called "The Copy Protection Snafu." By complaining loudly and refusing to buy copy-protected software, we won that round of the battle we're always fighting as consumers. After much travail and inventiveness on the part of users who figured out ways to break protection codes in any case, the companies caved in one by one, and most software sold today is not copy protected. Pardon me while I don my populist hat, but I think this is a great example of how users can band together to make change in an industry we've built into a major economic force.

For those ready to take up the cudgel again, I'd like to present another problem that needs our energy: getting better support and warranties for the software we buy. I think we need a uniform licensing code. Some software companies think they've been so magnanimous in hearing us out on copy protection that they need give no more. Their idea of a guarantee is to say, The disk is formatted, the manual has been proofed and printed, call us when you want to buy again. Microsoft is one of the few exceptions in that it guarantees satisfaction on all application software.

Don't you think that a program costing \$400, \$500, or \$600 deserves a little more support from its seller—especially when the cost of the goods going into it is often less than \$25? Sure, the ingenuity of the idea, the programming, and the marketing are worth a lot—but \$500 a copy includes a healthy profit. Software licenses should represent an ongoing relationship between seller and buyer.

At the very least, we should have the satisfaction of a code spelling out certain elements we could always count on in buying software. This would include some mention of an ongoing upgrade plan. As it stands, we're ripped off all too often by buying what really amounts to a shrink-wrapped, beta-test version of a program. There are invariably bugs and missing features that the next couple of versions help remedy, but the overall effect of a company being first out of the gate is to penalize early buyers. And then we're stuck choosing between versions when we don't know what's coming next or when we'll see it.

A uniform code would also ensure that incremental upgrades would be sold for some fixed percentage of the original cost of

*(continues)*

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the program. I think that 15 percent is a good guideline. Having a reasonable and predictable price for upgrades would give buyers more confidence in their purchasing plans, and vendors could count on steadier sales year in and year out. With releases as random as they are now, software companies spend more on promotion, and you'd better believe that we pay more as a result.

As for our responsibility in this committed relationship, we have to become more savvy consumers. We must know our rights, but we must also send in warranty cards and keep track of bugs, fixes, and price points that matter to us. We should let companies know when their advertising works and how they can market their products more effectively—even after the sale. What kind of technical support do we expect? Are the companies aware of that expectation?

I think that user groups and associations of user groups can lead the call for a code that will make our lives a little easier. We've lived long enough with PCs to know they're not a fad, remarkable though they may still be. They are tools we want and need to use in all kinds of work we do. We've made software companies successful by using their products in our machines. This relationship implies a responsibility on both parts. If we agree not to illegally copy or alter software, if we are willing to learn new programs and commands and even languages in order to work more effectively, then software companies can work to improve and support their products for our use. To paraphrase an old saying, what's good for business is good for users everywhere. ●

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## TI's OmniLaser<sup>TM</sup> 2115. The network printer you need when your application needs are demanding.

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advanced graphics.

Best of all, with speeds of up to 15 pages per minute and a duty cycle of 25,000 pages per month, it can satisfy the needs of even the busiest group of professionals.

You can connect an OmniLaser to virtually any computer or network. It features multiple standard interfaces for IBM<sup>®</sup>, DEC<sup>®</sup>, Apple<sup>®</sup>, even specialized hardware like CAD/CAM workstations.

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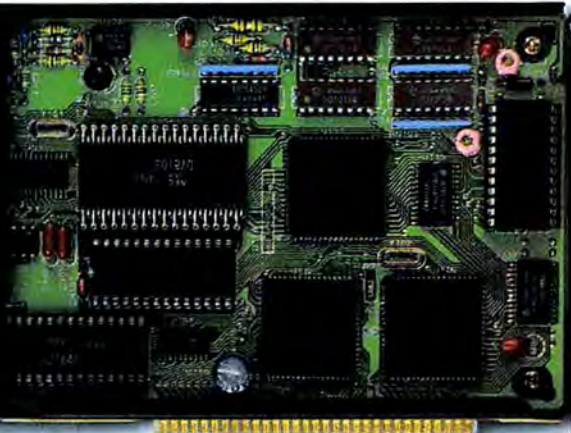
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**PC WORLD**

December

## Hardware Buying Guide

In the past year, we've seen a bonanza of new and challenging hardware technologies. Understanding when you need state-of-the-art equipment is the key to making intelligent choices. Buy smart, and it makes a difference in the way you work.

PC World's hardware extravaganza focuses on the latest and greatest offerings in the PC universe. Buyers' Guides survey PS/2 peripherals and high-powered 80386 systems, and our reviewers scrutinize 15 VGA monitors, 10 VGA boards, 7 20-MHz 386s, and 7 lightweight laptops. With the support of NSTL's performance benchmarks and compatibility tests, plus our Features Evaluations, we highlight the most important factors in your hardware buying decisions.

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## Lotus 1-2-3

(1) Upgrade offer valid September 6, 1988 through 30 days after the 1-2-3 Release 3 ship date. (2) National Software Testing Laboratories, Inc. Software Digest Ratings Report, June, 1988.

(3) 1-2-3 system requirements will vary from Release 2.01 to Release 3. 1-2-3 Release 3 runs under DOS and OS 2. Hard disk and 640K required. Lotus certified compatible PC with 80286 processor or better recommended. Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. dBase is a registered trademark of Ashton-Tate Corporation.

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The best news about the Cambridge Z88 is the price; you pay less for this personal computer than you would for some PC software and peripherals—\$599.00. And it won't cost you anything to try the Cambridge Z88 yourself.

### Architecture

The Cambridge Z88 is designed with four chips: a CMOS Z80; a 32K RAM (expandable to over three megabytes); a 128K ROM for the operating system, powerful BASIC, and built-in applications (word processor, spreadsheet, daily date manager, etc.); and custom controller chip.



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### Operating features

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# A Perspective on the Presentation Manager

The graphic user interface tells a story about what manufacturers think of users.

It's not a pretty picture.



Stewart  
Alsop

Around the time you read this column, in late October or early November, you should be hearing quite a lot about the Presentation Manager. If it's not shipping, you'll be hearing the thud of blows as IBM and Microsoft get beat up in the press for promoting vaporware. If it is shipping (and my best guess, as I write this in late August, is that it will be), then you'll be hearing all the gurus and gods of the PC industry proclaiming the goodness or badness of this latest and greatest graphic user interface.

Earlier this year I realized that the graphic user interface (GUI) would ultimately become the battleground for computer systems manufacturers. So I spent some time sitting in front of the various GUIs competing for our attention, including Apple's Macintosh, Hewlett-Packard's *NewWave* extension of *Microsoft Windows*, Sun's *Organizer* interface for its 386i workstation, Sun and AT&T's *Open Look* interface for UNIX, IBM and Microsoft's *Presentation Manager*, Xerox's *Viewpoint* interface for its 6085 workstation, and Tandy's *DeskMate* interface for DOS. I have used a Macintosh regularly and *Windows* programs sporadically—in addition, of course, to all the DOS programs I know and love, each of which sports its own interface.

So now I consider myself an expert observer (but not designer) of user interfaces. Here's the first thing I learned: Most of the so-called experts have never actually sat in front of the interfaces they are pontificating about. As a result, most of what they have to say about user interfaces is pure hogwash.

Perhaps a little history is in order. The researchers at Xerox PARC (Palo Alto Research Center, where much of the original research into user-interface design was completed in the early 1970s) determined that, since most people who use computers work in offices, it might be helpful to use graphic representations of office tools to represent computer tools. Thus was born the infamous "desktop metaphor," which contained such items as a wastebasket for clearing objects from the screen, filing cabinets to represent storage space, folders and books to represent groups of files and directories, and in- and out-boxes for receiving and sending electronic mail. Indeed, in the Xerox model (carried into its *Viewpoint* interface) there is no such thing as a software program (since it has no real-life equivalent); anything you do—like writing or drawing or filing—is simply part of the *(continues)*

computer system. It took Apple to come up with the idea that software was a separate object on the desktop and that each program (and therefore each developer/publisher) should have its own icon and identity beyond that of the system.

Unfortunately, much of this basic notion of modeling computers on the real world in order to help the user has been lost, because the industry neglected to distinguish between graphics technology and a graphic interface. Graphics technology gives computers the ability to turn spots on the screen on and off and, by arranging these spots, to make graphic objects appear. (This technology is called bit mapping.) Instead of setting out

to help the user, each developer focused on proving to the world that its machine was more "graphical" than anyone else's: Witness IBM's dramatic announcement of a machine with a palette of 256,000 colors that can actually display 256 of them in any one of 307,200 spots (or "pixels") on its best color monitor.

The net effect of this achievement (known by yet another user-friendly acronym, VGA) is to help your machine turn pixels rapidly on and off, giving you your graphic interface. Of course, you're restricted to eight-letter file names (plus a three-letter extension), and you're still required to understand the concepts of path names, AUTOEXEC files, and CONFIG.SYS files if you want to customize any of your applica-

tions. And VGA does absolutely nothing to help most users get more out of their machines; it just lets them do what they've been doing for the past four years with a lot more colors and a lot faster.

No one is going to say VGA isn't good enough just because the developer left out some icons and other metaphors. But let's not call this a graphic user interface. Instead, let's insist that IBM and Microsoft finish the job they started. For instance, when you see your first demonstration of the Presentation Manager, ask the rep: Why do I need to put brackets around the path name in OS/2? If this is a desktop, *(continues)*

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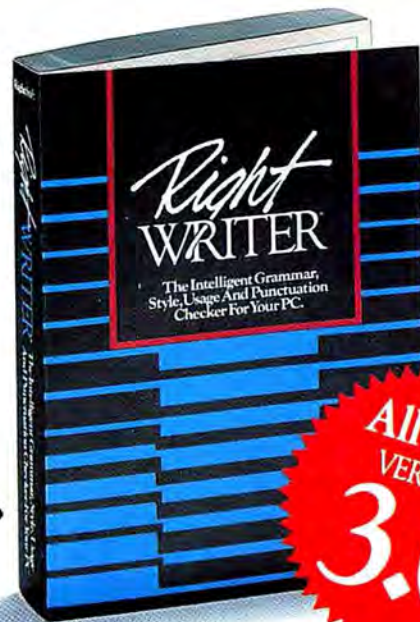
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### The Original Text...

There is a problem of a severe nature in widget production. It is clear that our current system will not cut the mustard. We may possibly need to move on this reasonably quickly. To start, it would be advantageous to see if a new design is doable. (This should be looked into at once.)

### ...RightWriter's Analysis

There is a problem of a severe nature in widget production. It is clear that  
 <<\* U12. WORDY. REPLACE problem of a severe nature BY severe problem \*>>  
 <<\* S14. CONSIDER OMITTING: It is clear that \*>>  
 our current system will not cut the mustard. We may possibly need to move on  
 <<\* S16. CLICHE: cut the mustard \*>>  
 <<\* U13. REDUNDANT. REPLACE may possibly BY may \*>>  
 this reasonably quickly. To start, it would be advantageous to see if a new  
 <<\* S17. WEAK: reasonably quickly \*>>  
 <<\* S13. REPLACE advantageous BY SIMPLER helpful or good? \*>>  
 design is doable. (This should be looked into at once.)  
 <<\* U16. NOT A WORD. REPLACE doable BY can be done \*>>  
 <<\* P11. IS THIS PARENTHESIS CLOSED? \*>>  
 <<\* S1. PASSIVE VOICE: be looked \*>>

#### << SUMMARY >>

Overall critique for: C:\RIGHT30A\newtest.  
 Output document name: C:\RIGHT30A\newtest.

READABILITY INDEX: 5.23

14th	12th	10th	8th	6th	4th
*****	*****	*****	*****	*****	*****
COMPLEX					
Readers need a 5th grade level of education.					
SIMPLE					

STRENGTH INDEX: 0.78

0.0	0.5	1.0
*****	*****	*****
WEAK		
The strength of delivery is good, but can be improved.		
STRONG		

DESCRIPTIVE INDEX: 0.27

0.2	0.5	1.0	1.2
*****	*****	*****	*****
TERSE			
NORMAL			
OVER DESCRIPTIVE			
The use of adjectives and adverbs is in the normal range.			

JARGON INDEX: 0.00

SENTENCE STRUCTURE RECOMMENDATIONS:

2. Few compound sentences or subordinate clauses are being used.
14. Many prepositional phrases are used.

#### << WORDS TO REVIEW >>

Review this list for negative words (N), jargon (J), colloquial words (C), misused words (M), misspellings (?), or words which your reader may not understand (?).  
 ADVANTAGEOUS(J) 1 DOABLE(C) 1  
 NOT(N) 1 SEVERE(N) 1  
 WIDGET(?) 1  
 << END OF WORDS TO REVIEW LIST >>

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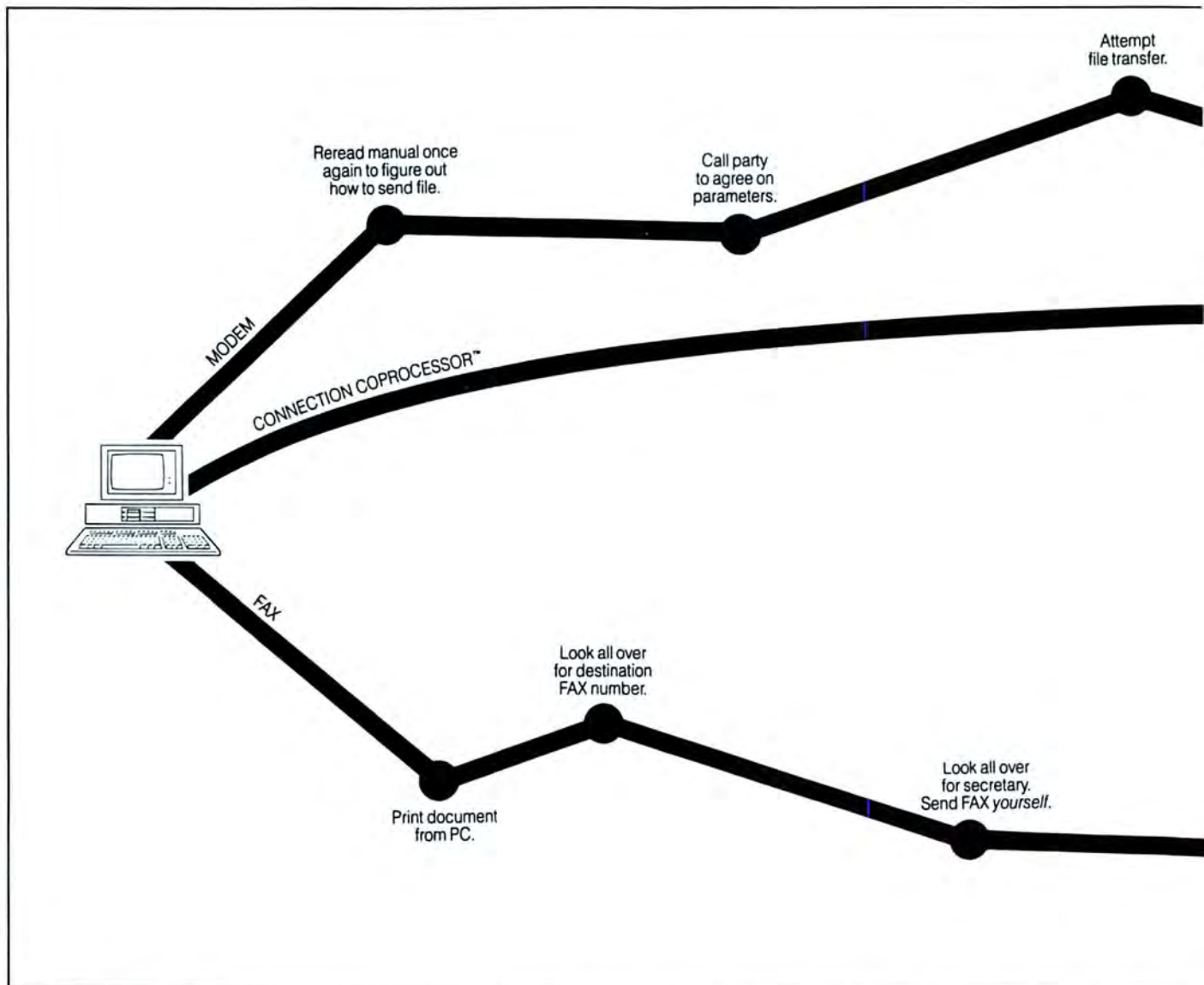
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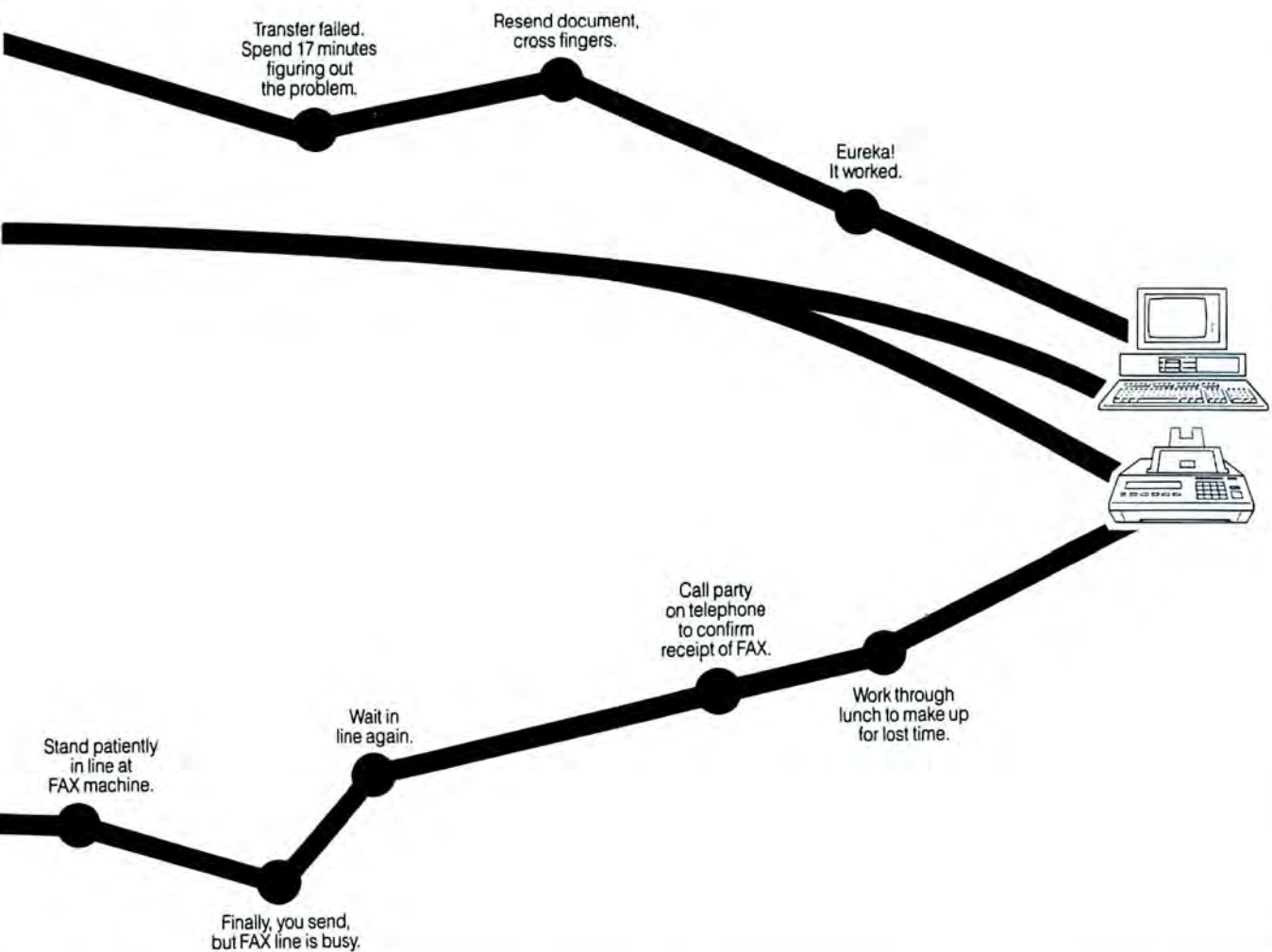
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where are my file folders? If this is a graphic interface, where are the icons to help me see the differences between different files? Why can't I label my files the way I label folders sitting on my desk? Where are the in- and out-boxes, the file drawers, and the trash can?

If people keep asking those kinds of questions, perhaps we will begin to see the kind of user-interface innovations presented in some of the more obscure interfaces that most of us will never see. For instance, Hewlett-Packard implemented an interesting notion called "compound documents" in its *NewWave* interface. This means that if you copy a portion of a drawing document into a word processing document, when you

put your cursor into the drawing portion of the new document, the drawing software puts itself in memory and becomes available to you. So you don't have to remember where the software is or what it's called.

Another interesting innovation that is part and parcel of the Xerox interface is the belief that sending documents to another person should be as natural as (and a heck of a lot easier than) dropping them in an out-basket. That is literally how it's done: Click on the icon for an object, drag it over to the out-basket icon, and let go. If the system can't figure out who you're sending it to, it asks you for a name or an address. If the icon happens to be a printer or a facsimile machine, then the document gets translated to the appropriate format and sent.

The newest version of Tandy's *DeskMate* interface assumes that the system, not your application, should contain the ability to correct your spelling, wherever it is that you're spelling something—whether in a file name or a database program or a spreadsheet. When technology is able to do that right, a logical extension will be for the system to also provide some advice on grammar and usage. Another idea, used first in *NewWave* and adopted recently by the Macintosh, is that the system should contain a macro recorder, giving you the ability to automate simple processes.

When you hear Microsoft and IBM proudly proclaim that the Presentation Manager is derived

(continues)

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Center a page without moving cursor	11	2	82
Move 7 words to cursor location	13	6	54
Bring a page of text in from a file	19	6	68
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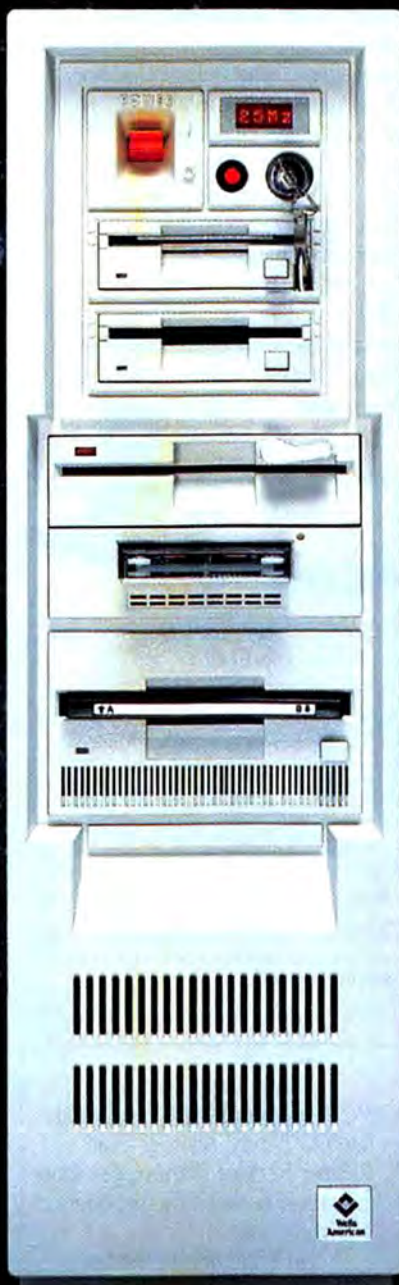
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from four years of development for Windows, ask them why it took so long to put colored windows around the DOS file system. And then ask them how long it will take to get a real user interface, one that helps users become more effective and more comfortable with their computers instead of just making the programmer's life easier or organizing the printer interface. And when they deliver the user part of the Presentation Manager user interface, ask them whether other vendors aren't already a step ahead. ●

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

## POWER TIP NO. 17

### Quick Blocking With WordPerfect

You can quickly block sections of text, from the current cursor position, with WordPerfect 4.2 and 5.0 by pressing <Alt>-<F4>-<Space> to block a word, <Alt>-<F4>-<Period> to block to the end of a sentence, or <Alt>-<F4>-<Enter> to block to the end of a paragraph. You can also press <Alt>-<F4> and type any character; if it's within the next 2000 characters, WordPerfect will block to it.

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Orem, Utah

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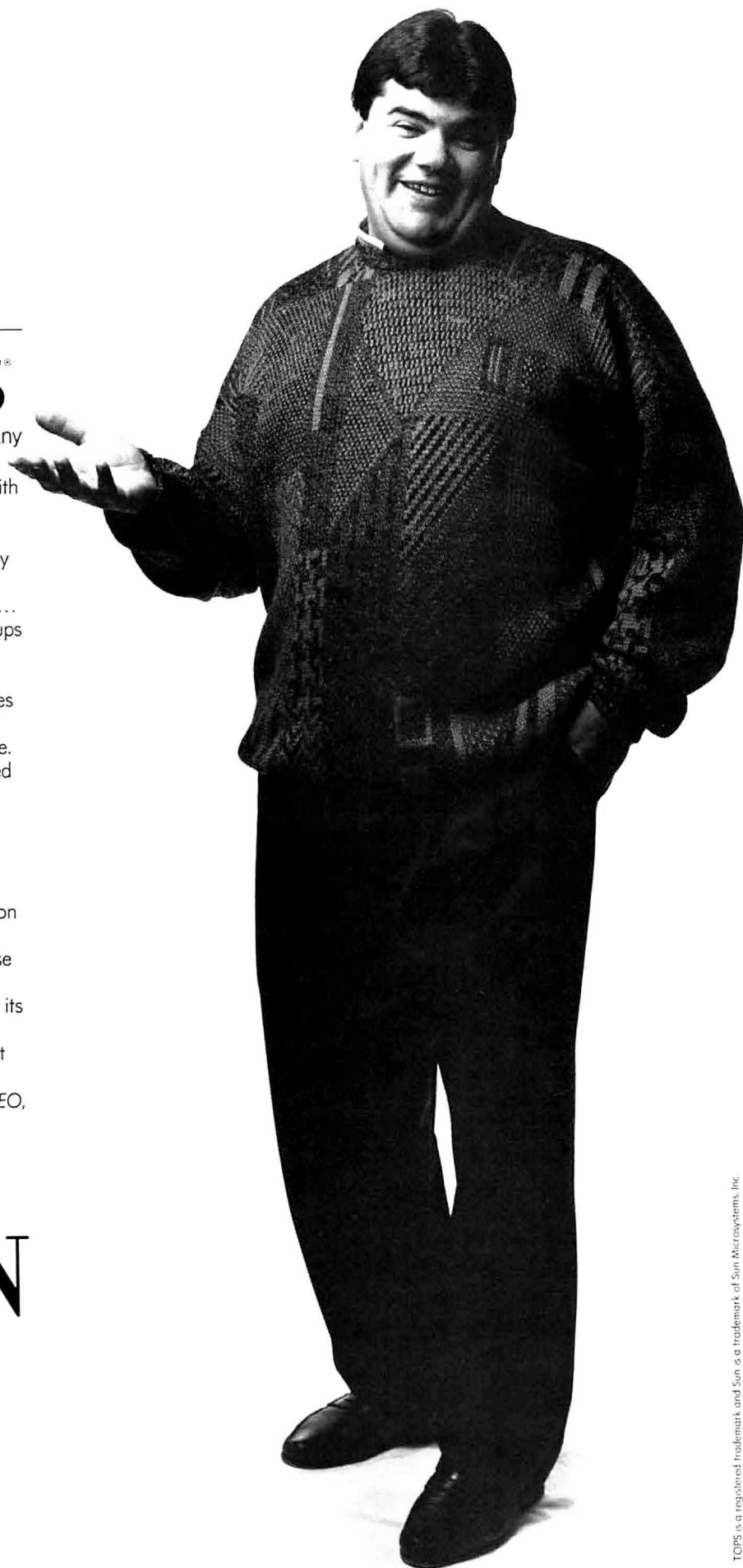
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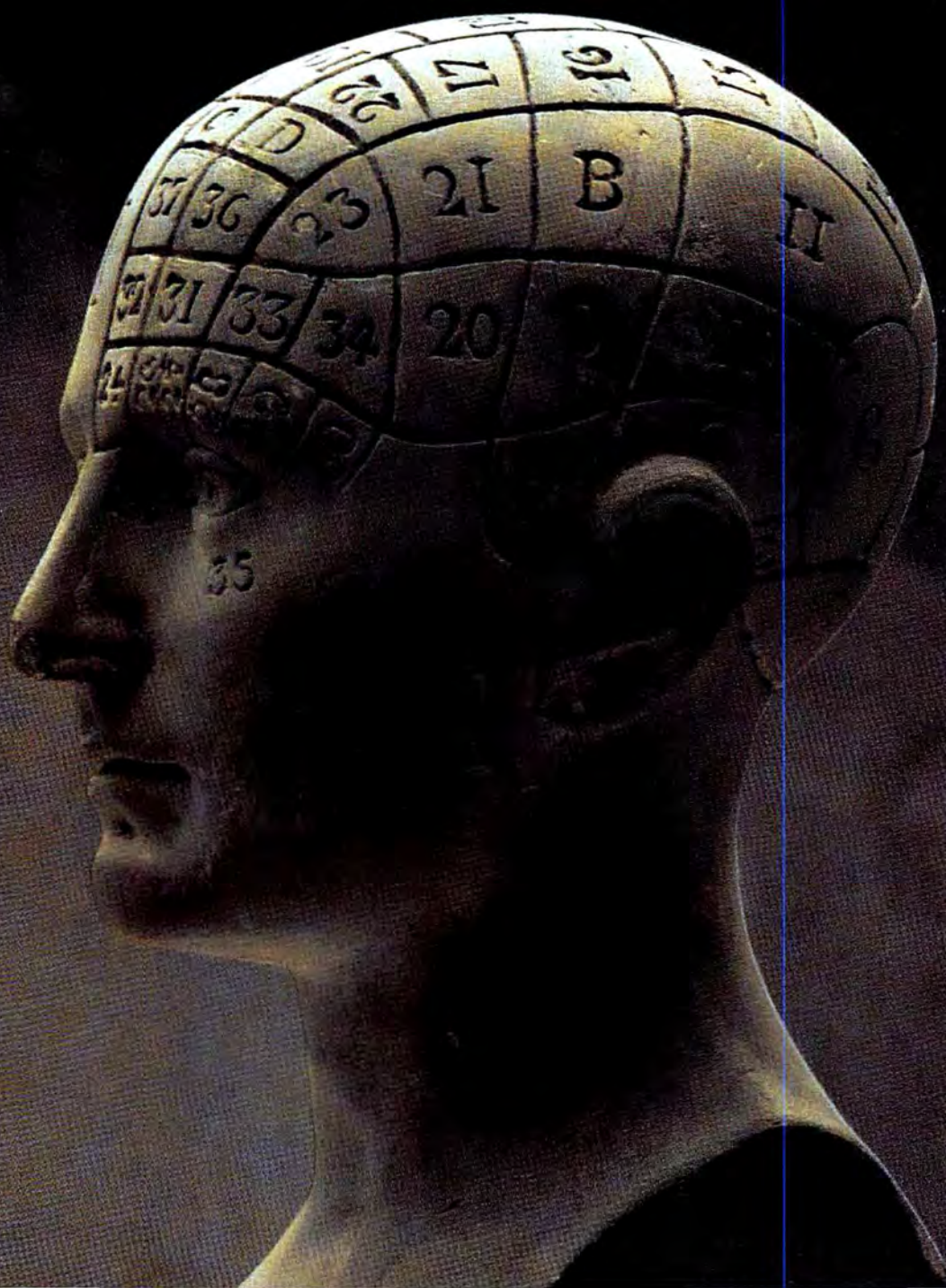
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File: C:\AGENDA\FILES\ISSUES 06/21/88 11:00

• Research	• Decision needed on research budget by end of this week—discuss options with Jim and Joan.	• High	• 06/25/88
• Competitive Tracking	• Forward product comparison articles to Joan.	• Low	• 07/07/88
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• High	• 06/22/88
• Bonus Dollars	• Bob will present ten-point incentives program at sales conference.	• Medium	• 06/29/88

*Agenda automatically files items in all relevant Categories. Then you can View information from different perspectives.*

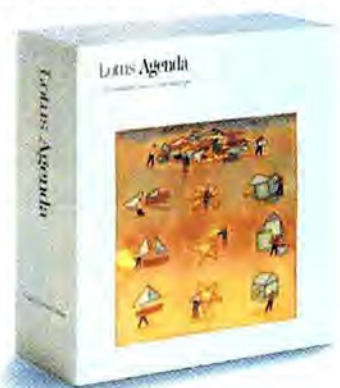
File View Category Print Utility System Quit  
New, Remove, Position, Assign, Discard, Undiscard

Scratchpad	Who	Issues
• Forward product comparison articles to Joan.	• Joan	• Competitive Tracking
• Can we get the cost of goods sold under \$12?	• Tom	• Materials
• Bob will present ten-point incentives program at sales conference.	• Bob	• Bonus Dollars
• Tom will adjust mix by 10%.	• Tom	• Distribution Vendors Pricing
• Decision needed on research budget by end of this week—discuss options with Jim and Joan.	• Jim • Joan	• Research

*Enter items of information manually, import them electronically, or use the pop-up capability while in another program.*

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# Keys to IBM's Future Success

We are all taught to learn from our mistakes, but there is much that IBM can learn from its successes.

Simply put: Don't look back.



**William  
F. Zachmann**

In times past, the name IBM was synonymous with the computer industry. IBM was the only game in town, and its identity was built solidly on technological sizzle and market leadership. But the giant has been slipping lately, and stooping to some pretty unappealing tactics to retain its leadership position: By insisting on building and promoting proprietary, closed systems, IBM is trying to recapture its glory days. It's a strategy that dooms IBM to remain mired in the past.

The proof, as they say, is in the pudding. In 1985 and 1986 IBM suffered its first two consecutive years of declining earnings per share since the Great Depression of the 1930s. Its modest increase in earnings in 1987 owes as much to higher foreign earnings from a weak dollar and to a lower tax rate at home as to any real improvement in results.

According to IBM's annual report, in the workstations revenue category (which primarily consists of personal computers, though it also includes terminals and whatnot), IBM actually had over a billion dollars *less* revenue in 1987 than in both 1985 and 1986. So despite IBM's self-proclaimed "success" with the PS/2, bottom-line results were so-so at best.

IBM's PS/2 Micro Channel Architecture (MCA) has turned out to be more a creation of advertising hype than of engineering excellence. More than a year and a half after its introduction, the MCA has yet to demonstrate any real advantages in either performance or function.

The fact is, IBM has a lot of problems that aren't going away. The dominant position that it has long held in the computer industry is fundamentally threatened. That is not, however, because personal computers are the source of IBM's largest revenues or biggest profits. Large mainframe systems hold that distinction. Rather, it is because the market for personal computers most directly displays IBM's deepest and most severe challenges for the 1990s.

Personal computers stand at the forefront of the transition away from the proprietary mainframe and minicomputer architectures of the past toward the increasingly standardized world of the future. The economics of the industry are shifting away from limited competition and semimonopolistic pricing. IBM, the most successful vendor in the old environment, must change  
(continues)

drastically if it is to continue to be successful in the new.

IBM's response so far has largely been to try to roll back the changes that are revolutionizing the market. The PS/2, the MCA, OS/2 Extended Edition, and IBM's aggressive defense of "intellectual property rights" in patents and copyrights are all part of its effort to return to the proprietary architectures of the past—and to the control of the industry that proprietary architectures gave it. At the same time, IBM is trying hard to turn personal computers back into peripherals, albeit very smart peripherals, of the mainframe. The idea is to lock users in.

But it isn't going to work. The PS/2 and the MCA offer no real advantages over competitive of-

ferings from other vendors. OS/2 Extended Edition is an overpriced underperformer that won't even run on most of the systems currently in use, including most of the PS/2s IBM has sold so far. Most users are much too smart to permit themselves to be led back into IBM's proprietary corral.

The sad part about all this is that IBM doesn't have to follow a regressive road in order to be successful. The key to IBM's future isn't in trying to turn back the progress of history and technology but in adopting strategies that will succeed in the new environment. IBM needs to take forward-looking action, as it did in the mid-1950s in response to Univac's early success with computers; or in 1964 with the introduction of its IBM System/360, a line of processors as consistently

integrated for its time as the Digital VAX has become in the 1980s.

In fact, IBM has a tremendous initial advantage over competitors. Despite recent setbacks, IBM's reputation remains good. And most buyers are willing to pay more for a product from a company with a good reputation. Compaq, a mere whippersnapper in the industry, has built a reputation for quality that commands premium prices in the market. IBM can certainly do as well.

The problem, however, is that IBM seems to be preoccupied with finding ways to return to a more proprietary architecture instead of with finding ways to build a superior product at the best possible price. Obsessed with preserving the high mainframe profit margins that it has



The advertisement features four IBM Diamond Scan monitors arranged in a row against a background of a grid of colored squares. Each monitor displays a different image: a fish, a building, a globe, and a mechanical part. Below each monitor is a caption detailing its specifications.

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**Diamond Scan 16L**  
Auto-Tracking  
1024 x 768 pixels (typical)  
1280 x 1024 pixels (maximum)

**Diamond Scan 20L**  
Auto-Tracking  
Up to 1280 x 1024 pixels

Actual unretouched screen images

# A Clear View To Monitor Quality

come to expect, IBM is living in the past. That's no way to run a company in the 1990s.

A blatant example of this shortsightedness is IBM's approach to its excellent RISC-based RT computer system and UNIX. Appropriately packaged and priced, the RT would without a doubt be IBM's most competitive midrange offering, filling the role of both network server and departmental processor. Its speed and I/O capabilities would make it a natural winner in such a role.

Instead, IBM promotes the RT simply as an expensive, high-end workstation for scientific and engineering applications. Even though the new models last summer improved on the RT's so-so floating-point performance, the RT is really best suited as a general-purpose business processor.

For departmental and file server applications, it could be highly competitive with less powerful Intel 386 and Motorola 68030 systems from other vendors.

IBM has so far been unwilling to aggressively position the RT for the markets where it has the greatest potential. The company is too concerned with promoting the less suitable but more proprietary 9370 (for larger organizations) or the AS/400 (for small and medium-size businesses) to let the RT fulfill its potential. IBM is still reluctant to admit that the UNIX-based operating system of the RT, AIX, is relevant outside the narrow world of technical computing (and government contracts that require it).

An analogous shortsightedness occurred with local area

networks. If IBM had embraced and supported Ethernet as a standard in 1981 when it was introduced by Intel, DEC, and Xerox, IBM would dominate the local area network market today. An IBM ethernet would have achieved a much larger market share than has the IBM Token-Ring. IBM's insistence on doing it differently confused and thereby retarded the market, ultimately diminishing IBM's influence on local area networks in general.

Repeating mistakes like that is not the way for IBM to maximize its prospects for success in the new era of information systems. IBM ought to take a leadership position supporting standards; it ought to further reduce corporate overhead to become  
(continues)

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XC1429C	14/13V	31.5	0.28				•				
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truly price competitive; and it ought to concentrate on building the best possible products instead of finding ways to build more proprietary products. If it does all these things, IBM will continue to play the dominant role it has long enjoyed in the industry. If it does not, IBM will join the buggy-whip manufacturers and the railroads as a monument to the failure of keeping up with change. ●

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

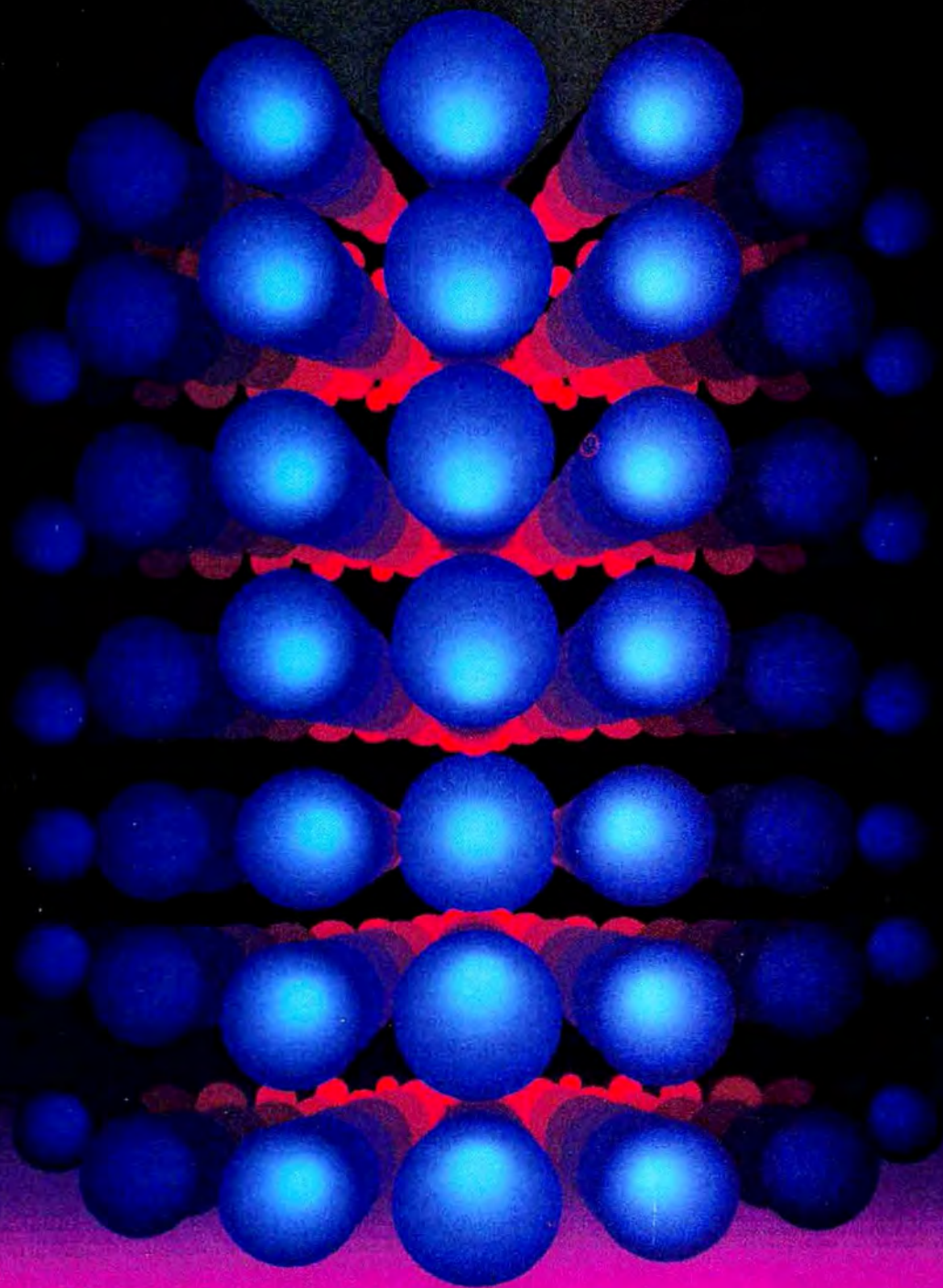
### POWER TIP NO. 18

#### Use Backspace to List 1-2-3 Directories

Have you ever selected File Retrieve in 1-2-3 release 2 and then realized that the file you're looking for isn't in the current directory? To change directories you could type in the path name for the file or use the File Directory command. Instead, try pressing <Backspace>. This lists all the subdirectories and .WK1 files in the current directory and may enable you to find the file you want quickly. In fact, each time you press <Backspace>, 1-2-3 will display subdirectories and .WK1 files in each directory all the way back along the path to the root directory.

*Thomas Oniguchi  
Santa Clara, California*

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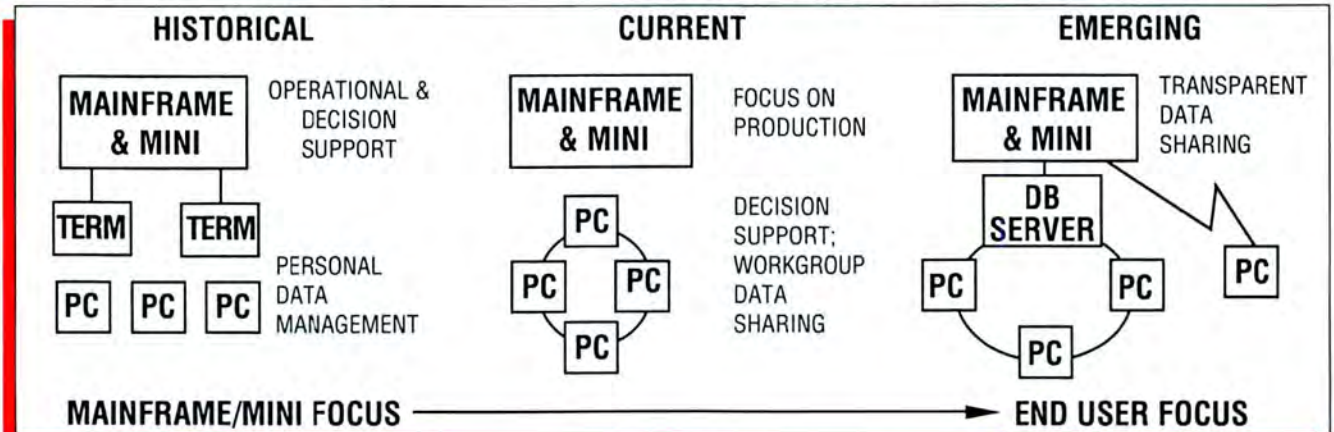
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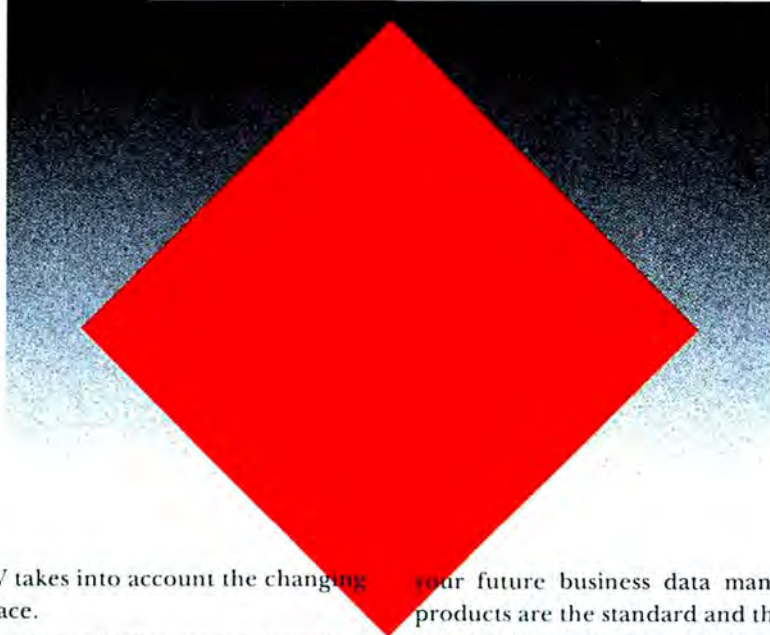
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#### The solution.

Ashton-Tate provides the most comprehensive database solution for meeting the needs of all users from the first-time user to the professional developer. Working at an individual PC workstation, in a workgroup or accessing corporate databases, dBASE IV provides a clear migration path toward the integrated office of the future.

The Ashton-Tate® database solution is based on the concept that users want to work from a set of highly integrated and usable database tools — regardless of their location, operating system or database type. They require the flexibility to access many different databases across key operating system platforms. And want that access to be both immediate and transparent.



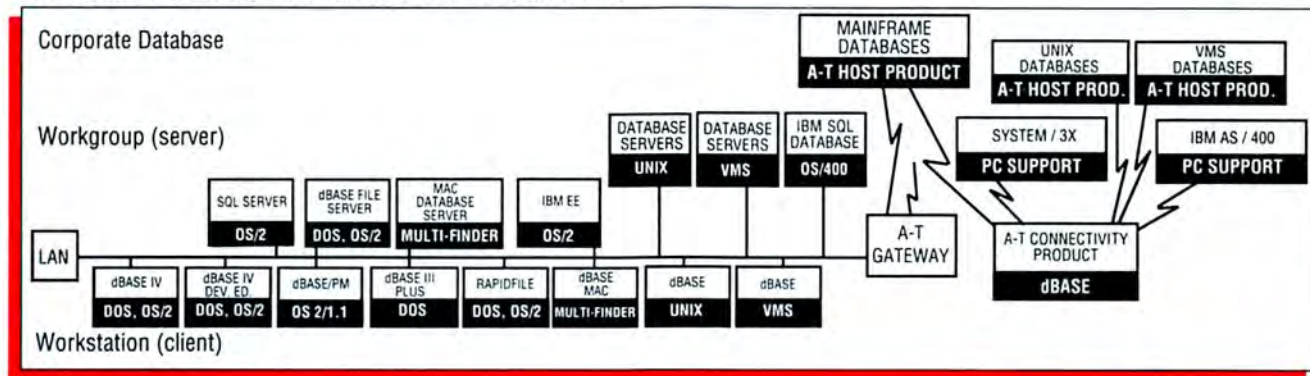
The design of dBASE IV takes into account the changing structure of the workplace.

It is the ideal PC database from which users can share data in a workgroup and transparently access corporate data when combined with the Ashton-Tate/Microsoft SQL Server and Ashton-Tate connectivity solutions. MIS maintains control of the data while the individual gains greater usage and flexibility in their familiar PC environment. Ashton-Tate's database solution provides businesses with the assurance that they can leverage their application and database investments. Businesses want the best and most cost-efficient platform for the application while keeping training and support costs for end users to a minimum.

#### The foundation.

With dBASE IV, Ashton-Tate has created a foundation for

your future business data management needs. dBASE products are the standard and the preferred workstation solution in application development and personal data management. dBASE IV and SQL Server in combination provide the ideal next generation client/server workgroup computing environment. Users will have the flexibility of accessing many different types of databases both in the LAN server environment and remote hosts via intelligent micro- and server-to-mini/mainframe links. The foundation for this solution is the dBASE/SQL language. It is the only language that combines the comprehensive application environment of dBASE software with the common data access language of SQL as a key foundation component for your connectivity solution.



USER ENVIRONMENT	SOLUTION	BENEFITS
Workstation	dBASE products are the standard in micro application development and personal data management. Versions will be provided for DOS, OS/2, Macintosh, UNIX and VMS providing comprehensive coverage with leadership in usability and productivity.	Superior interface and tools for application development and interactive productivity that is 100% compatible across operating system platforms to leverage your data and application investment.
Workgroup	Leadership in next generation database server solutions with the flexibility of accessing heterogeneous (different) back-end servers across OS/2, Macintosh, UNIX and VMS operating systems. Continued leadership in file server solutions for low cost, easy to use multi-user requirements for DOS and OS/2.	Highest performance and compatible solution with dBASE IV as the front-end and SQL Server as the back-end. Ability to utilize the best back-end server to optimize application processing.
Heterogeneous Mini/MF Connectivity	Access to heterogeneous (different) database types on mini and mainframes from dBASE for retrieval and optional updating across a wide range of operating systems.	Transparent access to your corporate data from a consistent and familiar dBASE interface to most effectively utilize your corporate database investment.

#### The driving force.

With more than two million end-users of dBASE products and tens of thousands of third-party applications written in the dBASE® language, dBASE products are the standard by

which all other products are measured...and written to. And with dBASE IV, Ashton-Tate continues to challenge itself to reach a new standard of functionality and integration in the business environment.

#### The next step.

Now, with dBASE IV and dBASE/SQL, Ashton-Tate provides the next generation database management system foundation for end-users.

## A look at dBASE IV: You mean it's this easy to do all this?

You look to database software to organize, coordinate and add some discipline to your job performance. You expect it to miraculously transform your inventory or sales information into an intelligent pathway for business direction. You expect it to be easy. Then, you sit down to try to use it. And what you find is often somewhat less than inspiring...and just plain too hard to get it to do what you want it to do.

Ashton-Tate based their product development on feedback from users. dBASE IV's completely new, intuitive user interface — the Control Center — allows you to perform tasks with simple to use pull-down menus and logical task-oriented tools - all without delving into the more complex function of programming.

As a first-time user of a database management system or as someone who breaks into a cold sweat when the word "programming" is mentioned, you gain access to the sophisticated organization and retrieval of information that used to be left to someone else to provide for you. You'll be off to a fast start with dBASE IV's on-disk tutorial. And context-sensitive, on-line HELP is available to answer all your questions.

### Query-By-Example (QBE)

Query-By-Example makes it easy to extract, view and manipulate selected records from a database. You specify the record selection criteria by entering simple phrases in the query design screen. Or, you can use pull-down menus for even greater ease of use. With QBE, you can extract data from several files simultaneously, in a single operation. No knowledge of the dBASE/SQL programming language is needed.

#### Problem:

You just completed a record-breaking sales quarter. You need a report that combines several criteria in the same file to show all sales over \$20,000 within California during the past 3 months.

#### Solution:

Select "create" under Query in the Control Center and use the pull down menus to select the database files you need. With the QBE screen in front of you, go to the sales field and type in "> 20000". Then go to the state field and type "CA", and then to the date field and type "> {01/01/88}". Hit the DATA key (F2) to see your results.

Layout	Fields	Condition	Update	Exit
Sales.dbf	ORDER_NO	ISALE_DATE	STAFF_NO	
		> {01/01/88}	LINK1	
Staff.dbf	STAFF_NO	LASTNAME	FIRSTNAME	
	LINK1			

View	Fields	Condition	Update	Exit
Unfiltered	Sales-> ORDER_NO	Sales-> SALE_DATE	Staff-> LASTNAME	Staff-> FIRSTNAME

Query: D:\dbase\ddata\QBE> File 1/2  
Next field:Tab Add/Remove all fields:FS Zoom:F9 Prev/Next screen:F3/F4

### Forms Manager

Using a full screen work surface, you can lay out full-color forms for data entry, modification or viewing. It's as quick and easy as drawing them on paper. When specifying data entry forms, you can take advantage of dBASE IV's enhanced data entry capabilities to reduce data entry time and errors. Once you specify a form, dBASE code is automatically generated to describe it. You can recall forms for later use, quickly modify them with the new editor and include them in turn-key applications.

#### Problem:

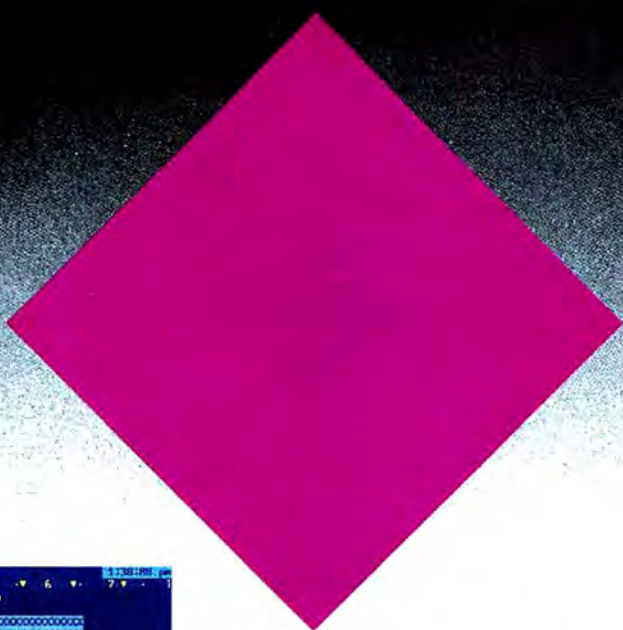
You just finalized the major account contracts for the next year and you want to set up a customized form to update progress against annual and quarterly goals.

#### Solution:

Select "create" under Forms and use the Quick Layout feature of the forms manager. All the fields are immediately placed on the screen. Lay out the form with the box and line drawing capabilities and block copying and moving. With a few keystrokes, add color codes and set up multiple choice options for each question. This saves time and reduces margin for error because all you need to do is hit the spacebar or first letter of the answer when filling in the form.

From a single screen, the Control Center gives you control of all the powerful facilities of dBASE IV: File Creation, Query-by-Example, Forms Manager, Report Writer, Label Writer and Application Generator to the level that you need. This next generation user-interface lets you accomplish your data management tasks quickly, whatever your experience level.

Catalog	Tools	Exit
dBASE IV CON		
CATALOG: D:\DBASE\		
Data	Queries	Forms
<create> CUSTOMER	<create>	<create> TESTMEMO
ACCT_REC ASSEMBLY CLIENT CODES CONTENTS CUST EMPLOYEE	3WAY DEPGROUP	
File: D:\DBASE\DDATA\CUSTOMER.D		
Description:		
Help:F1 Use:← Data:F2 Design:Shift		



Layout Fields Words Go To Exit  
1 2 3 4 5 6 7

Accounts Maintenance Screen

Identification Number: 22222 Company: XXXXXXXXXXXXXXXXXXXX  
Primary Phone: (999)999-9999 Address: XXXXXXXXXXXXXXXXXXXX  
Secondary Phone: (999)999-9999 City/ST/Zip: XXXXXXXXXXXX

Purchasing Agent: XXXXXXXXXXXXXXXXXXXX UGM Executive: XXXXXXXXXXXXXXXXXXXX  
Inventory Contact: XXXXXXXXXXXXXXXXXXXX IFM Support Rep: XXXXXXXXXXXXXXXXXXXX  
Sell Contact: XXXXXXXXXXXXXXXXXXXX

Discounts

Annual: XXXXXXXXXXXX  
Quarterly: XXXXXXXXXXXX  
Discount: XXX.XX

Form: D:\MS\reseller\MAIN.DBF Row: 2 Col: 18 File: Account  
Alt-F1: Fields Select-F6 Move-F7 Copy-F8 Size-Shift-F7

---

Layout Fields Words Go To Print Exit  
1 2 3 4 5 6 7

Report: Intro Band

Account Summary Report  
January 1, 1988

Page Header Band  
Page No. 999 2/22/88

ID	NAME	ADDRESS1	ADDRESS2	CITY
Group 1 Intro Band				
Accounts for the state of: XX				
Detail Band				
XXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX				
Group 1 Summary Band				
Total number of accounts: 999999.99				
Page Footer Band				

Report: D:\MS\reseller\MAIN.DBF Line: 2 Col: 18 File: Account  
Alt-F1: Fields Select-F6 Move-F7 Copy-F8 Size-Shift-F7 Quick Report: Shift-F9

### Report Writer

Whether you're generating simple columnar reports, filling in pre-printed forms or producing mail merge documents, laying out a report format is a snap with the dBASE IV Report Writer. Using a full screen work surface, you can lay out report formats. Repeating information, such as page headers, is easy to handle and you can take full advantage of your printer's special features such as underlining and boldface text.

### Problem:

You need to quickly summarize accounts by state, with subtotals, for the Executive Committee meeting.

### Solution:

Enter the dBASE IV Report Writer and select the Quick Column Layout. In the page header band, type in the title of the report and draw a box around it. The fields are already laid out. For subtotals, select ADD A GROUP BAND from the pull-down menu. Move to the summary band and type "Total number of accounts" and add a summary field. The report is complete and ready to print.

### dBASE IV Applications Generator

Once you've created the files, forms, queries, reports and labels you require, you can use the dBASE IV Applications Generator to tie them together into a turn-key application. You can add sign-on banners, pull-down or pop-up menus with the powerful menu editor. The Applications Generator writes menus with the powerful menu editor and writes all the necessary dBASE code for you. To get your job done even faster, the "Quick Application" facility provides default application designs so you can develop complete applications in minutes.

### Problem:

You've been asked to create a system to track the top 25 accounts based on a special database, form and reports that you've already created, and it has to be done before Monday.

### Solution:

Enter the Applications Generator and create a menu which lists the different types of reports. Assign the proper report to each option and select the "Generate" option which generates the application for you. Immediately, you have a cohesive application which includes your file, form and reports, and you can still enjoy the weekend.

Design Menu Item Generate Process Exit 12/20/88

File Reports Maintenance

Chart of Accounts  
Reconcile  
Billing  
Inventory  
Purchase Orders  
Mailing Labels

Sign-on definition  
Display options  
Perimeter of screen: DOUBLE

Standard - All  
Normal text  
Message  
Titles  
Enhanced - All  
Highlight  
Boxes  
Alert  
Fields

Position: 11 Select: Alt Accept: Ctrl-End Exit: Esc  
Select display style for object border

File: D:\MS\DATA\FILES Purchase Orders File: CUSTOMER  
t-F2 Quick Report: Shift-F9 Menus: F10

## A look at dBASE IV: How far can you take this much power?

You're the one who people come to looking for answers. The last person in your position didn't have them. You've developed turn-key applications using dBASE III PLUS™. You know it's easy to create, access and update data files such as mailing lists, personnel directories or sales contacts.

You've been working with dBASE III PLUS for some time now. You tinker with other application development languages. But you find that more and more of the requests you receive for program development are all focused on data manipulation and analysis. dBASE III PLUS works great, but there's got to be more. You want an environment that allows you to develop, test and distribute database applications quickly and productively. You want more speed, fewer bugs and easier editing. You want a bigger slice of the pie with royalty-free application distribution. You want an enhanced package for data management development from Ashton-Tate.

Problem is, it's still not enough. You're at the point of looking for short cuts, time-savers and more efficient ways to create more sophisticated files. You know how to build programming code. You just have more important things to do. Like designing all those applications everybody keeps asking for.

Now, because of dBASE IV's powerful relational capabilities, you can do all those things. You can set up data management systems that involve interaction between interdependent files such as sales orders, customer data, inventory and billing. You can build networking answers with various combinations of dBASE IV, dBASE IV LAN Pack and Ashton-Tate/Microsoft SQL Server to achieve the right workgroup solution. And most importantly, you can still accomplish all these tasks without writing any programs.

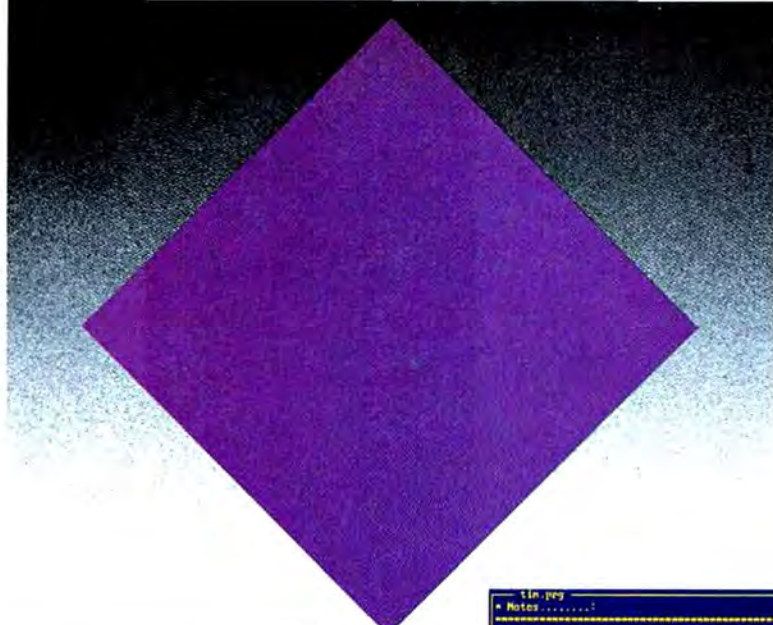
And when you want to customize a program further with embedded code of your own, you can rest assured that your old familiar dot prompt is still there, supported by a built-in automatic compiler that performs significantly faster than dBASE III PLUS. And naturally, programs you already created with dBASE III PLUS will run transparently.

dBASE IV significantly increases the capabilities of the already powerful dBASE III PLUS programming language. It adds 310 new or enhanced commands to this foundation including new, powerful user-defined functions, enhanced data entry capabilities, new window and menu features, multi-dimensional arrays and high precision financial, numerical and statistical functions.

dBASE IV offers a full implementation of IBM's SAA compatible Structured Query Language, the advanced relational database language rapidly emerging as the corporate standard for data access. SQL's set-orientation allows the user to perform complex relational operations with a single command.

And if you are a database applications developer, dBASE IV's Developer's Edition offers a complete database application, test and distribution environment that meets all your requirements.

Catalog	Tools	Exit
dBASE IV CONT		
CATALOG: D:\DBASE\I		
Data	Queries	Forms
<div>&lt;create&gt;</div> <div>CUSTOMER</div> <div>ACCT_REC</div> <div>ASSEMBLY</div> <div>CLIENT</div> <div>CODES</div> <div>CONTENTS</div> <div>CUST</div> <div>EMPLOYEE</div>	<div>&lt;create&gt;</div> <div>3WAY</div> <div>DEPGROUP</div>	<div>&lt;create&gt;</div> <div>TESTMEMO</div>
File:		D:\DBASE\DBDATA\CUSTOMER.DE
Description:		
Help:F1		Use:← Data:F2 Design:Shift



#### Advanced Debugger:

The advanced program debugger operates with multiple windows. Because it works closely with the built-in editor, which runs in one of the windows, the user can quickly edit and change programs interactively as error conditions occur. And, the fixes can be permanently saved.

#### Problem:

You've written a very sophisticated program with many different modules and a large number of variables and the results are not correct.

#### Solution:

With the Advanced Debugger, you can interactively set up breakpoints to check the values of your variables to quickly determine the problem. You can monitor the variables as they change in the Display window and the built-in editor lets you edit and change programs as errors occur.



#### Built-in Multi-user Features:

dBASE IV includes many built-in, multi-user features for both the end-user and application development environment. These features include single-user to multi-user transparency, transaction processing, automatic screen refresh and password protection and data encryption. You can easily develop applications that allow any number of end-users to access information simultaneously from a common database without fear of data loss. And you can add capabilities such as Transaction Processing.

#### Problem:

Six people in your department need to access the Account Maintenance database. Three will be entering data, two will make changes and the other will run the reports.

#### Solution:

With one dBASE IV and a dBASE IV LAN Pack, you have a six user LAN setup. Placing the Account Maintenance database on the LAN Server will allow all six people to access the database. Automatic record locking ensures integrity, and auto-refresh ensures that users are always looking at the most current data.



## Delivering the tools to the workstation.

The strength of any vision is to take what is known and expand the possibilities. Ashton-Tate provides the foundation for your business data management needs today, building toward the future. dBASE products are the standard in micro application development and personal data management on DOS. Versions will be provided for OS/2, Macintosh, UNIX and VMS platforms as well, providing leadership in usability and productivity through comprehensive platform coverage. With the introduction of dBASE IV, Ashton-Tate continues the momentum and moves forward into the next generation.

### dBASE IV.

dBASE IV is the next generation that provides levels of ease of use, speed and power with a combination of features never before available for personal computer users.

The Control Center is the next generation interface that makes your job easier by letting you access all the power without programming for personal data manipulation. Involving interactive queries, reporting and data manipulation, dBASE code is automatically generated and a built-in compiler automatically compiles your application for execution speed significantly faster than dBASE III PLUS.

dBASE IV represents the latest generation of the dBASE family and builds on the industry standard language features of this relational database by adding over 310 new and enhanced dBASE commands and functions. In addition, dBASE IV offers a full implementation of IBM's SAA-compatible Structured Query Language (SQL) bringing unparalleled power and flexibility to the programmer for improved productivity and extensibility for future connectivity solutions.

### dBASE IV Developer's Edition.

For the developer, this edition provides the complete dBASE IV software with additional programming tools, utilities, two additional LAN keys for multi-user testing, and a royalty-free application distribution module to provide the most complete environment for application development, testing and distribution available.

### RapidFile.

RapidFile® is the economical entry path to Ashton-Tate's database product line. It is a fast and easy-to-use file manager for lists, labels, reports and form letters. RapidFile is specially designed for novice to experienced users who want to manage lists of information quickly and easily, but who do not need relational capabilities. Upgrade pricing is available from RapidFile to dBASE IV.

### dBASE III PLUS.

The industry standard will continue to be provided for users who have lower memory requirements or dual floppy systems. Applications developed in dBASE III PLUS are 100% upwardly compatible to dBASE IV, thus ensuring continued support of your investment to minimize cost and save time.

### Future versions.

Leadership requires an understanding of user demands and the ability to develop an appropriate solution for them. Ashton-Tate's leadership is founded in their dedication to meeting users' needs for application portability and a common interface across key operating systems to leverage their workstation investment now and in the future.

## ASHTON-TATE FUTURE DATABASE DIRECTIONS

Character-based Interfaces	dBASE Control Center dBASE/SQL DOS	dBASE Control Center dBASE/SQL OS/2 1.0	dBASE Control Center dBASE/SQL UNIX	dBASE Control Center dBASE/SQL VMS
	Presentation Manager dBASE Interface/Tools dBASE/SQL OS/2 1.1	Macintosh dBASE Interface/Tools dBASE/SQL Multi-finder	Open Look dBASE Interface/Tools dBASE/SQL UNIX	DEC Windows dBASE Interface/Tools dBASE/SQL VMS

Ashton-Tate will be delivering future versions of the industry standard dBASE products with the familiar character-based Control Center interface on DOS, OS/2, UNIX and VMS with guaranteed application portability. This new environment will allow its users to select the best hardware and operating system for their own applications with the assurance that they can leverage their investment in the future.

Future versions will include a graph-

ics-based interface for next generation ease of use and utilize the new functionality of the OS/2 1.1 Presentation Manager. This graphics-based interface will be the foundation for future solutions under Macintosh, UNIX Open Look and VMS DEC Windows. These are the kind of solutions that will maintain Ashton-Tate's leadership in microcomputer relational database management systems and extend that leadership to new platforms.

## Leadership in workgroup computing.

The first PC-based workgroup solutions were file server LANs with each workstation having its own processing power for greater personal computing flexibility plus file sharing — at a more economical cost than multi-user minicomputers. However, file servers did not provide the transaction processing performance, data integrity, crash recovery and central data management control typically provided by a minicomputer database.

Minicomputer databases suffered from the high cost of application development and maintenance, limited customizability, limited individual productivity and lack of user-friendly interfaces. It was difficult to build a minicomputer solution that fits the needs of today's end-user environment.

A need clearly surfaced for a synergistic approach that could combine the capabilities of the minicomputer database with the benefits of the familiar workstation database. The result would be dramatically improved performance, while retaining centralized control and better data integrity at a lower cost.

### The next generation workgroup solution.

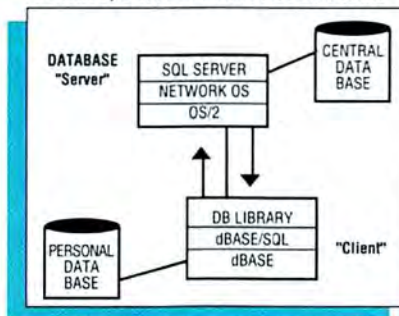
Database servers based on a client/server architecture provide a superior solution as the next evolution of database management systems for workgroup computing. Unlike a file server, a database server has database processing power of its own. The database server's processing power also offers the benefits of the minicomputer-based network (performance, integrity, administration and concurrency) at only a fraction of the cost. As a result, processing can be split to be more effectively distributed between the server and the LAN workstations. The Ashton-Tate/Microsoft SQL Server is a database server that will provide the benefits of a distributed

processing environment. With its roots in the more powerful environments of minicomputers, its heritage provides the opportunity to build a product that offers the best of both worlds.

### The structure behind the change.

SQL Server is a major breakthrough in workgroup computing. Based on an advanced model called a Client/Server Architecture, the client/server model segments database operations and exploits the strengths of each system component. When SQL Server is teamed up with Ashton-Tate's dBASE IV, the combination creates the best solution for workgroup computing needs now and the next evolution for future data management systems.

### CLIENT/SERVER ARCHITECTURE



The back-end ("server"), SQL Server, handles data input/output and transaction processing activities using large and high band-width data storage devices. The server delivers the benefits of traditional on-line systems — database level security, transaction processing and production database power, sophisticated data sharing and high system availability.

As the front-end ("client"), dBASE IV provides the power and ease of use of a highly interactive personal data management system and access to all the applications. Running on PCs over local area networks, the combination

replicates all the data integrity, performance and superior security typically associated with mainframe and minicomputer DBMS — at a fraction of the cost. All while maintaining the integrity of a central database management system. SQL Server also offers other features like server scalability which lets you add more or larger servers to a workgroup and is an open platform for applications written in other languages.

From an application development perspective, dBASE IV offers significant advantages over other client solutions utilizing 3GLs like Cobol and C languages. The dBASE/SQL language in dBASE IV with its highly integrated WYSIWYG (What You See Is What You Get) tools provides a more productive and easy-to-use environment for application development, testing and distribution.

### Building cooperation.

In the future, dBASE workgroup computing will offer several alternatives for the user and provide the greatest flexibility for true office connectivity through shared database resources. Users will have the flexibility of choosing SQL Server as today's back-end of choice for database server capabilities, selecting the LAN Pack file server configuration for simple multi-user sharing of data for a low-cost situation with minimal application requirements, or in future versions accessing other database servers as they become available from vendors such as IBM and DEC. Ashton-Tate is committed to providing access from dBASE products on the workstation to future database servers on UNIX and VMS-based minicomputers.

The key for growth is being able to select the computing platform that best meets your application processing needs and utilize your data and application investment to minimize your costs.



# IT'S NO WONDER PEOPLE THINK OF US AS THE dBASE COMPANY.

We did, after all, pioneer what has become the most widely-used database management system for personal computers on the planet.

While at the same time adding a full complement of Ashton-Tate® products that enhance the dBASE® standard even further.

Products like dBASE IV™ Developer's Edition, which gives you a complete set of programming tools, utilities, and royalty-free run-time distribution.

dBASE IV LAN Pack, adding as

many as five simultaneous users to your dBASE IV installation in a networked environment.

CHART-MASTER®, which makes the production of business charts and graphs using dBASE data as easy as pie. Or as bars. Or lines.

RapidFile™, a fast and easy-to-use a file manager designed for business people who work with lists, mailing labels, and form letters.

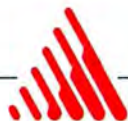
And dBASE DIRECT/36™ and

dBASE DIRECT/38™, which let you transparently access system 3/X data as if it were on your PC.

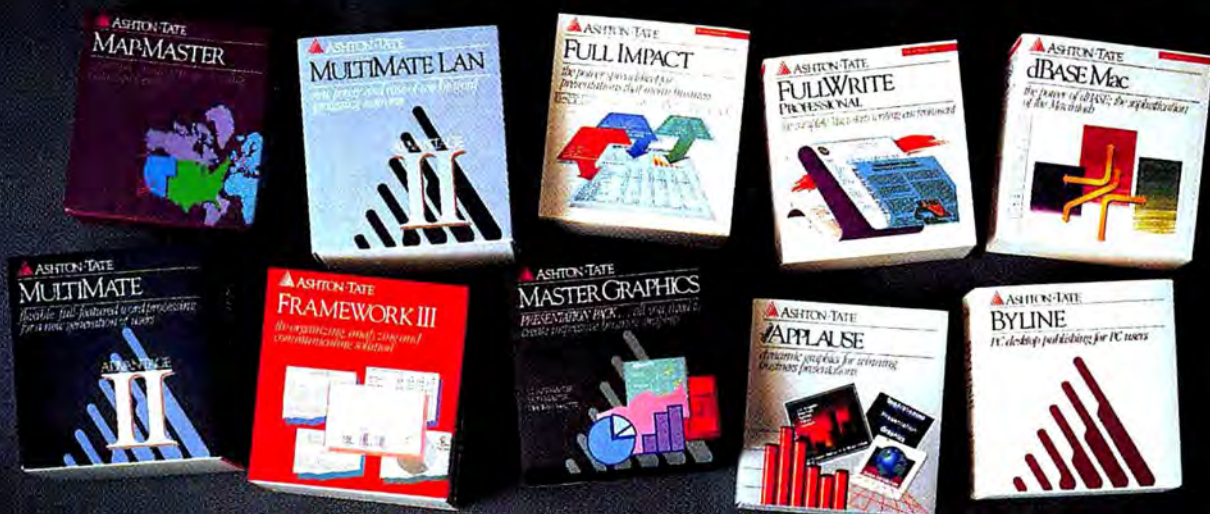
Naturally, you'll find the highest degree of compatibility among all the products in the dBASE family—from being able to share files between CHART-MASTER and RapidFile, for example, to having all of your dBASE III PLUS™ applications automatically run in dBASE IV.

All of which reinforces dBASE as the industry leader.

But then, it's really no wonder.



# ASHTON • TATE®



# IT'S A WONDER PEOPLE THINK OF US AS THE dBASE COMPANY.

We do, after all, offer one of the most complete and advanced product lines of any software company on the planet.

Products that go beyond those in our flagship dBASE® environment to set standards for power and performance in other areas as well.

Areas such as presentation graphics, where DRAW APPLAUSE™ takes your text and data and transforms them into impressive charts and graphs. And where BYLINE™ lets you be a desktop publisher—even if you're not.

Areas like integrated software,

where FRAMEWORK III™ lets you bring all your work—from spreadsheets, databases, and text documents—together in a single, cohesive, and intuitive workspace.

And finally in the Macintosh arena, where FullWrite Professional™, a tool that combines powerful word processing and page layout capabilities, is quickly establishing itself as one of that environment's leading products.

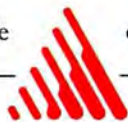
As is Full Impact™. A presentation spreadsheet that gives you the ability to transform your data into clean, crisp, and understandable documents.

And dBASE Mac, a powerful database with the sophistication of the Macintosh.

Beyond software, we also provide a wide range of support for our customers, including publications, training, and even a fast-turnaround graphics service.

But why take our word for it? See all our products at COMDEX in Meeting Room B-3, East Hall, LVCC. You'll be just as surprised as we are that we're often seen as just the dBASE company.

It's a wonder, really.



# ASHTON • TATE®

## Sharing information in an expanded environment.

Access to what is known as "corporate data" (information essential to the livelihood of a company such as customer orders, inventory and accounting) has traditionally been stored, controlled and analyzed on a corporate mini or mainframe.

To date, corporations have invested a tremendous amount in their existing corporate DBMS environments. In many cases, there may be multiple DBMS program products serving different data management functions. This type of environment is described as being heterogeneous because it involves many different database types across many different platforms.

As the microcomputer increased in power and functionality, users found they could do many of the analyses MIS used to handle on the corporate mini/mainframe at their desks. Transparent access to data suddenly became a catalyst in the drive to integrate micro, mini and mainframe environments.

With the inherent accessibility problems posed by the mini/mainframe system, the micro DBMS interface has proven to be the superior solution because it satisfies the user's need for a transparent, immediate and easy-to-use approach to data management

from their workstation.

Therefore, the key in designing a viable connectivity environment lies in enabling the company to take the existing DBMS environments it now employs and connect them through common data access languages (such as SQL) and industry standard communications facilities. And at the same time, provide the end-user with a comfortable and familiar way to realize this connectivity and take advantage of it at the workstation level.

### Ashton-Tate's Heterogeneous Connectivity Solutions.

The Ashton-Tate family of connectivity products will let you transparently access data and integrate dBASE applications with your current database systems on mini and mainframes. The workstation user does not have to deal with the complexities of the mini and mainframe while MIS continues to control and manage centralized database investments.

The initial connectivity products targeted by Ashton-Tate are the IBM midrange computing environments. dBASE DIRECT/36™ allows querying, manipulating and reporting on System/36 data transparently through dBASE III PLUS. dBASE DIRECT/38 provides the same capabilities on

System/38 files.

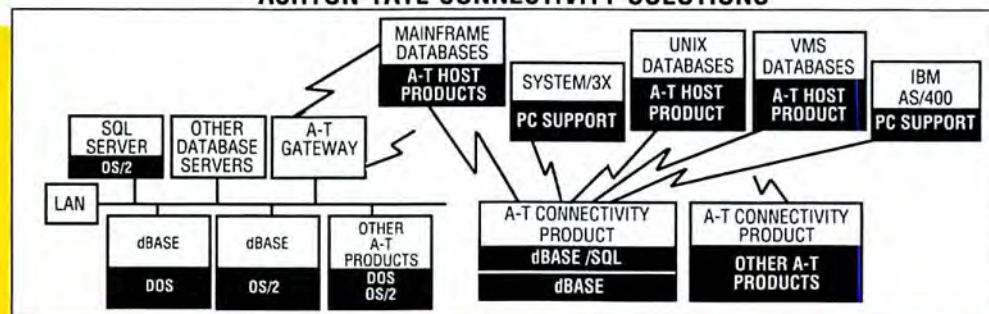
In the longer term, Ashton-Tate's heterogeneous connectivity solution is targeted to cover the IBM System/3X, AS/400, OS/2 Servers, UNIX, VMS and future mainframe platforms in a phased approach.

In Ashton-Tate's view, connectivity is represented by a variety of clients hooked to multiple servers, which in turn tap into the corporate data source, be it a minicomputer or mainframe. They also see it as intelligently linking single, stand-alone clients with corporate DBMSs through applications integration.

Two key components to this solution will be transparent data access and application integration. Transparency will allow the user to make a request of a remote data base without knowing where it is stored or how to deal with the complexities of the host database system.

Application integration will permit the PC user to directly access remote databases from within Ashton-Tate PC applications. This type of integration leverages customer's investments in mini, mainframes and PCs. Ashton-Tate's connectivity solutions will bridge the gap between dissimilar worlds.

### ASHTON-TATE CONNECTIVITY SOLUTIONS



## Glossary of Database Terminology

**Application:** A software program that is designed to accomplish a specific task. A database management program is an application, so are word processing and spreadsheet software programs. Applications software can also have a more narrow focus such as tailoring a general database management program to serve accounting or inventory management functions.

**Client:** Workstation software that utilizes the services of any type of server on a network.

**Database management system (DBMS):** A consistent method of storing, organizing, retrieving and calculating data in database files.

**Database server:** Software and hardware (usually a microcomputer) that operates as the designed "hub" of a local area network. This "hub" stores the network's shared database files. In addition to managing the distribution and retrieval of these files, the database server offers additional data manipulation and protection capabilities.

**Database file:** A file used for storing and organizing information. Some computer database files are organized in table format with information arranged in rows (records) and columns (fields).

**Dataframe:** A conceptual term referring to the computer system - usually a minicomputer or mainframe - a corporation employs to store information essential to its livelihood (such as sales, order entry and inventory).

**Field:** The smallest unit of information in a record.

**File server:** A common term for the software and hardware that perform the storage, distribution and retrieval functions for shared files in a local area network. The file server controls the network communication and the definition and sharing of network resources.

**Heterogeneous database environments:** Distinct computing platforms upon which database software is designed and operated. Each of the current platforms (there are three: microcomputer, minicomputer and mainframe) represents a different level of technology with its own methods of operation.

**Links:** Software tools that allow heterogeneous database management programs to share files.

**Local area network (LAN):** A system in which a group of microcomputers and peripheral devices are linked to-

gether (through hardware and software) to allow data and resource sharing among the members (also called nodes) of the LAN.

**Multi-tasking:** Procedures in which several separate but interrelated computer tasks (for example, creating a word processing document and updating a database) operate under a single program identity.

**Programming language:** A set of computer commands that form a procedure, or language (complete with its own syntax and structure), by which software programmers design and implement computer software programs.

**Operating system:** The master control program that directs the internal operation of a computer (MS-DOS and OS/2 are microcomputer operating systems).

**Query:** A specific request for data or instructions in a computerized DBMS.

**Query By Example (QBE):** A method of making database queries in a graphics manner, rather than an English-like or programmatic manner.

**Record:** A group of related fields of information treated as a single unit.

**Relational database:** A system that allows data to be accessed based on relationships set up among several database files.

**Transaction processing:** The running of a sequence of database operations as a single unit of work.

**Transparent data sharing/access:** A characteristic of advanced workgroup computing technology in which a user can retrieve and view data regardless of where it is stored within the computing environment — microcomputer, minicomputer or mainframe DBMS.

**User interface:** The means by which a computer and a user communicate. It is the collection of everything the user sees, hears and does while activating the computer to perform some task.

**Workgroup:** Best described as a corporate department or division in which computer users (usually in a LAN setting) require data access and sharing capabilities to carry out their departmental objectives.

**Workstation:** An individual personal computer connected to another within a network.

## The language of the present and the future.

The dBASE language is the standard for DBMS applications development on the microcomputer. It is recognized as the most comprehensive and productive application development environment compared to any other micro-based DBMS language and other 3GL languages such as COBOL or C. dBASE IV further extends the standard by adding significant language functionality that far outstrips any competitive products in both its level of flexibility and productivity.

The key to dBASE IV is its integration of the language with the usability and productivity of its Control Center tools. The Control Center provides an easy to use WYSIWYG interface that gives you access to all the power of dBASE without having to deal with the language or develop programs. The synergy creates a highly integrated environment with dBASE/SQL as the integrating language foundation.

What is needed is a common way of accessing data. SQL is the emerging data access language standard. However, while SQL provides a common way of performing queries and manipulating information, it lacks the

capabilities of a complete application development environment. As a result, many companies have to rely on COBOL, C or utilize the vendor proprietary language with embedded SQL (ESQL). In all those cases, considerable expertise is required to build applications.

The advantage of dBASE/SQL is that it provides a strong programming environment that is intuitively geared to database application development. With the strong programming and user-familiarity strengths of the dBASE language and the power and data access language of SQL, dBASE/SQL is the strongest solution available today for the increased demands of database application development and an important protocol on which to build future connectivity solutions.

### A natural evolution.

As business information requirements grow more complex, an appropriate integration of technologies will be critical to meet the demand. An effective combination of mini/mainframe and PC functionality must be developed to answer that need for an integrated office environment.

Ashton-Tate understands that creat-

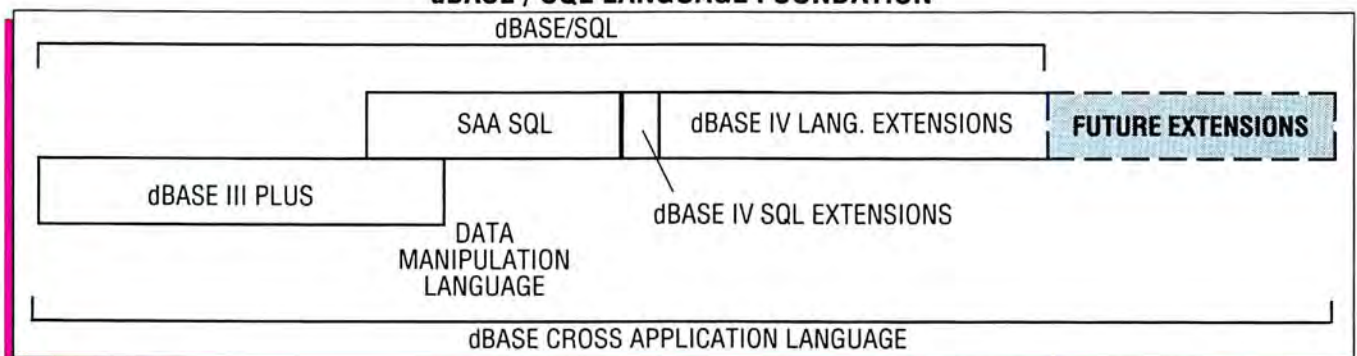
ing efficiency and productivity in the individual, stand-alone environment is only a part of the solution. To be truly integrated into the future business environment and to be able to address databases existing on other computing systems such as minicomputers and mainframes, common protocols or languages are needed.

Ashton-Tate has laid the groundwork for a foundation that provides office solutions today and for the future in an ever-changing business environment. The effective combination of dBASE IV and SQL is just the beginning.

Ashton-Tate's intention is to evolve the language guided by three basic principles:

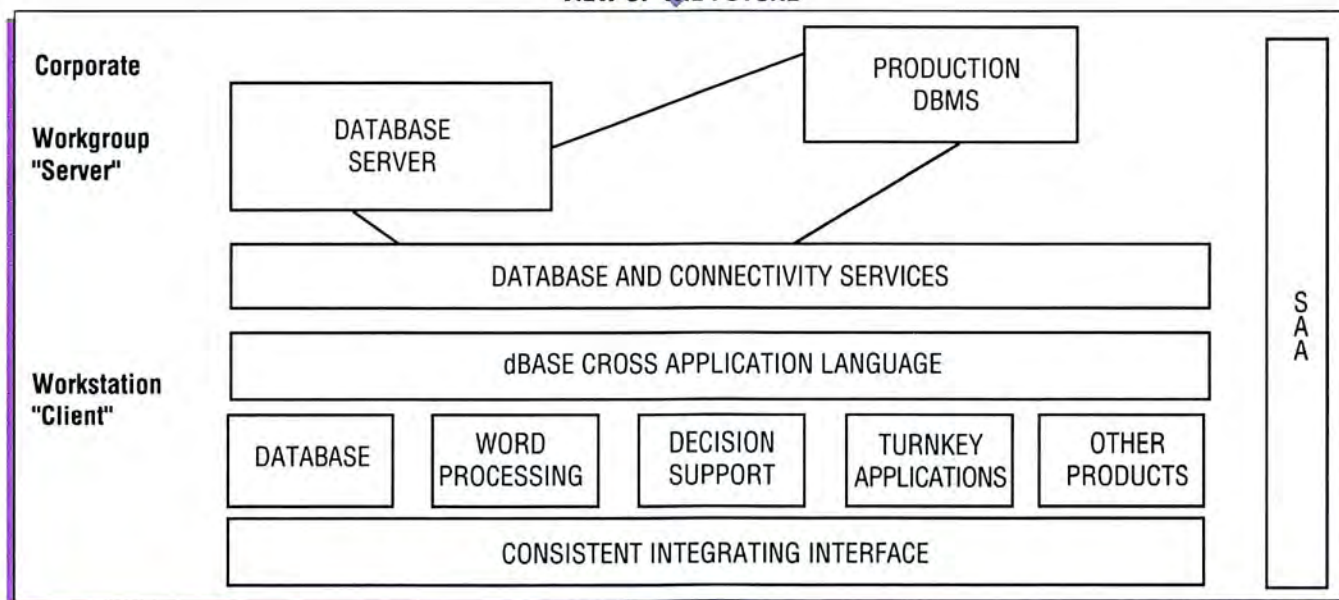
- Upward Compatibility - Assurance that current applications will run in future versions.
- Leadership Functionality - Extensive user need analysis will determine future extensions, including issues such as a cross-product application language.
- Greater Usability - Incorporating more visual programming techniques and object-orientation for easier use and greater productivity.

### dBASE / SQL LANGUAGE FOUNDATION



## Achieving a new level of integration through the database.

### VIEW OF THE FUTURE



The issues discussed here — stand-alone database management software, workgroup computing, client/server models, SQL, connectivity, etc. — put computing on a path toward an integrated information system solution. The database will play the most important role in making this solution a reality.

A database system has the necessary data manipulation and data management capabilities to control and manipulate essential company data. The DBMS also provides the necessary technology to build and manage complex office applications of the future that combine, integrate and distribute the processing of multiple applications across the business enterprise.

The personal data management solution at the workstation will be the

focal point for the user. There, he will use multiple applications in a consistent environment, transparently sharing data between applications contained in a common data pool managed by an advanced DBMS. At the workgroup level, the information will be stored in a server database that acts as a central integrating element of each workgroup network. Users will store and retrieve data and objects for all their software applications in this database.

In addition, access will be available to heterogeneous database types on minis and mainframes from dBASE for retrieval and optional updating across a wide range of operating systems.

At the same time, the corporate database managers will be able to monitor

raw data flow and storage with the necessary level of control and security.

Ashton-Tate has laid the groundwork. dBASE IV is the leading technology which significantly raises the PC database standard. It is a foundation that provides office and information systems solutions today and for the future...in an ever-changing business environment.

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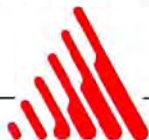
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## ZENITH UNVEILS THE AT®-COMPATIBLE COLLECTION.

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The Z-286 LP comes standard with 1MB RAM—expandable to 6MB without using an expansion slot. Generous memory capacity to run new MS OS/2™ applications. And with a single 3.5" floppy and fast 40MB hard disk you have truly impressive storage capacity.

The Z-248/12 is among the fastest 286 systems available. Its zero wait state design magnifies its 12MHz to speed past 16MHz systems with wait states.

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The Z-248 is also standard with 1MB RAM and is expandable up to 6MB without using an expansion slot. However, four open expansion slots can artfully handle future growth. Configurations of 5.25"/3.5" floppy or 40, 80 and 160MB hard disks truly expand all your options.

All systems are available with Zenith's revolutionary Flat Technology Monitor (shown above) and VGA-compatible video card for ultimate video performance.

With breakthrough after breakthrough, these new computers are yet further proof that Zenith's AT-compatibles define the State of the Art. See the "AT Collection" now showing at your Zenith Data Systems authorized dealer. For your nearest location call: 1-800-553-0350.

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Edited by ERIC BENDER

## Double Trouble for Rivals?

### Oracle's Successful SQLs *Soaring on Data Base Management*



Oracle rapidly gains PC market share under CEO Larry Ellison.

Oracle Corporation only recently decided to push its relational data base management program into the PC market. Yet a little over a year after Oracle's April 1987 debut, the program was battling it out for the number two position behind Ashton-Tate's *dBASE*.

"We are a very aggressive company," says Oracle's hard-driving founder and chief executive, Larry Ellison. Indeed, he's famous for saying his ideal marketing vice president would be Genghis Khan—it's not good enough for Oracle to win sales; everyone else must lose.

"Oracle has brilliant and aggressive marketing," concedes an official at a rival firm, "but we rarely lose to them technologically. They just seem to find sales opportunities no one else sees."

Ellison calls that opinion "utterly ludicrous." He insists Oracle is both the technology leader and the marketing leader.

He may be right. Oracle claims to have the only relational data base that runs exactly the same way on mainframes, mini-computers, PCs, and LANs. A user can start out with an application on a PC, add it to a PC network, and later migrate to mini or mainframe as the

need arises. Not even IBM can offer that flexibility. Oracle's only noticeable product vulnerability, another opponent observes, is in the quality of its end user tools and report generators.

Oracle attributes its rapid rise to a 1977 decision to build the first commercial data base supporting Structured Query Language (SQL), which facilitates the movement of data between computers, regardless of architecture. The accompanying decision to program Oracle in the portable C language made the move to PCs relatively easy.

"We made a lot of good or lucky decisions back in 1977," Ellison says. Since then, the Belmont, California, software company has doubled sales in 10 out of 11 years. In the most recent fiscal year, ending in May, profits surged 175 percent to \$42.9 million, based on a 115 percent increase in revenues to \$282.1 million.

About 10 percent of sales came from PC products. Ellison is committed to overtaking Ashton-Tate as the top PC data base company, and he isn't coy about his intentions—witness the widely circulated ads with an Oracle jet shooting down an Ashton-Tate triplane.

"If you're a corporate user of data base software for PCs, you better keep your eyes on Oracle," boasts Gene Shklar, director of marketing for (continues)

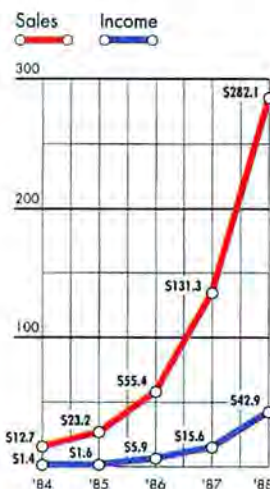
## Businessland Flourishes

### *Succeeds Without Franchises*

How do you build a billion-dollar computer chain?

A few years ago when Businessland was launching its retail chain, common wisdom held that franchising was the road to rapid market penetration and purchasing clout. But Businessland avoided that route, and its success became the prime argument against franchising. (continues on page 90)

## Oracle's Quick Rise (in millions)



Source: Oracle Corp.

Oracle's sales are soaring even faster than these yearly figures indicate. The data base management system vendor posted \$104.2 million revenues in the fourth quarter of its 1988 fiscal year, ended May 31.

# Intel, DCA Put CAS on the Line

## *Embedding Batch Communications*

Intel's vision was profoundly simple: You should be able to transmit your working file from within your spreadsheet, word processor, or other application to a co-worker just as easily as you can print it.

But this scenario demands an extremely high-level interface that allows application developers to embed a communications hook with absolutely minimal effort, and someone to tackle the follow-on connection tasks in all their depressing variety and agonizing complexity.

Intel took up the challenge, and the vision has materialized for users of *1-2-3*, *WordPerfect*, and a few other packages who buy Intel's Connection CoProcessor fax/modem board (see *Product Outlook* in this issue). Guided by simple menus, they'll be in touch over phone lines with other comparably equipped users. Early next year, owners of Hayes-compatible modems and Irma micro-to-mainframe boards also will be able to join up.

However, Intel has even grander plans in mind, connecting to an intimidating range of LANs, big machines, public data networks, and other interfaces and applications. Intel enlisted Digital Communications Associates, with its market-leading Irma boards and *Crosstalk* communications software, as a partner. In August the two placed

documentation for the high-level interface (the DCA/Intel Communicating Applications Specification, or CAS) in the public domain.

An A-list of software houses has formed around the standard, including Ashton-Tate, Borland, Lotus, Microsoft, and Symantec. Each promises to build a CAS hook into at least one product. Given the minimal development strain and the potential for substantial user benefits, most of the enlistees are highly enthusiastic about the approach. (The lone exception is Microsoft, which describes its role as "interested bystander.")

With these backers, and significant customer benefits near at hand, CAS seems a ready-made standard. But how far will the standard extend? The major modem manufacturers have withheld endorsement, saying only that they're studying the announcement and that it seems complicated by the Connection CoProcessor.

"If Intel is trying to promote a way of facilitating high-speed background communications under OS/2, that's one thing," comments Gary Betty, senior vice president at Hayes Microcomputer Products in Norcross, Georgia. "If CAS is just a spec to do batch file transfers on an application-independent basis, that's another thing."

Jim Johnson, co-manager of Intel's Personal Computer Enhancement Operation in Hillsboro, Oregon, points out that the first version of CAS is for DOS, not OS/2. Additionally, he defends Intel's CoProcessor approach as mandatory for handling high-speed communications comfortably in the background.

But focusing on these issues may miss the main point, Johnson maintains, because CAS is not restricted to a single operating system or any hardware requirements. "We designed the basic architecture for both intelligent and nonintelligent devices," he says. Recasting the installed base of modems, 3270 boards, and other equipment as CAS devices calls for software development but not necessarily hardware modification, he notes.

Like Hayes's Betty, James Dow, president of Microcom in Norwood,

Massachusetts, cautions that Intel's wish list of connections will be extremely difficult to build. Johnson acknowledges the scope of the effort but promises that Intel and DCA will dedicate suitable resources.

Providing bare-bones batch communications, CAS doesn't support fancy scripting or interactive links, so it offers limited flexibility and no tools to check the news on Dow Jones. However, many users need only simple file swapping, so communications software vendors may feel the impact.

But outside observers generally give CAS a thumbs-up. "It's a terrific idea," declares Mike Millikin, senior analyst at Patty Seybold's Office Computing Group in Boston. "Today it's very difficult to take a *WordPerfect* file and communicate with someone, and this would be a transparent way." —E. B.

## Oracle

(continued)

the PC product line. Oracle aims to run its product on all the key hardware and operating systems in the PC field.

Oracle's full PC data base software is powerful, expensive (at \$1295 for each machine), and aimed primarily at networked rather than stand-alone PCs. But Oracle also sells a trimmer version that runs as an adjunct to *1-2-3*. And the company recently signed a deal with WordTech Systems to sell a *dBASE*-compatible front end for Oracle data bases.

"Their real intent with these announcements is just to upset the status quo, to try to break the mind-set that users have about Ashton-Tate in the PC data base market," suggests Kenneth Burke, analyst at Alex. Brown & Sons in Baltimore. "Their future growth in the PC end is going to be pretty significant if they can break the stranglehold."

Overall, Ellison says, he sees no reason why the company can't keep doubling sales in each of the next two years—and reach \$1 billion in revenues. —John Eckhouse

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## Setting a New Standard

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Dealers took notice. So did software developers. The LaserJet Printer's ability to print multiple fonts, produce graphics, and shade areas, inspired software developers to incorporate these new features into their packages.

The press was intrigued. In February 1987, Hewlett-Packard's LaserJet Printer lined up with the IBM PC, Lotus 1-2-3, and Apple Macintosh on *Personal Computing's* list of "10 Most Significant Personal Computer Products of All Time."

While LaserJet Printer sales continued to grow, the product development team was busy looking for ways to enhance the printer to better meet customer needs.

## Advancing the Standard of Excellence

In March 1987, Hewlett-Packard introduced the new LaserJet Series II Printer. What could customers expect from the new printer? Everything they liked about the "Classic" plus improved ease of use, font flexibility, paper management, and add-on memory. All in a lighter-weight unit that cost less than the original.

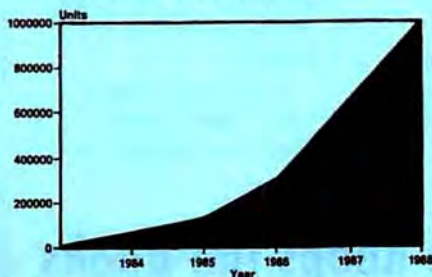
"We'd been listening closely to our customers all along," says Tom Old, customer satisfaction Q/A manager. "Maybe that's why Hewlett-Packard leads the industry in meeting people's needs for laser printing."



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▼ U.S. Laser Printer Industry Growth in Units Shipped. HP's LaserJet Printer family has played a significant role in the laser printer industry growth.

U.S. Laser Printer Industry Growth



Source: Dataquest

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## PS/2 Compatibles Missing From Action

*Demand Seen as Doubtful*



Long accustomed to the most sincere form of flattery, IBM has seen surprisingly little imitation of its Personal Systems/2 line.

The industry expected a deluge of PS/2 compatibles last summer, but only a trickle appeared. Tandy did ship its entry in late July but downplayed any expectations about the machine. Dell Computer, meanwhile, has suffered abrupt mood changes—indeinitely postponing in August the PS/2 compatibles it announced with a dramatic flurry in April. Other vendors continue to make PS/2 noises, but fall arrived unaccompanied by shipments of any new PS/2 clones.

Both system and component suppliers declare that the technical problems involved in duplicating IBM's Micro Channel Architecture have been solved. And Tandy and Dell don't anticipate legal

problems—although even after IBM's spring announcement of a patent licensing scheme, many vendors seem less than confident that the waters are clear of Blue sharks.

The major sticking point is lack of customer demand. While IBM has sold well over 2 million

PS/2s worldwide, researchers say the company continues to lose U.S. market share to purveyors of AT-compatible machines. Storeboard's studies of U.S. dealer revenues show that IBM's take of PC sales dropped from 46 percent in second quarter 1987 to 33 percent in second quarter 1988.

In Europe, where PS/2s have met with a kinder reception, announcements of PS/2 compatibles finally began to appear in September, led by Apricot and Amstrad.

But in the United States, even Micro Channel customers have trouble pointing to benefits of the bus. If IBM has a hard time making the argument with its customers, competitors reason, other vendors would only spin their wheels. Given the legal risks plus the engineering, manufacturing, and licensing costs, why bother?

Zenith Data Systems takes a typical stance: The firm continues to de-

velop Micro Channel-related technology, but "we may never bring it to market," remarks President John Franks.

Simultaneously, Zenith and others have embarked on multiple-processor designs built on proprietary bus architectures. These machines should offer tremendous computing power—at the risk of partly incompatible hardware that will whittle down customer choices in the 1990s.

But in September, Zenith and many other vendors joined behind Compaq in a march toward standardization via the Extended Industry Standard Architecture (see *Top of the News* in this issue). A framework for 32-bit machines, EISA should address many of the same tasks as the Micro Channel without abandoning today's PC and AT cards. Adherents say it may swamp the Micro Channel. —E. B.

## Peachtree Keeps the Books *Spins Off From Intelligent Systems*

Peachtree Software nearly ended up in the scrap heap three years ago after attempting to turn the momentum from its pioneering accounting software toward a diverse line of more horizontal applications. "We weren't smart enough to be Microsoft; we couldn't keep that many products moving," summarizes Bill Goodhew, chief executive of the Norcross, Georgia, firm.

Although Peachtree enjoyed an early edge in accounting (its program was one of the few IBM relabeled and sold during the PC's early years) its pricing had drifted off target. Peachtree's eight-module program cost almost \$5000; competing packages with similar features began selling far more copies for far less.

Peachtree hit bottom in 1985, when its parent,

mainframe software vendor Management Science America, sold the company for \$1.1 million to Intelligent Systems, a PC products conglomerate also based in Norcross. But the move sparked a turnaround.

Slashing *Peachtree Accounting's* price to \$199, the firm added 100 features to the package and reintroduced it in 1986 as *Peachtree Complete*. Additionally, Peachtree bundled its also-ran *Peachcalc* spreadsheet with its moderately successful *Peachtext 5000* word processor for \$199. (continues)



Quick—turn the page.

## Peachtree

(continued)

This June, Peachtree unveiled *Back to Basics: Professional*, an easier-to-use version that costs \$199. ("Our sales department can't remember different prices," Goodhew jokes.)

The company has been profitable since 1986, and Goodhew and several other executives, backed by venture capital, recently offered Intelligent Systems \$20 million for an 80 percent share. The buyout of the 64-employee firm has won preliminary approval from the current parent. Former Peachtree head Ben Dyer will return as chairman, while Goodhew remains president and chief executive.

*Peachtree Complete* will continue to be sold mainly through direct and retail channels. For accounting software, where considerable hand-holding is needed, such a strategy entails some risk, particularly since Peachtree charges for support (\$1 per minute, with a \$20 minimum).

Sophisticated PC accounting programs have traditionally been sold to end users through accountants and consultants. That works fine with a high-margin price, but Goodhew says even some retailers dropped *Peachtree Complete* when its price dropped to \$199. Today, consultants and accountants are responsible for only 28 percent of *Peachtree Complete* sales. The rest are made directly via an 800 number (30 percent) or through retailers (42 percent).

This volume-oriented strategy puts Peachtree

face-to-face with DAC, whose \$99 accounting program is the market's volume leader, according to Bill Higgs, vice president of software research at InfoCorp. Peachtree today is among the top ten—not top five—PC accounting software makers, says Higgs. Fortunately, Peachtree profits from an installed base of 250,000 copies—a big plus in an arena where replacement sales are crucial.

Peachtree has development efforts under way

for Windows, OS/2's Presentation Manager, and the Macintosh, but "two out of the three will be learning projects," Goodhew says. He hints that the Windows applications will get the nod, but cautions against expecting products before mid-1989. And the firm will enter no new software markets in the next two to three years. With characteristic good humor, Goodhew says that accounting software "is all this old peanut-brain can think to do."  
—Edward Warner



**Peachtree president Bill Goodhew plans to stick to the knitting.**

## Vendex Targets Consumer Stores

### *Bundy Helps Make a Bundle*

Professional wrestler King Kong Bundy may lack the subtle charm and human appeal of a Charlie Chaplin or an Alan Alda, but then, Vendex doesn't want to sell computers the way IBM does.

In the TV ads, Bundy, a completely clean-shaven giant of no known intellect, climbs into the ring and learns to use a Vendex HeadStart computer in 23 minutes. It's a powerful image for the technophobic millions, and one that Vendex claims sold about 100,000 computers in the past year.

Headquartered in the affluent suburb of Great Neck, New York, Vendex Technologies is a subsidiary of a 104-year-old, \$10 billion private Dutch conglomerate. Vendex International holds a majority interest in Barnes & No-

ble bookstores, Software Etc., and various department stores here and overseas.

Vendex Technologies is trying to get computers into consumer electronics stores, the places you go to buy VCRs or refrigerators. More to the point, it's packaging computers like VCRs.

In these stores, consumers are comfortably spending thousands of dollars, says Harry Fox, the quick-talking executive vice president of Vendex Technologies. At the same time, the outlets "are looking for home office goods to offset slower growth in traditional electronic equipment." Hence the everything-you'll-ever-need-in-one-package HeadStart: \$995 for a starting configuration with monitor and basic productivity software.

Which came first, the computer or the egghead? "The product came first," Fox says. "It was designed to be as idiot-proof as possible. We came up with an extremely effective approach of showing someone who clearly is not your power user."

Other vendors have gone the same route—powers such as Commodore, Atari, and even IBM with the late lamented PCjr. Fox says the quality of Vendex's Korean hardware, its bundled software, and its turnkey system approach all help it crack the market.

Vendex is moving into more powerful 80286 and 80386 machines, still emphasizing simplicity and complete systems. But Bundy won't be going up-market. He'll remain, Fox says, in "a limited role geared to the 85 to 90 million households that don't have a computer."

Less prime time for Bundy? OK—but who breaks the news to him?  
—Daniel J. Rosenbaum



## Businessland

(continued from page 83)

The San Jose chain's fiscal 1989 sales should easily top \$1 billion, and it boasts an enviable list of corporate accounts.

"Businessland is in a very attractive position," declares Kevin McCarthy, analyst at Mabon Nugent & Co. in New York. The six-year-old chain appears to be in a better position than any other reseller to offer cost-effective networking and other connectivity solutions to big business, he explains.

Businessland's advantage can be traced to that 1982 decision by cofounders David Norman and Enzo Torresi not to sell franchises. Unlike rivals such as ComputerLand and Entré, the firm owns all 94 U.S. Businessland Centers, 1 Canadian outlet, 10 in the United Kingdom, and 24 ComputerCraft stores in Texas and California.

In the brutally competitive arena of PC sales, where most retailers operate on net margins below 8 percent, Businessland stores enjoy a definite pricing advantage over competing franchisees. (ComputerLand stores must pay the franchiser 5 percent off the top.) Central buying also makes it easier to command the best prices from suppliers and to standardize on products and services. That, McCarthy notes, is a godsend for customers charged with equipping and supporting offices that stretch from Massachusetts to California.

Then too, Businessland can't be considered a retailer; 80 percent of a cen-

ter's revenues comes from outbound sales efforts. In fact, the company has a reputation of being almost unfriendly to customers who wander in without an appointment. That modus operandi may be changing, however, as a result of a \$23 million stock swap last summer, in which Businessland acquired the retail-oriented ComputerCraft chain.

At first glance, it seems a strange pairing. While the two chains sell a similar mix of IBM, Compaq, and Apple computers and accessories, Businessland's offices are as subdued as corporate boardrooms and often nearly vacant unless a training class or demo is going on. By contrast, ComputerCraft operates a number of "superstores," usually crammed with colorful displays that shout at the customers milling about. Small business, home, and educational tools are a strong focus.

As Senior Vice President James Heisch emphasizes, "Businessland is not a retailer. It's an outbound sales force with a facility to provide demonstrations and training for our clients." But if ComputerCraft can seize some retail opportunities, so be it.

"Retail is not dead," says JoeAnn Stahel, president of the Dallas research firm Storeboard. She credits Businessland with leading the industry into outbound sales. Now, she says, the chain is pointing the way back into a fresh retail boom that's sparked by improved price/performance levels delivered by the 80386 chip.



"Businessland is not a retailer," stresses senior VP James Heisch.

Plans call for ComputerCraft to continue operations under the same name, with the same retail orientation. However, it is destined to swim upscale, addressing the increasing needs of small businesses by sharing Businessland's vaunted support capability. That technical structure is key to both divisions as they move into ever more complex networked systems.

Businessland installed 45,000 network nodes in its last fiscal year, and the number is expected to double this year. But such rapid growth requires top-notch talent, analyst McCarthy notes. "If you're a top engineer coming out of school and you have a choice of working for Hewlett-Packard or Businessland, most people are going to choose Hewlett-Packard," he adds.

To buck that trend, Businessland—which posted a profit of \$19 million last year—plans to spend almost as much this fiscal year on training system engineers and sales and technical staff.

And, practicing what it preaches, the company has tied its stores into one of the industry's largest wide area nets.

As founder Norman once remarked, "In this business, a quarter is like a year, and a year is like five years." From the beginning, Businessland has responded quickly to fast-shifting market opportunities. Last spring, for example, it launched a catalog of discount software and mailed a million copies.

But since start-up, Businessland has studiously avoided price competition, concentrating on adding services and support and charging for them. This approach is paying off: sales per employee have risen steadily, from \$296,000 in fiscal year 1987 to \$360,000 in fiscal year 1988. Profits have finally risen above the paper-thin 1 percent-of-sales level, where they hovered in the early years, to more than 2 percent.

The chain now employs slightly more than 3000, and it will continue to expand, says Heisch. Both Businessland and ComputerCraft logos will appear in new geographical markets, particularly Canada and Continental Europe. —Mark Henricks

*John Eckhouse reports on business for the San Francisco Chronicle, Mark Henricks is a Dallas business writer, Daniel J. Rosenbaum wrestles with computer and communications issues, and Ed Warner is a Boston-based writer on high technology. ●*

# TWO-FISTED MANAGEMENT

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WV Marek, 32

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God, how'd I get into this?

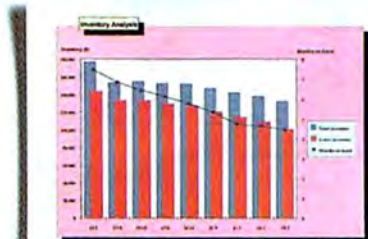


But if I win that could really be bad news!! But if I, if I if I... hominy hominy hominy...



Wow, I've never seen anyone blackout playing horseshoes!



[illegible]

A collection of various computer storage and interface components. At the top left is a small floppy disk with a label. To its right is a large, complex circuit board, likely a hard drive controller or interface card, featuring numerous integrated circuits and connectors. Below the floppy disk is a 3.5-inch floppy disk. To the right of the circuit board are several more 3.5-inch floppy disks, some with labels. At the bottom left is a large, dark, rectangular component, possibly a hard drive or a large floppy disk, with a label that includes technical specifications.

*These documents were brought to you  
by Microsoft Excel, Microsoft  
Windows, and the HP LaserJet Series II,  
PaintJet and DeskJet printers.*



### Personal Stock Portfolio

<b>Client:</b>	Harry S. Norriss	<b>Date:</b>	7/26/1996
<b>Business Address:</b>	2124 Norriss St.	<b>Home Address:</b>	1714 Elm St.
	Locustville, WA 99026		Locustville, WA 99026
<b>Telephone:</b>	(509) 495-2200	<b>Telephone:</b>	(509) 724-3995

Stock	Symbol	Costs
Zachry/Intertec Future	FL	5,212.80
Trans World	TW	74,130.00
Telex Corp.	TC	40,575.00
Time Group	TGM	33,780.00
Master Technology	MTW	50,000.00
Micro Systems	MS	68,470.00
<b>Holdings:</b>		<b>\$25,854.88</b>
		<b>\$36,777.83</b>
		<b>\$26,883.88</b>

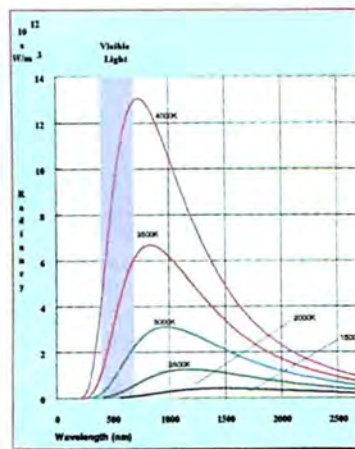
  

Stock	Holdings	Current Costs	Current Value
Zachry/Intertec Future	50	74,515.00	\$7,122.80
Trans World	125	68,875.00	\$64,130.00
Telex Corp.	125	32,700.00	\$41,000.00
Time Group	15	34,675.00	\$30,000.00
Master Technology	125	63,375.00	\$57,180.00

<b>Portfolio Total:</b>	<b>\$26,883.88</b>
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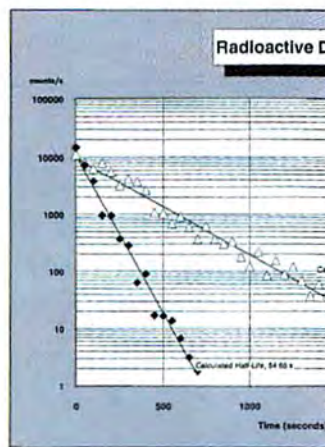
## West Coast Sales

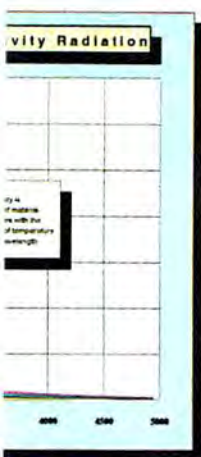
## Consolidated Balance Statement

Assets	1998	1997
<b>Current Assets</b>		
Cash and Short-term Investments	\$152,584	\$127,544
Accounts Receivable	\$80,478	\$136,798
Inventory	\$18,756	\$12,581
Other	\$7,964	\$6,282
<b>Total Current Assets</b>	<b>\$359,782</b>	<b>\$383,205</b>
Property, Plant, and Equipment	\$61,236	\$59,406
Other Assets	\$4,617	\$3,227
<b>TOTAL ASSETS</b>	<b>\$425,635</b>	<b>\$445,838</b>
<b>Liabilities and Stockholder's Equity</b>		
<b>Current Liability</b>		
Accounts Payable	\$17,794	\$(12,144)
Current Deferred and Deferred Revenue	\$6,257	\$9,099
Revolving and Commercial Facility	\$4,257	\$4,213
Contract Commissions and Employee Retention	\$1,324	\$1,675
Notes Payable	\$15,623	\$20,000
Income Taxes Payable	\$1,180	\$1,964
Other	\$1,235	\$(4,478)
<b>Total Current Liabilities</b>	<b>\$48,670</b>	<b>\$35,729</b>
Capital Lease Obligations	\$13,814	\$16,792
Commitments and Contingencies	\$1,408	\$1,727
<b>Total Liabilities</b>	<b>\$63,892</b>	<b>\$54,248</b>
<b>Stockholder's Equity</b>		
Common Stock	\$56	\$37
Paid-in Capital	\$76,614	\$99,818
Retained Earnings	\$365,051	\$315,000
Transitional Adjustment	\$1,240	\$931
<b>Total Stockholder's Equity</b>	<b>\$361,743</b>	<b>\$391,590</b>
<b>TOTAL LIABILITIES &amp; STOCKHOLDER'S EQUITY</b>	<b>\$425,635</b>	<b>\$445,838</b>



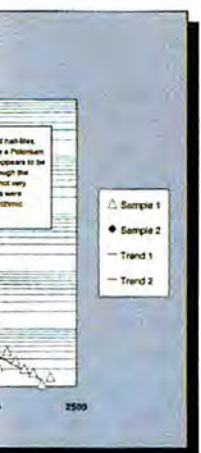
### Purchase Form

[illegible]



	1984	1985	1982	1983	1980
75,308	366,299	151,256	549,442	545,757	
12,765	58,423	27,591	81,933	57,436	
17,514	87,879	57,363	147,722	22,857	
52,579	123,157	71,504	171,180	9765	
66,776	331,576	261,707	567,226	736,052	
26,159	129,004	117,848	116,376	114,735	
32,543	171,881	11,797	11,360	8762	
32,625	1,059,506	657,402	475,562	973,134	

\$1,768	\$38,911	\$72,513	\$26,760	\$33,250
\$3,621	\$2,490	\$2,560	\$1,676	\$1,738
\$2,572	\$1,861	\$1,861	\$1,172	\$1,172
\$2,754	\$2,490	\$1,837	\$1,073	\$1,031
\$2,754	\$2,136	\$2,000	\$1,051	\$664
\$6,705	\$1,931	\$623	\$623	\$215
\$1,520	\$1,520	\$1,520	\$1,260	\$762
\$2,232	\$1,717	\$1,717	\$1,717	\$1,717
\$6,705	\$999	\$634	\$357	\$357
\$5,740	\$2,136	\$1,836	\$1,456	\$1,076
\$8,787	\$40,267	\$21,777	\$1,456	\$40,277
\$28	\$10	\$10	\$15	\$13
\$2,668	\$13,515	\$5,081	\$3,263	\$7,932
\$77,399	\$14,511	\$42,830	\$10,540	\$28,061
\$626	\$544	\$477	\$371	\$291
\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
\$1,000	\$1,000	\$1,000	\$1,000	\$1,000



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# Laptops of Luxury

NEC aims for another MultiSpeed-like splash with the high-end ProSpeed 80286 and 80386 laptops.

But the tiny UltraLite may make the biggest waves.

Eric  
Knorr

People who need a laptop fall into two camps: those seeking a box with enough power to replace their desktop computer, and those who want the least obtrusive, most mobile PC they can find. With the ProSpeed and UltraLite laptops, NEC Home Electronics is courting both groups.

The clamshell-style ProSpeed, which comes in both 80286 and 80386 models, is a desktop to go. Weighing in at 18 pounds without the optional 3-pound battery, each model offers an EGA-compatible backlit LCD, a 1.44MB 3½-inch floppy drive, 16-MHz operation, and enough options to give a Compaq lunch box a run for its money. The UltraLite, on the other

hand, is the size of a notebook and weighs less than 4½ pounds—literally the smallest, lightest PC compatible available with a full 25-line display.

**Muscle in a Clamshell**  
NEC is pushing its pair of ProSpeeds—not just as road warriors but as all the PC you'll ever need. The ProSpeed 80386 comes with 2MB of 32-bit RAM (expandable to 10MB) and a 29ms 40MB hard drive with a 64K cache controller. Also standard are a VGA port, an 80387 coprocessor socket, a 91-key PS/2-style keyboard (minus the second cursor keypad), one serial and one parallel port, DOS 3.30, and IGC's VM/386 multitasking environment.

NEC expects to sell this starting configuration for between \$7000 and \$7500. A whopping 100MB internal hard disk with a 25ms average access time will also be available, and a proprietary 16-bit expansion slot will accommodate as-yet-undisclosed options.



NEC's ProSpeed 386 and desktop docking station (left) are a powerhouse team; at right, the tiny UltraLite.

The ProSpeed 80386's most unusual feature is its optional deskbound "docking station." More than just an expansion box, the docking station provides its own 200-watt power supply along with three full-size 8/16-bit expansion slots, one full-size 8-bit slot, and two 5¼-inch half-height drive bays.

When you return from the road, you simply slide the ProSpeed 80386's 120-pin connector into the docking bay—no muss, no fuss. The clamshell automatically switches to the docking station's AC power, a second CONFIG.SYS file kicks in to handle your desktop options, and ports on the rear of the desktop box duplicate the functions of those on the ProSpeed. The docking bay also adds a second se-

**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.**

rial port and a switchable AC socket for a VGA monitor.

The deskbound unit for the ProSpeed 80286 seems more like a garden-variety expansion box. The 80286 model is scaled back in other respects. It comes with 1MB of RAM (expandable to 5MB) and a 27ms 20MB hard disk; as with the ProSpeed 386, the 2400-bps modem is a \$599 extra. NEC representatives aver that the ProSpeed 80286's asking price will be between \$5000 and \$6000.

One of the most impressive features of both ProSpeeds is a detachable 5½-by-9-inch display, one of the first EGA-compatible LCDs available. The so-called "compensated" twisted nematic display offers excellent light absorption, while the fluorescent backlighting is exceptionally bright and even. The upshot is that this backlit LCD is truly black and white, with first-rate contrast.

The backlighting on both units powers down automatically after a period of keyboard inactivity. That's good, because a charge lasts an average of only 2 to 3 hours. The battery is external and covers all the ports on the back of the unit, so battery operation was clearly an afterthought.

#### Born to Get Lost

While the ProSpeeds have the muscle, the UltraLite seems guaranteed to get the most oohs and aahs. Less bulky even than Tan-

dy's TRS Model 100, the 1.4-by-8.3-by-11.75-inch UltraLite centers on a NEC V30 running at 9.54 MHz—the same CPU as the NEC MultiSpeed's. For \$3000, you get 640K of RAM, a 1MB dedicated RAM disk (upgradable to 2MB), a NiCad battery, a 2400-bps modem, an AC adapter, and a built-in serial port. The display is a pleasant backlit super-twist LCD with CGA resolution, similar to that offered by the MultiSpeed HD. As with the ProSpeed display, the backlighting times out automatically.

Although full size, the UltraLite's keyboard might take some getting used to. The keys are nearly flat, and though they're responsive, they sink only slightly when you press them. Nonetheless, the layout is sensible: 12 small function keys line the top, and when you press the special <Fn> key, the four arrow keys on the inverted T cursor pad double as <Page Up>, <Page Down>, <Home>, and <End>.

One UltraLite ace in the hole—or more accurately, card in the slot—is a selection of ROM-based options. To begin with, DOS 3.30, *Lap-Link*, and a DOS shell are burned into system ROM, which is treated as drive D:. More interesting are the other ROM-based applications, each of which is

sealed in a credit-card-size package.

Pop off a plastic door, and the ROM card slips into a slot on the side of the UltraLite, which treats this receptacle as drive B: (the RAM disk is drive C:). NEC has ROM cards showing for *Crosstalk Mk.4*, 1-2-3 release 2, *WordPerfect 5.0*, *Microsoft Works*, and *XyWrite III*; other applications are reportedly in the works.

Drive A: is an optional 3½-inch bootable external drive. It requires the UltraLite's AC adapter and offers the only way to get data on and off the machine, aside from a modem or null-modem link. Outfitted with a parallel port, the external drive is also the sole way to talk to a parallel printer.

Battery operation is the UltraLite's weakest link; a full charge, as with the ProSpeeds, lasts for only 2 to 3 hours. In its favor, the UltraLite provides a clever four-LED "gas gauge" that tracks battery charging. The LEDs are otherwise unlit, but press a button and they tell you how much juice is left.

Rarely does a company aggressively target both the high and low ends of a market at the same time. Whether NEC hits the right note on the high end with the bulky but powerful ProSpeeds 80386 and 80286, the UltraLite seems sure to strike a chord with users dying for a laptop that *really* fits in a briefcase. ●

*Eric Knorr is a senior editor for PC World.*

## SNAPSHOT

### ProSpeed 80386, ProSpeed 80286, UltraLite

NEC Home Electronics is targeting both ends of the laptop spectrum with powerful but hefty 80386- and 80286-based ProSpeed models and an extremely compact battery-powered UltraLite unit.

#### KEY FEATURES

- Deskbound "docking station" for ProSpeed 80386 offers heavy-duty power supply, four expansion slots, and two disk bays
- Optional 25ms 100MB internal hard disk for ProSpeed 80386
- EGA-compatible ProSpeed LCD with "compensated" twisted nematic design offers excellent screen quality
- UltraLite places DOS 3.30, *Lap-Link*, and a DOS shell in ROM and supports ROM cards for *Crosstalk Mk.4*, 1-2-3 release 2, *WordPerfect 5.0*, *Microsoft Works*, and *XyWrite III*

#### AVAILABILITY

ProSpeed 80386 and UltraLite in November 1988, ProSpeed 80286 in February 1989

#### PRICING

Starting configurations, only estimated at press time: \$7000 to \$7500 for ProSpeed 80386, \$5000 to \$6000 for ProSpeed 80286, \$3000 for UltraLite

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# Is Smaller Better?

Can a laptop be your only computer? With Compaq's

SLT 286, the answer is a definite "maybe."

*Richard Landry  
and Karl Koessel*

ver since Alan Kay envisioned Dynabook—the perfect portable—vendors have labored to create the smallest, lightest, most powerful and expandable system possible—with the best screen and the longest battery life. NEC, Toshiba, Zenith, and others have offered products that make various trade-offs between performance and portability (see the preview "Laptops of Luxury" in this issue). Moving from lunch box to laptop, Compaq waited for the technology needed to create the ultimate 286 design—a lightweight, full-function, OS/2-compatible, no-compromise portable.

The result is the SLT 286, which parallels the Deskpro 286 and Portable III in price and performance while delivering the sharpest laptop screen currently available. Weighing in at just under



**Compaq's first laptop, the svelte SLT 286, easily slips in and out of the optional Desktop Expansion Base.**

14 pounds, the SLT 286 features a 12-MHz Harris CMOS 80286 processor operating at one wait state. The built-in VGA gives the 10-inch, backlit, fluorescent, supertwist LCD screen up to 8 shades of gray at 640 by 480. The SLT 286's display is thus both rich and soothing to the eyes—and when was the last time you could say *that* about a laptop screen?

The sleek, compact SLT 286 houses one 3½-inch floppy drive and a fast 20MB or 40MB hard drive. Both drives rate a 29ms average access time, but the 40MB model gets a performance boost from its 1:1 interleave ratio. The standard configuration also features a serial port, a parallel port, a

socket for a 12-MHz 80287 math coprocessor, and interfaces for an external VGA monitor, an enhanced keyboard, a separate numeric keypad, and an internal 2400-bps Hayes-compatible modem or a second serial port.

The SLT 286 comes standard with 640K of RAM, expandable to 3.64MB with 1MB memory cards that easily snap into the system. Support for EMS 3.2 is built in.

So light that it feels somewhat flimsy, and missing a separate numeric keypad, the detach-

able keyboard nevertheless has a nice touch that compares favorably with the standard Compaq keyboard. The keyboard stows into a shallow recess on the top of the unit, concealing the bay for a drop-in NiCad battery that provides up to 3 hours of power. The battery gets help from a power conservation system that shuts down the screen and hard disk when they are inactive for a user-specified period of time. You can also put the laptop in limbo temporarily by pressing a standby button, so you can restart it without having to re-

load your applications. The system includes a lightweight AC adapter.

What's the tariff for this ride? At press time, the Model 20 was slated to retail for \$5399, the Model 40 for \$5999. The comparable Portable III Models 20 and 40 retail for \$4999 and \$5799, respectively, while the Deskpro 286 Models 20 and 40 go for \$3599 and \$4199.

#### Computing à la Carte

Memory aside, the SLT 286 isn't short on expansion options. To keep prices from skyrocketing, Compaq has adopted a modular approach that lets you add options incrementally. For example, you can supplement the unit's keyboard with an external numeric keypad, and you can enhance storage capacity with an external storage module that holds a 5¼-inch floppy disk drive or a 40MB tape backup unit. A switch enables you to boot the system from the floppy drive.

If you simply want to add a full-size keyboard and a VGA color monitor, you don't require any additional options. But if you need to use a network card, for example, a desktop expansion base provides two full-size 8/16-bit slots, and its own power supply, along with parallel, keyboard, and display ports that duplicate the functionality of the laptop. The SLT 286 simply slides into this base and can immediately access

any devices connected to it. At press time, prices were not set for the external numeric keypad, storage module, or expansion base.

Unfortunately, this à la carte approach penalizes those who want the SLT 286 to be their one and only computer. If you need to supplement the system's storage capacity with both a 40MB tape backup unit and a 5¼-inch floppy drive, then you'll need not one but two external storage modules, but you can use only one at a time. If you want fur-



The Deskpro 386/20E appears identical to the Deskpro 386S but packs 20 MHz of full 32-bit power inside.

#### SNAPSHOT

##### Compaq SLT 286, Compaq 386/20E

Designed to fill the bill for both travel and office, Compaq's first laptop features a 12-MHz 286 chip, a VGA screen, and powerful expansion capabilities.

#### KEY FEATURES

- Backlit, supertwist LCD display offering 640 by 480 resolution with eight levels of gray
- 29ms 20MB or 40MB internal hard disk
- Expansion base with room for two full-size 8- or 16-bit expansion boards

#### AVAILABILITY

immediate

**Compaq Computer Corp.**

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ther hard disk expansion, you must invest in the desktop expansion base and either the fixed disk drive expansion unit designed for Compaq desktops or a hard disk card. All in all, you could end up with a system that sprawls across your desk.

Michael Swavely, Compaq's vice president of sales and marketing, states that upcoming products will incorporate further improvements in size and weight as well as in processor, hard drive, display, and power technology. A 386 laptop would certainly qualify as the ideal all-in-one computer. In the meantime, the SLT 286 looks like an attractive alternative to a 286 desktop for users who want to take their data with them.

### 20 MHz and Shrinking

Compaq is thinking small even on the desktop, offering a trimmed-down version of its 20-MHz 80386 system and discontinuing two larger 386 models.

The Deskpro 386/20E sports the small footprint and new styling pioneered by the Deskpro 386S but goes one better by integrating 16-bit VGA graphics directly on the motherboard instead of on a piggyback card. Like its now-defunct brother the Deskpro 386/20, the 386/20E gets a lift from an 82385 cache controller paired with 32K of 35ns RAM and an optional 80387 or Weitek coprocessor. The unit comes with 1MB of 32-bit RAM ex-

pandable to 16MB on a board plugged into its high-speed memory slot. Compaq offers this board in both 1MB and 4MB options, with expansion through 1MB or 4MB memory modules.

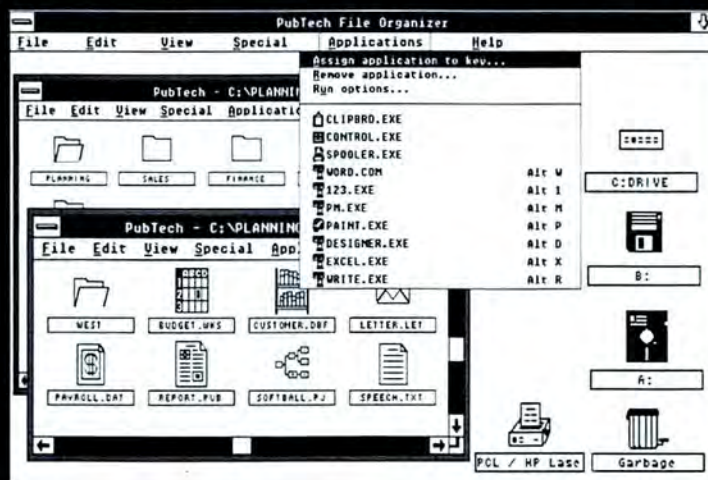
Like the diminutive 386S, the 386/20E includes four 8/16-bit expansion slots; serial, parallel, and mouse ports; a 5¼-inch, 1.2MB drive; and room for three additional half-height devices. You can get up to 220MB of storage by installing two 110MB hard disks. Compaq offers the 386/20E Model 1 with a single 1.2MB drive for \$5199. The Model 40 includes a 29ms 40MB hard drive for \$6599; the Model 110, with a 25ms 110MB drive, goes for \$7999. Both hard drives feature a 1:1 inter-

leave. Compaq also has upgraded its disk-caching software. All models are available now.

Gone with the Deskpro 386/20 is the 16-MHz Deskpro 386 (the world's first 80386 machine to ship in volume), leaving only the Deskpro 286 and the Deskpro 386/25 in traditional Compaq livery. Swavely says Compaq will continue to move its line to the trimmer design. New high-end offerings will appear first in the larger size, but customers who wait awhile will get the same power—writ small. ●

*Richard Landry is PC World's editor in chief, and Karl Koessel is the technical editor.*

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#### SPECIFICATIONS

MICROPROCESSOR: Intel 80286-12  
 SPEED: 12MHz/8 Switchable  
 BIOS: Award  
 BUILT IN RAM: 1 Megabyte  
 EXPANDABLE TO: 3 megabytes  
 POWER SUPPLY: 145 watts 110/220 switchable  
 KEYBOARD: 101 key PS/2 compatible  
 GRAPHICS: VGA Autosync  
 FLOPPY DRIVES: one 5.25" 1.2 megabyte, one 3.5" 1.44 megabyte

HARD DRIVE: 32.1 megabyte, 28 milliseconds, 1:1 interleave  
 BUILT IN INTERFACES: Parallel, 2- RS232 serial, mouse, joystick  
 EXPANSION SLOTS: 3 available  
 MOUSE: Standard  
 SOFTWARE: DOS 3.3, GW Basic, HeadStart Advanced Environment, Floppy Driver, Framework II, 3-D Graphics, ATI and Computer-EEZ Tutorial Software, Xtree hard disk manager, Publish-it! Chessmaster 2000, Splash VGA paint program, Bookmark, plus Twist and Shout.

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# PRODUCT OUTLOOK

## 104 **PRODUCT OUTLOOK**

### **SuperCalc 5**

The granddaddy of spreadsheets greets the new generation, adding worksheet consolidation, selective recalc, and more.

### **Connection CoProcessor**

PC-based communications gets a big boost with this combination fax/modem board and 80188 CPU.

### **Opus I**

Link graphics to data base records, text, or other graphics with this powerful *Microsoft Windows*-based drawing program cum data base.

### **Smalltalk/V 286**

Cheaper and easier than OS/2, this object-oriented programming environment for 80286- and 80386-based computers addresses more memory and delivers multitasking and a graphic user interface.

### **MapInfo**

Turn your data base files into maps that let you analyze the data and create presentations.

### **TASK-force**

Pare down billing and accounting chores with an all-in-one small-business-management program.

### **Paragon 286V**

Clever design packs advanced features, VGA graphics, and lots of free slots into a small system.

## 112 **BRIEFLY NOTED**

### **3000 NL, 1000 TL, 1000 SL**

Tandy boosts the performance of its most popular 80286-based machines by up to 30 percent and upgrades two low-end PCs.

### **Who/What/When Office**

Schedule people and resources on your network and then view the info three ways.

### **Extend-A-Name**

Break the DOS 8-character limit for naming files with this memory-resident product.

### **Battery Watch**

Laptop users: If running on empty isn't your style, this utility checks your batteries every 2 seconds to let you know when you're getting low.

### **Microsoft Word Companion Disk**

Peter Rinearson's one-man crisis intervention team for *Word 4.0* users includes over 300 macros, a slew of style sheets, and more.

### **OPTune**

Like a private mechanic for your hard disk, this program keeps your disk in top shape.

### **EFAX-88**

A portable fax machine that transmits hard-copy information at a decent rate without errors.

### **386 MotherBoard/AT**

Transform your AT or compatible into an 80386 with Hauppauge's motherboard upgrade.

## 120 **UPDATE**

### **Harvard Project Manager 3.0**

First-time users of Software Publishing's project planner can get to work within minutes, thanks to new fast-tracking and outlining capabilities.

### **DeskJet Landscape Upgrade Cartridge**

Print spreadsheets and tables sideways and expand your font repertoire with a pair of cartridges from Hewlett-Packard.

### **Foxbase+ 2.10**

Customizable templates bundled with this data base manager let you produce applications, paint screens, and compile code.

### **Actor 1.2**

An object-oriented programming language whose turf is *Windows* and expanded memory.

### **Turnkey 3.1, Turnkey 3.1 Menu Builder's Version**

Optimal Solutions updates its easy menu-building utility with a 1-2-3-like interface and adds a developer's version that lets you create fast-running menus for others in your work group.

### **Accpac Plus Windowing System Manager, LanPak**

Improved windowing and LAN modules give this accounting package greater macro muscle, enhanced search power, and more.

### **Media Master 5.0**

Format CP/M, DOS, and TurboDOS disks for easy swapping among incompatible systems.

### **Designer 1.2**

*Windows* desktop publishers can build palettes from a rainbow of 16 million colors.

## SuperCalc 5

### SuperCalc, The Sequel

The latest episode in the *SuperCalc* saga fast-forwards to the future of spreadsheet-based business modeling, bringing users many of the most frequently asked for features in the genre, including worksheet consolidation and selective recalculation. But *SuperCalc 5*, whose roots are planted firmly in the origins of personal computing, hasn't forgotten the million or so users who have taken it this far. The new *SuperCalc* maintains complete file compatibility with previous versions, the earliest of which may even now be chugging away on an old CP/M machine somewhere in your company.

*SuperCalc 5* will play on any stage, whether it's a full-featured 80386 platform or a two-floppy PC—a definite plus for worksheet consolidation. Now you can integrate the monthly or annual budgets of the many departments or divisions in your company by hot-linking crucial cells (like those containing totals) with the appropriate cells in a master worksheet; the critical cells need not be in the same locations in their respective worksheets. And, figuring the daily consolidated receivables for a company with multiple departments is no longer a forbidding chore.

Consolidated Sales for Eastern and Western Regions												
			January			February			March			
Widget retail sales			275500			567000			725000			
WH Widget sales			275500			325000			110000			
Sales for Eastern Region												
			Jan	Feb	Mar	Apr	May	Jun				
Appleton, Sarah			1000	1050	1100	1150	1200	1250				
Craig, Robert			900	975	1050	1125	1200	1275				
Ellison, Franklin			1250	1300	1400	1500	1625	1700				
Sales for Western Region												
			Jan	Feb	Mar	Apr	May	Jun				
Bernhart, Susan			1000	900	1150	1325	600	900				
Bulley, Ralph			900	1000	325	375	520	575				
Quang, Melinda			1250	1100	1000	900	950	1125				
SALESY16			Form:SUM(EASTIAN_SALES, WESTIAN_SALES)									
Width: 9			Memory:1111 Last Col/Row:A1									
1)			READY (F1 Help) (F2 Names) (Ctrl-Break/Cancel)									

*SuperCalc 5* consolidates worksheets, does selective recalc, and supplies many other popular spreadsheet-modeling features without abandoning the estimated 1 million users of prior versions.

*SuperCalc 5* also reads 1-2-3 .WKS and .WK1 files as well as executing Lotus macros, for those in your organization enamored of the other major player in the market. And should die-hard Lotus aficionados want to share your work, you can output in .WKS format or even hot-link to their worksheets.

The new release makes a second bow to flexibility and to 1-2-3 by letting you choose either *SuperCalc 5* or Lotus-style menus; you can even toggle between them using slash commands. If you like, embed the toggle in 1-2-3 macros to perform *SuperCalc* commands not found in 1-2-3.

*SuperCalc's* latest incarnation serves up dozens of different graph treatments with variable colors, 3-D pies and bars, and interactive links to the range that created them. Its forms-creating capability offers grids, lines, and shading of such quality that you can create a 1040 form that looks

just like the one Uncle Sam sends. Desktop publishers can move easily from spreadsheet to annual report by hooking up to a phototypesetter or a 35mm slide maker.

More news in the compatibility arena: *SuperCalc 5* cooperates with Computer Associates' add-in data base manager, *Silverado*. Sparse-matrix memory management means that you pay the price in RAM only for those cells that actually contain data; recalcs are faster because *SuperCalc 5* operates on only those cells affected by a numerical change. The program skips over labels, unaffected formulas, and other irrelevancies. An undo command saves you from ill-placed keystrokes.

*SuperCalc 5*, which lists for \$495, requires DOS 3.00 or a later version and 512K of memory. Upgrades are free to

Computer Associates' SupportPlus maintenance plan members who are caught up on their \$150 annual dues. If you bought *SuperCalc 4* after May 23, 1988, send in your registration card for a \$100 refund and a copy of *SuperCalc 5*. Others must pay \$100. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95131; 800/531-5236. Reader service number 740

## Connection CoProcessor

### Fast Talk

For all the chatter about multitasking, the PC is still a sequential device that, if human, couldn't walk and chew gum at the same time. Some clever control programs, like Quarterdeck's *Desqview*, are able to divide the processor's time between two or more applications and, by quickly switching between them, make it appear that they are running simultaneously. But to truly multitask, two brains are definitely better than one.

A second processor really pays off in the increasingly important area of PC-based communications, which is why the Intel Personal Computer Enhancement Operation equipped its new all-in-one communications board with a speedy 10-MHz 80188 CPU, backed up by 256K of memory. The Connection CoProcessor is a fax/modem combo that lets you spread out your spreadsheet or rummage

through your data base in the foreground while it sends and receives fax messages, data files, or even programs over phone lines in the background.

This single-slot board will route group 3 faxes at 9600 bps to and from fax machines or similarly equipped computers. A Hayes-compatible daughterboard modem lets you send data files and even binary files, such as programs, at 2400 bps to other PCs or E-mail and bulletin board services.

You won't have to wrestle with baud rates, stop bits, and other telecommunications trivia every time you want to communicate, because the Connection CoProcessor lets you script and store the parameters for your sessions. To use the Connection CoProcessor, you only need to know *who* and *what*. Its point-and-shoot interface makes it easy to select the what from a hard disk file directory and the who from your personal directory. Or, you can enter the information from the command line. The Connection CoProcessor forwards files, faxes, and E-mail to distribution lists as large as 999 names.

Intel says the Connection CoProcessor is just the first of a family of products that will support the DCA/Intel Communicating Applications Specification (CAS), jointly developed by Intel and Digital Communications Associates. CAS is a communications interface

standard that will let applications programmers add transparent but limited communications functions to word processing, spreadsheet, and other standard programs. It won't give these applications the scripting and interactive capabilities of full-blown communications packages, but it does support some batch-mode functions.

The Connection CoProcessor is \$995; the optional modem is \$295. Intel Personal Computer Enhancement Operation, 5200 N.E. Elam Pkwy., Hillsboro, OR 97124-6497; 800/538-3373.

Reader service number 741

## Opus I

### The Picture File

No file is an island, which is why spreadsheets, data bases, and word processors give us several indispensable ways to connect words and numbers. Pictures are a tougher proposition, though, since there seems to be no logical way to connect their parts.

Now, taking a cue from Apple's HyperCard, Roykore Software has married a powerful drawing program to a data base under the Microsoft Windows environment, so your desktop publishing drawings and CAD files needn't remain strangers. Using *Opus I*'s "hyper-drawing" technique, you can link all or part of a graphic to other similar or dissimilar graphics as well as to data base records and text in a nonrelational fashion.

Windows' pulldown menus and dynamic data

exchange make such linkage as easy as pointing—first to an object in your drawing, and then to a record in an accompanying text file. A tap on the <Enter> key or a click of the mouse makes your connection. When you want to call up another picture or record, you point to a linked portion of your graphic and click on it again.

A complete drawing program, *Opus I* lets you create your own drawings using object-oriented tools ranging from straight lines to polygons and ellipses. You can choose from 40 patterns, 8 colors, and 10 line styles, and you can add text in a variety of typefaces. You can even create objects from bit maps of scanned photos, then trace and edit them to your liking.

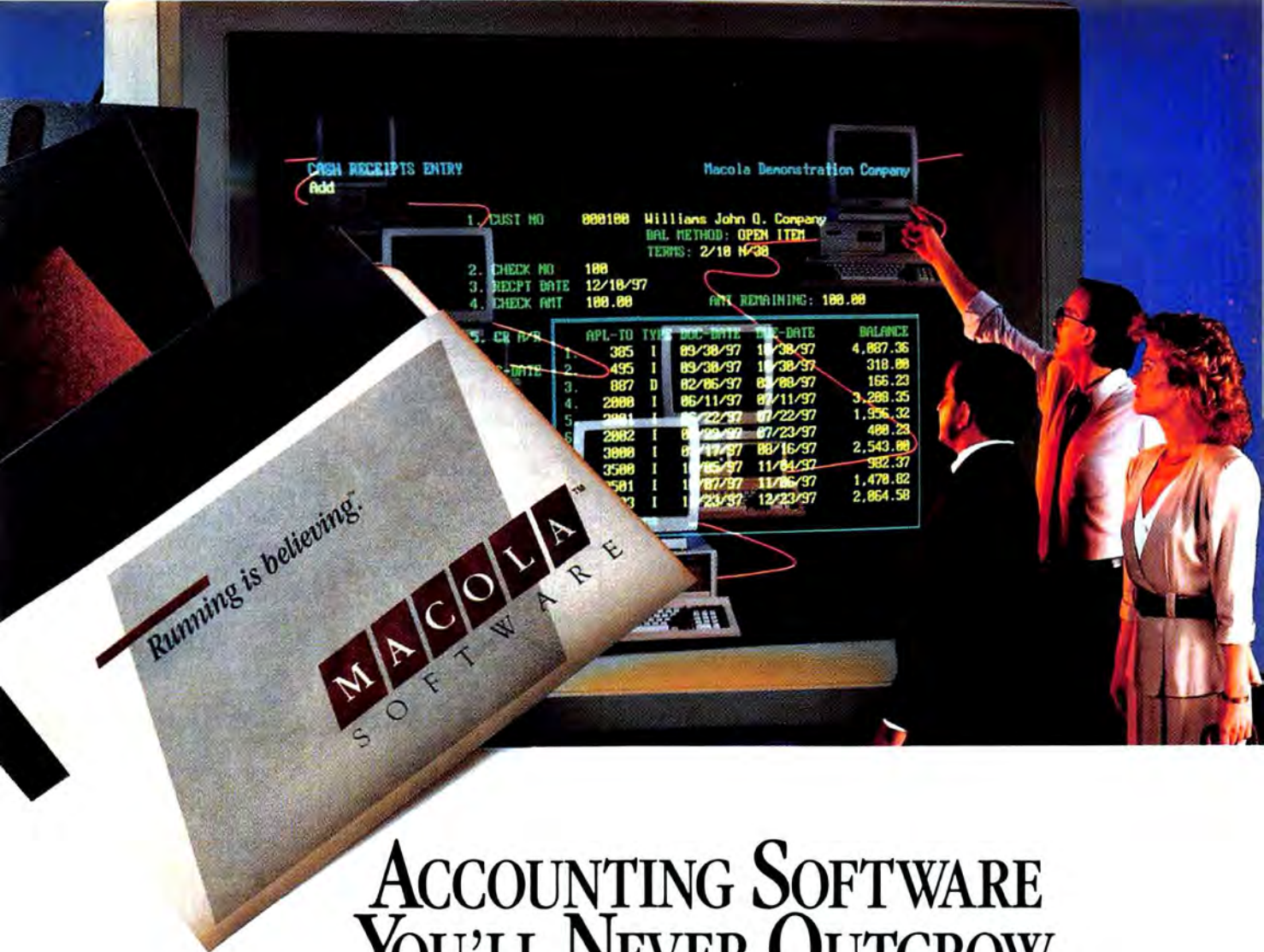
Applications for *Opus I* go far beyond manipulating and cataloging graphics files. A flat-file manager,

er, *Opus I* allows you to link just about any sort of information—text, numbers, dates—to your drawing. For example, you can manage a company's sales offices by linking up a number of images that show the different sales regions. By pointing the cursor at part of an image—say, a symbol representing an office location—you can call up further information, such as sales figures, personnel data, or a floor plan. You can even create maps that let you zoom to specific neighborhoods or streets for further detail.

You can transfer information between *Opus I* and other data bases using ASCII or DIF formats. The \$395 program, which includes a run-time version of Windows 2.0, requires DOS 3.00 or a later version, 512K of memory, and a hard disk drive, as well as a CGA, EGA, Hercules, or compatible graphics adapter.



Taking a cue from hypertext on the Macintosh, Roykore Software has combined a powerful drawing program with a data base under the Microsoft Windows environment. You can link all or portions of your graphics files to others as well as to data base records with *Opus I*'s flat-file manager.



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**Comprehensive Support.** PC Magazine also determined "Macola's technical support, documentation and customization assistance meet the high standards set by the software."

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Reader service number 742

## Smalltalk/V 286

### Paint Up, Fix Up

Computer industry superpowers are pulling together to revolutionize the operating system platform on which PC applications are based. OS/2 is nothing less than a floor-to-ceiling renovation of the current programming environment. Look forward to a far more robust, if more expensive, operating environment.

But just as with home remodeling, many smaller companies are finding more economical ways to offer increased memory addressability, multitasking, and a graphic user interface. Digitalk, for example, has introduced *Smalltalk/V 286*, an object-oriented programming environment for 80286- and 80386-based computers that offers in-

house and commercial application developers a form of multitasking, as well as the ability to address large memory blocks. Running under DOS, *Smalltalk/V 286* takes advantage of the protected mode of the 286 and 386 chips to address up to 16MB of extended memory directly. You can develop controlled applications for multiple, simultaneous processes—sorting a data base in the foreground, for example, while communications are conducted in the background.

Unlike those that run under OS/2, *Smalltalk/V 286*-based applications will not interact with programs written in other languages. Each process is restricted to its own reserved memory space and must queue up for processor time based on its relative importance to other processes competing for the CPU at a given instant. But since all this happens in the blink of an eye, it appears as though all of these applications run simultaneously.

Because it's an object-oriented language, rather

than a logical or procedural one, *Smalltalk/V 286* applications are relatively simple in design. Such a language is better for creating a graphic interface. Programming is as easy as linking objects in point-and-shoot fashion; within the graphic, windowed environment, you can browse and select from different classes of programmable objects such as windows or pull-down menus. *Smalltalk* applications are very portable across different microprocessors: Your *Smalltalk/V 286* applications need only be recompiled to run under *Smalltalk/V*, for the 8088 processor, or under *Macintosh Smalltalk/V*.

*Smalltalk/V 286*, which requires DOS 2.00 or a later version, retails for \$199.95. It comes with a windowed development environment, a language, and a powerful debugger. A disk-browser window gives you access to most DOS commands, while a library provides more than 200 classes of useful application building blocks such as those for windows and menus. A paint program lets you include bit maps in applications, and a clipboard makes it easy to move objects between *Smalltalk's* windows. Extension kits for color and communications drivers cost \$49.95 each. Digitalk, Inc., 9841 Airport Blvd., Los Angeles, CA 90045; 800/922-8255, 213/645-1082.

Reader service number 743

## MapInfo

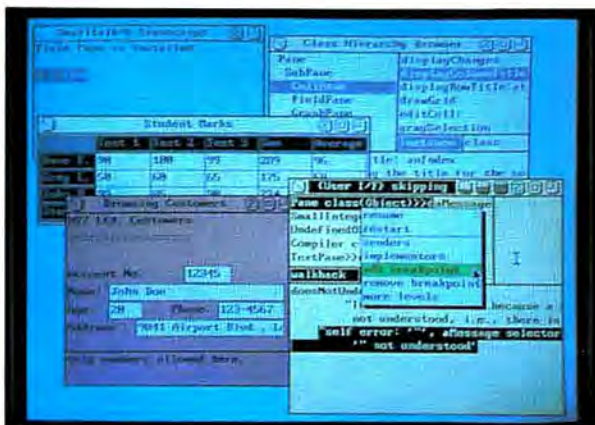
### Lay of the Land

You can work numerical wonders with a spreadsheet, but when it's time to make sense out of all those numbers, a graph can be even more wondrous. Similarly, data bases can swamp you with records and leave you without a way to chart a clear path through them. But now Mapping Information Systems lets you turn all those names, addresses, and notes into one or more maps with *MapInfo*.

Designed to be used as both a presentation package and a data analysis tool, *MapInfo* is built around a data base that uses *dBASE* file formats. You can enter your own data or import *dBASE III Plus* native files, as well as those from other data bases in ASCII format.

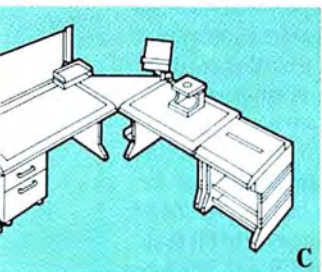
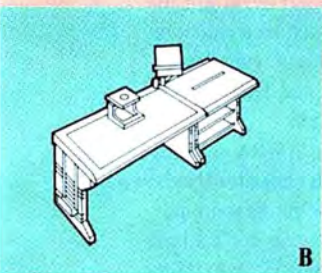
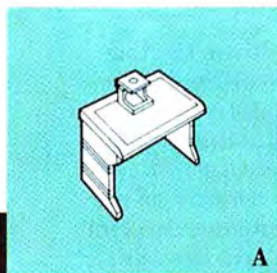
You then view that information in a variety of meaningful ways. For example, you can map your sales leads, office sites, or subscribers by region, state, city, or even more targeted geographic parameters, and use those distribution maps for sales analysis or as presentation aids. *MapInfo* automatically creates *pin maps*, whose on-screen points are as specific as street addresses, as well as *thematic maps*, which highlight user-defined regions using color, shading, and borders to define service area boundaries or delivery zones.

Use *MapInfo* to create road maps for your sales or delivery personnel. Po-



An easy-to-use, object-oriented programming language for in-house and commercial programmers, *Smalltalk/V 286* lets you multitask and address up to 16MB of memory in the protected mode of 80286- and 80386-based computers.

Right, it's efficient.  
Right, it's great looking.  
Costs an arm and a leg, right?



## Wrong.

If you think you can't afford computer workstation furniture as up-to-date as your computer, think again.

**Breakthrough prices.** The basic workstation (drawing A) costs less than \$275. For under \$580, you can set up the intermediate workstation (drawing B). And the full featured workstation (drawing C and photo) is less than \$1195. Since the WorkManager™ System is modular, you can start small and add on as your needs—and resources—grow.

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**Breakthrough construction.** Strong, lightweight structural components are molded of steel reinforced Resinite™ composite. Molded-in color makes surfaces highly scratch resistant.

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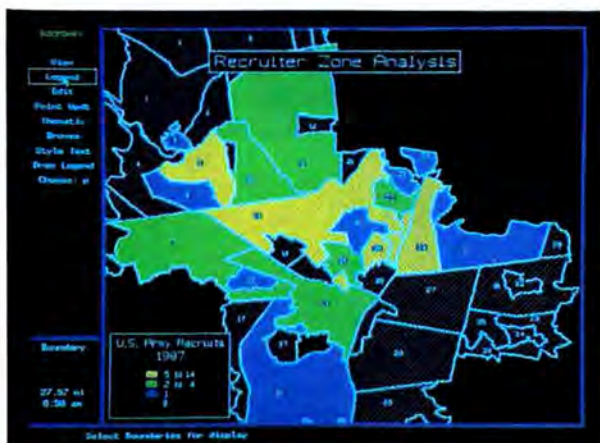
**MicroComputer Accessories, Inc.**

lice departments could use the program to track crime sites, fire departments could pinpoint neighborhood fire hazards, and retail chains could use it to describe market areas around store locations. Points on each map are accurate to within 60 feet and can be viewed from the perspective of up to 5000 miles out in space using the zoom feature. You can color-code different areas to reflect different demographics. Towns, streets, highways, even railroad tracks can be displayed graphically.

Mapping Information Systems sells several add-on data bases with a variety of additional demographic and mapping data that let you address your special needs. For example, the \$195 *MapPack Sampler* provides a digitized map of the United States with point locations of 5000 U.S. cities, boundaries of all the states, ZIP codes, and telephone area codes, plus an overlay map of the interstate highway system.

You can use *MapInfo*'s data base of street maps covering more than 330 metropolitan areas and thousands of suburbs to locate a street address and then open a window that displays the record for that address. The maps interact directly with the data base so that editing in one updates the data in another. Maps are redrawn instantly when the data changes or the information is examined from another perspective.

The program supports a wide variety of printers



Make all of those names, addresses, and notes in your data base truly meaningful by turning them into maps with *MapInfo*. Create pin maps of your sales locations or road maps for travel between locations.

and plotters, and files can be exported to other programs such as *Ventura Publisher* and *Harvard Presentation Graphics* for adding maps to documents that accept the CGM (Computer Graphics Metafile) format.

*MapInfo* requires 640K of memory, a hard disk, and DOS 2.00 or a later version. It supports CGA, EGA, VGA, Hercules, and some higher resolution boards such as the IBM 8514A graphics adapter. The core program is priced at \$750; digitized maps/data bases are sold separately for \$95 to \$2000. Mapping Information Systems, 200 Broadway, Troy, NY 12180; 800/327-8627, 518/274-8673.

Reader service number 744

#### TASK-force

### Big Deal for Small Biz

The 1980s are likely to go down in history as the decade of the entrepreneur, as small businesses spice

up the economy with hordes of innovative products and jobs. But small businesses—particularly those based at home—often lack the financial expertise found in larger firms, and that costs them plenty.

The 20,000-member American Home Business Association (AHBA) figures that the average person working out of the home spends the equivalent of one day a week just keeping the books. The association and Blue Chip, a maker of low-end PCs, have introduced *TASK-force*, an accounting package they figure can cut that time down to 2 hours a week, saving the average home-based business more than \$8700 a year.

The \$159 business management program targets the 13 million or so Americans whose morning commute consists of a stroll to the den or the kitchen table. Developed as a result of AHBA market research, *TASK-force* is a

menu-driven, all-in-one small-business package that includes accounting as well as desktop accessory modules.

You can start out with a job estimate, then turn it into an invoice with one or two keystrokes. With a few more simple commands, *TASK-force* ages that invoice, keeps track of who owes you money, writes statements, reports payables, balances your checkbook, creates a balance sheet, and generates a profit and loss statement at any point in the program. No inventory checking is provided since the program is designed primarily for service-oriented businesses that don't stock products.

Other features include a spreadsheet, a word processor, a spelling checker, a list manager, graphics (pie charts and bar graphs), communications, and desktop utilities such as a calendar, memo pad, calculator, clock, and DOS disk manager.

The AHBA says its research consistently shows that home-based businesspeople don't adapt successfully to existing business management software. These entrepreneurs find a large gap between personal financial management software—which isn't designed for business support—and the more complex management and accounting programs developed for larger businesses. *TASK-force* intends to fill that gap, and Blue Chip hopes you'll run the program on one of its low-cost PCs.

The RAM-resident package requires 512K and DOS 3.10 or a later

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version. Blue Chip Int'l, 7305 W. Boston St., Chandler, AZ 85226; 602/961-1485.  
Reader service number 745

# Paragon 286V

## Get It All, Keep It Small

Some computer vendors give you lots of empty slots in a big box. Others put everything but the kitchen sink on the motherboard and squeeze it into a small case with only a couple of available I/O slots. Still others focus on high performance with advanced features like a fast processor or high-resolution display adapter. American Mitac lets you have it all with the Paragon 286V—high integration, advanced features, lots of slots, a competitive price, and a small footprint.

You get a 12-MHz 80286 processor switchable to 8 MHz, up to 8MB of memory, VGA graphics, six empty slots on an AT bus, and room for three storage devices—all in a 14-by-16-by-6½-inch form. Mitac packs so much in such a little package by moving many control functions and all the main memory onto the motherboard. The VGA resides there, as does the controller for two types of floppy drives. The Paragon 286V has 1MB of memory, with room for another 7MB on the motherboard via 1MB memory modules. You can run your VGA monitor and load up on memory without touching a slot.

The expansion bus has five 8/16-bit slots and one 8-bit slot. The Paragon 286V supports the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 and gives you both a stan-

dard 9-pin digital connection and a 15-pin PS/2-type analog connection for your monitor.

The base configuration includes one 3½-inch 1.44MB floppy drive and a 5¼-inch 1.2MB unit, two serial ports, one parallel port, a clock/calendar, and a 101-key keyboard. You also get DOS 3.30; GW BASIC; and five memory, disk, and display management utilities—all for \$2195.

You can choose a 14-inch color VGA monitor for \$549 or a 12-inch monochrome VGA monitor for \$210; a 40MB, 28ms hard disk and controller go for \$734. American Mitac Corp., 410 E. Plumeria Dr., San Jose, CA 95134; 800/648-2287, 408/432-1160.

Reader service number 746



Mitac's Paragon 286V boasts high system-board integration, advanced features, lots of slots, a competitive price, and a small footprint.

## BRIEFLY NOTED

### 3000 NL, 1000 TL, 1000 SL

Tandy Corporation/Radio Shack has upgraded several models in its PC line, adding more complete integration, faster processing, and more memory options. Tandy has replaced the 3000 HL, popular among its mainstream business customers, with the 3000 NL, which includes a 10-MHz 80286 processor instead of an 8-MHz one. Its seven expansion slots include four 8/16-bit and three 8-bit slots, as well as a dedi-

cated memory slot that runs at processor speed regardless of how fast the bus is running. The company claims it delivers as much as a 30 percent performance gain.

The 3000 NL ships with 512K of memory, expandable to 640K on the motherboard, and up to 16MB using two add-on cards. It's also equipped with one 3½-inch, 1.44MB floppy drive—instead of the 3000 HL's 5¼-inch drive—with room for another 3½-inch device and two 5¼-inch drives. Also standard are a parallel port, a serial port, and a 101-key keyboard. The base configuration, which includes an 80287 coprocessor slot, retails for \$1699. The monitor, its adapter, and hard drives are extra. Tandy offers a \$250 EGA adaptor that drives a monochrome or color digital monitor, and a \$400 VGA adapter for use with your choice of a monochrome analog or either of two color analog monitors.

Tandy also has upgraded its low-end PCs. The 1000 SL replaces the 1000 SX, and the 1000 TL replaces the 1000 TX. The 1000 SL has an 8086 microprocessor instead of an 8088, while the 1000 TL has an 80286; both are switchable between 8 MHz and 4.77 MHz. The SL ships with a 5¼-inch drive, the TL with a 3½-inch; both have room for two additional drives of either size.

All five 8-bit slots are free, since the motherboard includes a video adapter for monochrome text display, as well as

C>ERASE \*.\*

Are you sure (Y/N)?\_

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Disk Optimizer comes through again with UnFormat that can instantly restore all the data on your disk to exactly where it was before that little slip of the finger on the keyboard.

And to make sure your data is really safe, the TrackSaver feature protects the surface of your disk from excessive wear by preventing the head on your drive from spinning over the same track for too long. And the Refresh program prevents the bad spots that develop on disks due to fading magnetic charges.

## Still the safest buy in performance optimizers.

As always, Disk Optimizer also gives you the safest, most advanced performance optimization available—proven by over a quarter of a million users.

The Optimize program speeds up disk reading and writing times by up to 300 percent by un-doing the file fragmentation that takes place

naturally over time. The DOConfig program lets you arrange the layout of your disk for best overall performance. And the Analyze program gives you a graphical look at the condition of your disk, so you'll always know when it's time to optimize again.

## A total of 17 different programs.

Disk Optimizer includes Findfile for locating files by name or wildcard anywhere on your disk. Sorts for re-arranging files and directories in the way that makes sense to you. Lock and Unlock for password-protected file security. Killfile for erasing sensitive data permanently. And lots more.

In all, there are 17 different programs in the new Disk Optimizer. Each one designed to improve performance, guard your data, and make disk management easier and simpler for everyone.

So get new Disk Optimizer 4.0, and get more than the courage to say yes. Get the peace of mind and total confidence that your disk is running better and safer all the time.



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The 3000 NL, 1000 TL, and 1000 SL bring increased integration, faster processing, and more memory options to Tandy's PC line and replace the 1000 SX and the 1000 TX.

Hercules or CGA graphics with 16 colors at 640 by 200 resolution. Another added feature is three-voice sound with a digital-to-analog-to-digital sound converter enabling you to record, store, and play back true speech and music from any analog source.

Both models feature Tandy's autoboot capability with DOS version 3.30 in 512K of ROM. Tandy's Deskmate environment, which contains the Deskmate desktop utilities, a mouse driver, and an 80,000-word spelling dictionary, is also contained in ROM and comes up when the system boots. The 1000 SL is aimed at the home and education markets; the 1000 TL is intended for small to medium-size businesses.

Without monitors, the 1000 SL retails for \$899

and the 1000 TL for \$1299. Tandy Corporation/Radio Shack, 1800 One Tandy Center, Ft. Worth, TX 76102; 817/390-3011. Reader service number 748

## Who/What/When Office

Chronos Software offers a way to coordinate the people and resources of a networked work group using its *Who/What/When Office* scheduling package. At the heart of *Who/What/When Office* is a daily calendar for each member of your work group. Individuals can enter details of meetings: whom he or she is seeing, what the meeting is about, and when and where it is to take place. There is room for scheduling group meetings, prioritizing to-do lists, delegating tasks, and describing

projects. The information is then cross-referenced into three views.

The People view displays the projects and schedules of the people with whom you work. The Project view displays current projects, the people involved, milestones, and deadlines. The Time view displays the daily calendars of all your fellow network members, whom they are seeing, and the subject matter. The program automatically prompts for available time slots for work group members and shared resources such as conference rooms, and it checks for conflicts.

*Who/What/When Office* coordinates projects, updating team members on any changes. Using *Who/What/When Office's* memo function, a meeting agenda can be sent throughout the network. The program supports external modem communications and recognizes group as well as individual mailboxes.

*Who/What/When Office* produces automated management reports on a per-person or companywide basis. Time reports include daily schedules, company calendars, and monthly overviews. Project reports, including Gantt charts and project calendars, show what responsibilities have been delegated, what tasks have been completed, and what remains to be done. People reports show all delegated tasks and work that are shared with another person or project.

*Who/What/When Office* runs on any server com-

patible with DOS 3.10 or as a value-added process under Novell's *Netware 2.1* or a later version. *Who/What/When Office* retails at \$695 for a 30-user, single-server license and \$75 for each user manual. Chronos Software, 1500 16th St. #100, San Francisco, CA 94103; 415/626-4244.

Reader service number 749

## Extend-A-Name

World Software breaks the DOS 8-character barrier with a memory-resident product that lets you use up to 60 characters to name a file. *Extend-A-Name* is compatible with all popular text-mode PC packages that prompt you to type in a file name. At that prompt, *Extend-A-Name* pops up with its own directory of extended names; you then select your file using a highlight bar and <Enter>. Up to 12 file or subdirectory names can fit on the screen at one time.

You can name a new file with a more complete description, such as "Balance Sheet—Fiscal Year 1988." You also have the option of either creating a second, 8-character name that DOS will recognize, or letting *Extend-A-Name* create one for you consisting of your initials and a number sequence. While *Extend-A-Name* is on screen, you also have access to common DOS commands for file management.

*Extend-A-Name* requires 39K of memory for up to 100 file names per subdirectory, and up to 65K for 400 file names. Compatible with EMS

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# NEC

**C&C** Computers and Communications

Software compliments of Microsoft Corporation.

NEC Information Systems, Inc., Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.



Do away with the 8-character file name limit—memory-resident **Extend-A-Name** lets you create file names of up to 60 characters.

3.2, it needs only a 3K kernel in conventional memory. The default hot-key configuration, <Alt>-X, can be changed to any <Alt>-key combination.

**Extend-A-Name** requires DOS 2.00 or a later version and retails for \$79.95. World Software Corp., 124 Prospect St., Ridgewood, NJ; 201/444-3228.

Reader service number 750

## Battery Watch

Portable computing specialist **Traveling Software** has a new utility that lets you know exactly how many hours of use are left in your laptop's batteries before they need to be recharged. **Battery Watch** monitors all of the battery-draining functions in your laptop every 2 seconds and gives you the remaining battery time in hours and minutes. A fuel-gauge-like graphic automatically pops up in a

window when you're running out of juice.

The package, which works with both nicad and lead-acid batteries, requires from 15K to 18K of memory. **Battery Watch** also boasts a "deep-discharge" feature, which counteracts the tendency of nicad batteries to lose operating time between recharges due to the "charge memory effect." The deep-discharge utility completely drains the battery before recharge. **Battery Watch**, which retails for \$39.95, is compatible with laptop models from Zenith, Toshiba, Epson, Quadram, IBM, NEC, and Tandy. **Traveling Software, Inc.**, 19310 N. Creek Pkwy., Bothell, WA 98011; 206/483-8088.

Reader service number 751

## Microsoft Word Companion Disk

**Help!** Those four letters say it all. When your plea goes out, the last thing you want to do is plow

through your user manual for obscure references to cryptic error messages. Nor do you want to languish on hold over a long-distance technical support line—assuming your warranty hasn't run out—especially if your business also is on hold until you get the computer up and running again.

What you want is intelligent help at your fingertips, which is precisely what the **Advanced Quick Help** feature provides for **Microsoft Word 4.0**. Taking advantage of **Word's** context-sensitive Help command, **Advanced Quick Help** replaces the program's current help messages with insights from Peter Rinearson, a Pulitzer prize-winning author of three books on **Microsoft Word**. Instructions are ad hoc and far more extensive than those that ship with **Word**.

But **Advanced Quick Help** is only one of 23 files on Rinearson's **Microsoft Word Companion Disk**.

Other files contain more than 300 macros and a variety of style sheets, sample print-merge letters, and other utilities.

The macros are organized into several libraries. One contains 80 general-purpose macros that copy text to a file, update summary sheets, print envelopes, zoom windows, and so on. Another library contains 14 macro modules that can be attached to specific **Word** modes. Other libraries contain glossaries that help you write your own macros or that teach **Word** to recognize **WordStar** commands.

The **Microsoft Word Companion Disk**, which retails for \$19.95, is available from Rinearson Support Associates in 5¼-inch or 3½-inch format. 219 First Ave. N #410, Seattle, WA 98109; 800/345-9111.

Reader service number 752



One of 23 files on the **Microsoft Word Companion Disk**, **Advanced Quick Help** replaces the program's current help file with extended assistance. Also available are more than 300 macros and a variety of style sheets, sample print-merge letters, and utilities.

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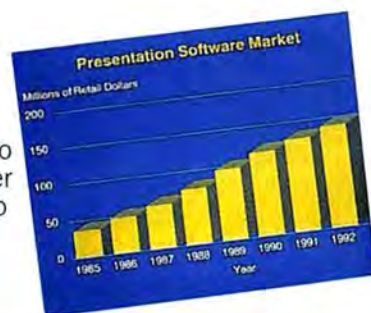
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## OPTune

Gazelle Systems has introduced an all-in-one hard disk survival, repair, and tune-up utility to ensure that your hard drive operates at maximum efficiency. Like other disk optimizers, the \$99 *OPTune* gathers scattered file fragments into sequential clusters, but only this program offers additional seek-speed enhancements.

For example, *OPTune* sorts file and directory entries and puts them in one place at the front of the disk; this speeds up directory searches, enables programs to load faster, and reduces head wear. The program eliminates erased file entries, giving you slimmer directories and potentially more disk space.

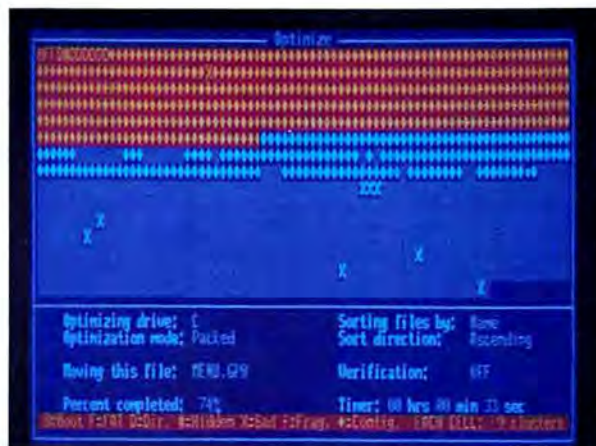
The program also lets you set your hard disk's interleave (which *OPTune* determines) for optimum synchronization with other elements of your controller, thereby improving speed as much as 300 percent. *OPTune* uses 256-

bit-wide test patterns to identify bad disk sectors and moves data from bad clusters to reliable areas of the disk. For extra insurance, every time it's run, the program backs up your file allocation table and root directory and saves them in a hidden file in case the originals are damaged.

*OPTune*, which features pulldown menus and automatic help screens that appear as each feature is selected, requires DOS 2.00 or a later version and 256K of memory. Gazelle Systems, Inc., 42 N. University Ave. #10, Provo, UT 84601; 800/233-0383, 801/377-1288. **Reader service number 753**

**EFAX-88**

The overnight letter was a first step toward instantaneous information exchange, and it quickly became a hit. But today, personal facsimile machines can often do the job faster.



**OPTune optimizes your hard disk by clustering files, speeding directory searches, and moving data from bad sectors to reliable ones.**



The Avatex EFAX-88 is a reasonably priced, 20-second-per-page personal copier/fax with an adjustable scanning mode for transmitting both graphics and photographs.

For those seeking the basics, the Avatex EFAx-88 personal copier/fax unit may fill the bill. Its \$1149 price is about average for its range of capabilities, which includes a reasonably fast 20-second-per-page transmission speed, an adjustable scanning mode for transmitting graphics and photographs, and a manual switch that allows you to transmit documents in the midst of a phone conversation.

The EFAX-88's fallback feature guarantees error-free transmissions by automatically adjusting its rate from 9600 bps to 7200, 4800, 2400, and below if line problems crop up. Weighing less than 10 pounds, the EFAX-88 can perform as a personal copier. A 110/220 voltage selector and an optional acoustic coupler also make the EFAX-88 a practical unit on the road. Elec & Eltak (U.S.A.) Corp., 1230 Oakmead Pkwy.

#310, Sunnyvale, CA  
94086; 408/732-1181.  
**Reader service number 754**

### 386 Mother-Board/AT

Hauppauge is offering a motherboard upgrade that will turn an IBM AT or compatible into an 80386-based computer. Like Hauppauge's upgrade for PC and XT compatibles, the 386 MotherBoard/AT is a complete motherboard replacement, with 1MB of memory and the Award 386 BIOS. It's equipped with four 8/16-bit slots and four 8-bit slots and has a dedicated 32-bit memory connector that will accept up to 12MB of additional memory. There's also a slot for an 80387 coprocessor. The 386 MotherBoard/AT retails for \$1595. Hauppauge Computer Works, Inc., 175 Commerce Dr., Hauppauge, NY 11788; 516/434-1600.

Reader service number 755

# Here's What People Are Saying about **EIGHT-IN-ONE™ . . .**

"... a really powerful product... as good as \$300 to \$500... products."

— **Soft • letter**

"It's hard to suppress this reviewer's combination of admiration for [Eight-In-One] and bewilderment over how the company can offer so much for \$59.95."

— **PC Clones**

"... works as promised."

— **PC Week**

"... the only computer program they (users) will ever need..."

— **NY Times**

"\*\*\*\*\*... the best integrated package I've ever seen..."

— **Home Office Computing**

"PFS: First Choice and Microsoft Works, move over! BetterWorking Eight-In-One may turn out to be the low-cost integrated sleeper of the year."

— **PC Magazine**

"... very easy to learn and use... quite intuitive."

— **PC Week**

"... this inviting and productive package would be a terrific bargain at twice the price..."

— **Washington Post**



BetterWorking Eight-In-One comes complete with every productivity tool you could ever need. It's a desktop organizer, outline, word processor, spelling corrector, spreadsheet, graphics program, data base and communications package all rolled into one. Plus, Eight-In-One is integrated, allowing you to pass work smoothly among all eight applications. The reviews are in... isn't it time you looked at BetterWorking's Eight-In-One?

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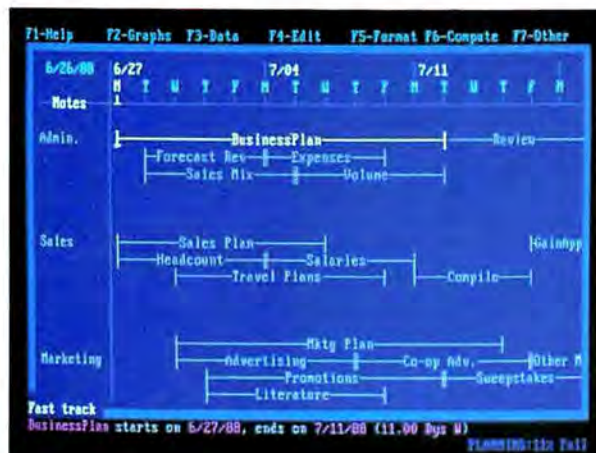
# UPDATE

## Harvard Project Manager 3.0

Software Publishing Corporation (SPC) has added a fast-tracking capability and outlining to enable novice project planners to make quick use of version 3.0 of *Harvard Project Manager*. The fast-track mode lets new users begin planning a project within 15 minutes. You enter task names and durations along a time scale, and *Harvard Project Manager 3.0* builds PERT and Gantt charts as well as a work-breakdown outline and a task list. The outline separates a project into its component tasks, each of which can be explored in greater detail by going to a deeper level of the outline.

SPC has also added calendars that note vacations and equipment commitments to be considered when scheduling resources; version 3.0 offers additional reporting capabilities, including the ability to run reports from a batch file and to create report templates, scaled reports, and E-size plots.

*Harvard Project Manager 3.0* offers enhanced PERT views, including a PERT logic view and the ability to zoom a portion of the chart and track penalty costs. It can take advantage of extended memory and 43-line displays and has additional import/export capabilities. *Harvard Project Manager 3.0*, which requires 512K, DOS 2.00 or a later version, and a hard disk, sells for \$695. Up-



Harvard Project Manager's fast-track module helps novice users begin planning a project within 15 minutes, quickly building PERT and Gantt charts and breaking projects down into specific tasks.

grades are available for \$135. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94039-7210; 415/962-8910. Reader service number 756

## DeskJet Landscape Upgrade Cartridge

Hewlett-Packard has added a landscape option to its DeskJet ink jet printer. Especially useful for printing spreadsheets or tabular reports sideways, the landscape option uses Courier 16.67 pitch. You plug the cartridge into one of the printer's two expansion slots and select Courier 16.67; an LED indicates which font has been selected. The cartridge also supports bold-face, super/subscripts, underlining, and double- and half-width letters.

Additional fonts are available in a second font cartridge, called the Landscape Fonts Cartridge, which includes Courier 10, Letter Gothic 12 (portrait) and 16.67 (landscape), and Letter Gothic Italic 12. Each cartridge costs \$95.

The \$995 DeskJet already supports Courier, Courier Bold, and Courier Compressed fonts. It prints full-page graphics at 300 dpi and text at either 120 cps in letter quality or 240 cps in draft mode. Hewlett-Packard Co., 3000 Hanover St., Palo Alto, CA 94304. Reader service number 757

## Foxbase + 2.10

*FoxBase + 2.10*, the dBASE-compatible data base manager, now has a series of customizable templates that aid in data entry and screen editing. The FoxView template lets you paint screens with color and draw lines and boxes on them. FoxGen produces data base applications that can run as is, without programming, or that you can modify to your liking. Both modules generate code that FoxCode compiles into compact, executable applications.

You can call any of the three template modules from the *Foxbase +* dot prompt or DOS. A new virtual-memory-management system writes *Foxbase +* to disk, creates a view of the operating environment, and automatically returns you to prior programming status when the template concludes operation. *Foxbase + 2.10* also comes equipped with a variety of default templates, found in pop-up and pulldown menus, that let you perform other common application- or report-building operations without programming.

Also included is FoxDoc, a technical documentation system that lets you analyze an application and develop detailed summaries of variable cross-reference, tree-structure, data-dictionary, index, format, label, and report files, as well as other types of reports. *Foxbase + 2.10*, which requires DOS 2.00 or a later version, 360K of memory, and a hard disk, retails



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EMS 4.0 expanded memory support and enhanced memory management are the new features in Actor 1.2, the object-oriented programming language for the Microsoft Windows environment.

for the same \$395 as prior versions; upgrades are \$75. Fox Software, Inc., 118 W. South Boundary, Perrysburg, OH 43551; 419/874-0162.  
Reader service number 758

## Actor 1.2

The Whitewater Group has added expanded memory support to version 1.2 of Actor, its object-oriented programming language for the Microsoft Windows environment.

Actor 1.2 lets you use up to 500K of expanded memory under EMS 4.0 for each programming session, and it fully supports the calls, messages, and menu styles of Windows/286. Actor 1.2 handles the memory management chores and produces stand-alone Windows applications that follow all of the environment's conventions for dynamic data exchange and linkage with Microsoft C code. Whitewater provides add-ons

for its interactive language, including the \$99 *Language Extensions I* disk with macro capability, conditional compilation, object storage, ordered dictionaries, and other facilities.

Actor 1.2, which retails for \$495, is shipped with a run-time version of Windows/286. Registered users can upgrade for \$80 or get the upgrade free if they purchase unlimited support for \$250. The Whitewater Group, Technology Innovation Center, 906 University Place, Evanston, IL 60201; 312/491-2370.

Reader service number 759

## Turnkey 3.1, Turnkey 3.1 Menu Builder's Version

Optimal Solutions has introduced both an update and a developer's version of its Turnkey menu-building utility. Equipped with the I-2-3-like inter-

face that is Turnkey 3.1's major enhancement, Turnkey 3.1 Menu Builder's Version also lets you create executable run-time versions of menus that your fellow workgroup members can use but not change. Written in the dBASE-compatible Clipper compiler, Menu Builder lets you produce faster-running menus that use less memory.

Since neither version is memory resident, your applications can use all the system memory. You can create as many as 1000 nested menus containing up to 15 choices each, and add password protection to each menu item if you wish. Menu Builder features on-line help with context-sensitive messages. Because it's so easy to use, Turnkey and Menu Builder ship without manuals; all documentation is on line.

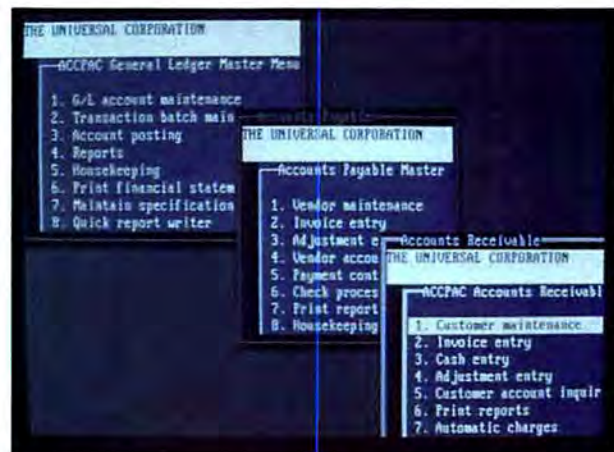
Turnkey 3.1 retails for \$49. Upgrades from Turnkey 3.0 are available for \$10; menus written with earlier versions are

not usable under version 3.1. Turnkey 3.1 Menu Builder's Version sells for \$295 with a run-time license for 100 users. Both 3.1 packages require DOS 2.00 or a later version, 256K of memory, and a hard disk. Optimal Solutions, 6 Salem Rd., Atkinson, NH 03811; 603/362-4758.

Reader service number 760

## Accpac Plus Windowing System Manager, LanPak

Computer Associates has beefed up its Accpac Plus accounting system with Windowing System Manager and LanPak, which are more powerful and versatile than the company's previous windowing and LAN modules. Windowing System Manager provides an advanced



The Accpac Plus accounting system has gained a new Windowing System Manager with an advanced macro facility, enhanced information searching, and multitasking as well as an enhanced LAN interface.

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In less than two years, LAP-LINK has connected over 200,000 computers to become the standard in accessibility software for IBM's and compatibles, laptops, and Apple Macintosh computers.

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"...LAP-LINK...sets a record for the fastest serial transfer on a P.C." **Howard Marks, P.C. MAGAZINE**— July 21, 1987. And LAP-LINK is not only the fastest, it's also the most accurate. LAP-LINK's error checking system guarantees that all data is transferred with 100% accuracy.

## Easy to set up.

"LAP-LINK is the absolute easiest, simplest and most convenient." **Harry Newton, TELECONNECT**— April, 1987. LAP-LINK comes with everything you need to set it up—including 3½" and 5¼" disks, documentation, and Traveling Software's universal cable with both 9-pin and 25-pin connectors.

## Easy to use.

"...I don't know if the manual is any good or not: I've never had any reason to open it. LAP-LINK is so thoroughly intuitive, fast and simple to use, the manual is blooming near superfluous." **Jerry Pournelle, BYTE MAGAZINE**— July, 1987. All you need to do is connect our high quality universal serial cable (no need to unplug your printer's parallel cable), type "LL" on both computers and LAP-LINK will automatically connect itself, ready to transfer single files, entire sub-directories, or hard disks.

## Award winning.

"If you like a package that's fast, efficient, and easy to use, LAP-LINK is clearly the...program of choice." **M. David Stone, P.C. MAGAZINE**—January 12, 1988. P.C. Maga-

zine was so impressed with LAP-LINK's performance that they gave it their Editor's Choice and "Best of '87" awards.

## LAP-LINK

LAP-LINK transfers files between IBM and compatibles, laptops and desktops, including the new IBM PS/2. It installs in seconds, features a split-screen design for showing files in both computers, and transfers data at incredible speeds of over 115,200 baud.

## LAP-LINK Plus

With all the simplicity and file transferring capabilities of LAP-LINK, LAP-LINK Plus also offers the option of direct disk drive and printer sharing between any two connected computers. It's like having a two computer network. You can easily switch between local and remote printers using a pop-up window without leaving your application.

## LAP-LINK Mac

Everything you need to share files between any model of the Apple Macintosh (512, Plus, SE and Mac II) and an IBM compatible laptop or desktop computer (including the IBM PC, XT, AT, and PS/2). It's easy to use and it's fast, over 57,000 baud. LAP-LINK Mac is also fully compatible with both Macintosh Finder and MultiFinder, as well as AppleTalk, TOPS, and 3Com.

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## Traveling Software



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macro facility, enhanced information searching, and the ability to switch between different *Accpac* applications in a windowed environment. The macro facility, which includes a macro recorder, lets you automate routine tasks like month-end accounting and supports error-checking parameters (such as imposing credit limits) that reduce the possibility of data entry mistakes.

*Windowing System Manager* doesn't permit data exchange between windows, but an advanced data-search function, SmartFinder, uses artificial intelligence techniques to reduce the need for precise queries. Type some letters in the SmartFinder window and it searches through all *Accpac* master files—including customer orders, inventory, and general ledger—to find partial matches and similar-sounding words.

*LanPak* provides an interface between network software and *Accpac Plus* applications. It's compatible with Novell *Advanced Netware*, 3Com 3+, IBM's *PC LAN Program*, and all DOS 3.10-compatible networks. Different work-group members can share the same data while tasks such as accounts receivable, order entry, and accounts payable are divided among them.

*Windowing System Manager*, which retails for

\$195, replaces the current *EasyPlus Windowing System*; *LanPak*, which offers a four-user license for \$395, replaces the *Network Manager*. Upgrades are free to anyone who purchased the earlier products after October 15, 1987. For anyone who purchased the program before that date, there is a \$50 charge for the *Windowing System Manager* and a \$100 charge for the *LanPak*. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95311; 408/432-1727.

Reader service number 761

## Media Master 5.0

Intersecting Concepts has released an upgrade of its disk-to-disk formatting utility for IBM PS/2 computers. *Media Master 5.0* enables PCs, PS/2s, and compatibles to read, write, and format more than 200 types of CP/M, DOS, and TurboDOS disks so that you can share information between incompatible computer systems. You also can customize the software using setup files. Other improvements include on-line context-sensitive help, full-color support, first-letter menu selection, and an easier installation procedure. The program retails for \$49.95, but registered users can upgrade for \$23.50. Intersecting Concepts, 80 Long Court #1A, Thousand Oaks, CA; 800/422-8018.

Reader service number 762



A Windows-compatible draw package, *Designer 1.2* offers enhanced desktop publishing tools—it can output Encapsulated PostScript files and work with color printers such as the QMS ColorScript 100.

## Designer 1.2

Micrografx has enhanced the desktop publishing capabilities of its Windows-compatible graphics product, *Designer*. Version 1.2 includes an optional Pantone PMS color palette, the ability to output Encapsulated PostScript (EPS) files, and support for color printers such as the QMS ColorScript 100. *Designer 1.2* offers full-color graphic art, technical illustration and drafting capabilities, and an enhanced color interface; you can access over 16 million colors and load and save custom palettes. *Designer* is equipped with CYMK, RGB, and HLS color models. The PMS palette is available for \$99.95. In addition, version 1.2 adds on-screen

WYSIWYG text editing so that you don't need to enter text in a separate window. *Designer 1.2* requires an 80286-based computer or better with 640K of memory, a hard disk, an EGA graphics card and monitor, and a mouse. It retails for \$695. Upgrades are \$99 or free to anyone who purchased the program after May 1, 1988. Micrografx, Inc., 1820 N. Greenville Ave., Richardson, TX 75081; 214/234-1769. ●

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

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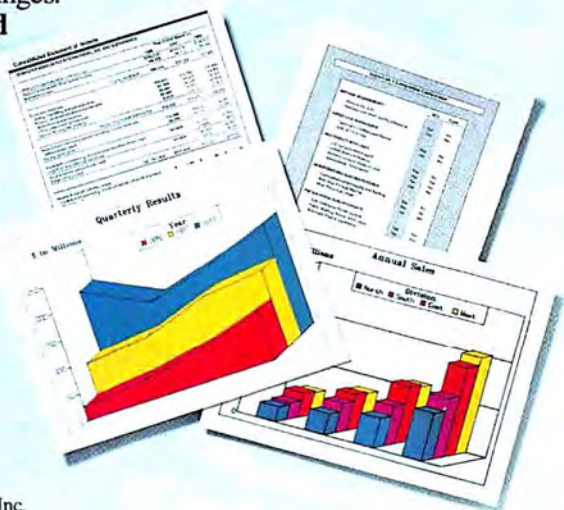
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**Remember**

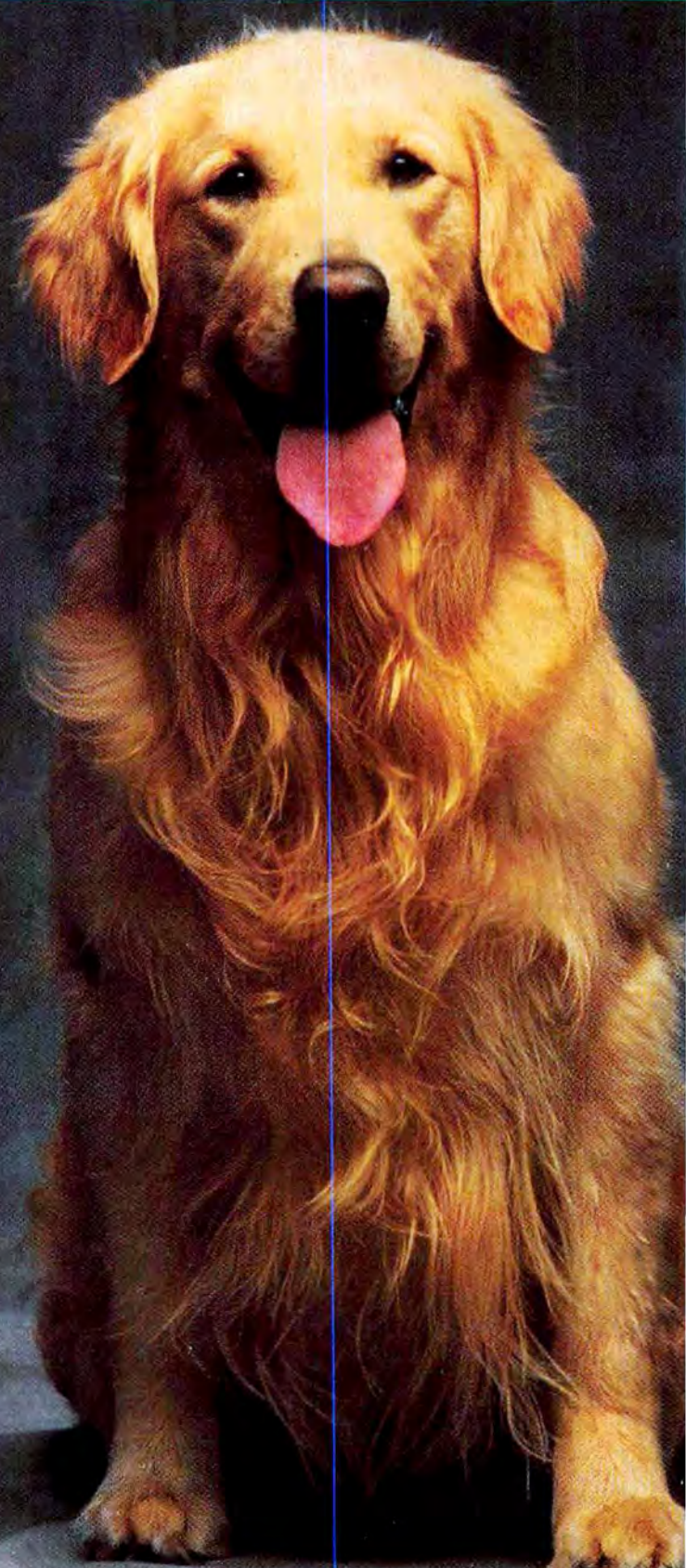
Smart's "REMEMBER" command lets non-programmers create custom programs.

**Send**

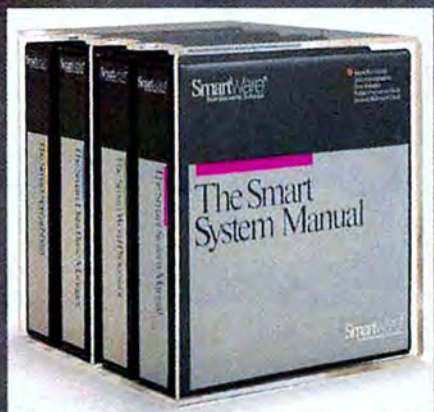
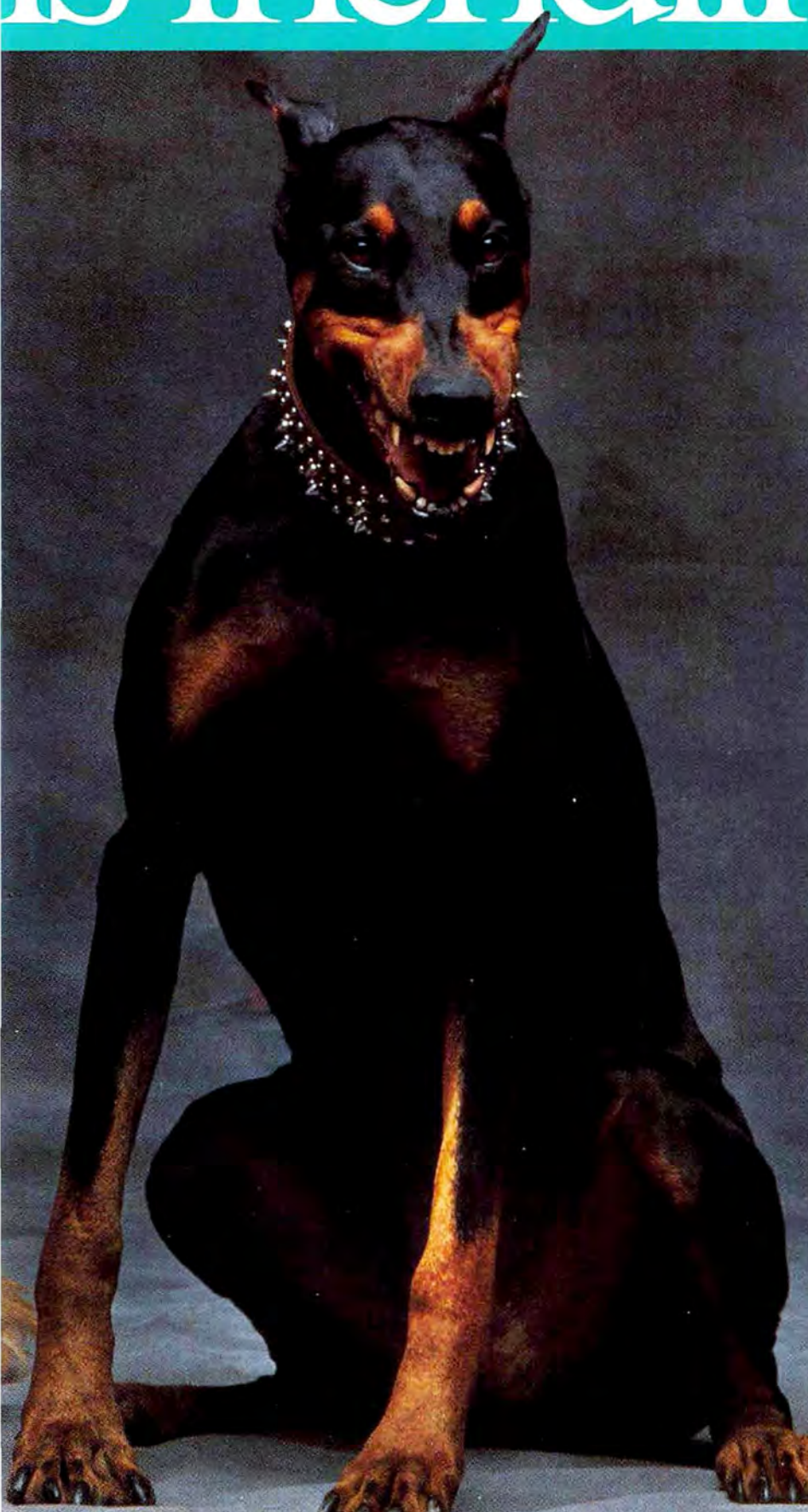
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# LAN E-Mail: Power to the Work Group

**LAN E-mail programs have  
finally come of age.**

**PC World looks at four powerful  
(though sometimes pricey)  
programs for networks of every  
size.**

**F**or many businesses, the convenience of electronic mail is a prime incentive for buying a LAN. The ability to shuttle messages and files throughout a work group eliminates telephone tag, streamlines group projects, and boosts interoffice communication. Yet most E-mail programs bundled with network operating systems are difficult to use, provide only primitive messaging features, and are limited to transporting text.

Luckily, a number of third-party vendors are breathing new life into this genre. *PC World's* roundup explores four new, intuitive, sophisticated, LAN-based E-mail programs that are compatible with any NETBIOS or DOS LAN: *cc:Mail* from cc:Mail, Inc.; *The Network Courier* from Consumers Software; *InBox/PC* from Symantec Corporation; and *Da Vinci eMail* from Da Vinci Systems. Each offers extensive messaging features, basic file management, a built-in text editor, and the ability to swap everything from formatted *Microsoft Word* documents to 1-2-3 worksheets to *AutoCAD* graphics over a LAN with ease.

**Gordon  
Haberfelde**

## Easy E-Mail

Features are a big factor in the E-mail purchase decision—but not the only one. Because an E-mail system is used by PC pro and neophyte alike, ease of use is just as important. The basic process—addressing, composing, attaching files to, and sending a message—must seem as natural as sending an interoffice memo, or the E-mail system simply won't be used.

Accordingly, all of the reviewed E-mail programs adopt a similar (and simple) metaphor. You post mail to an out-box, and you're notified by a beep or pop-up window when mail arrives in a separate in-box. You can read the mail (typically one message at a time), respond to it, delete or print it, and save messages to disk.

Just as important, all the programs sport menu-driven interfaces. *cc:Mail* and *InBox/PC* use pop-up menus that can be run with single keystrokes; *The Network Courier* relies on a 1-2-3-like command line; and *Da*



*Vinci eMail* works faithfully in the *Microsoft Windows* mold, complete with pulldown menus and dialog boxes. Most of the programs supply a fairly large set of keyboard shortcuts for bypassing menus.

Don't worry about installing any of the reviewed packages—that's a job for the network administrator. The E-mail program typically resides on the LAN's server—all you do at your PC is store messages. Network administrators, however, will appreciate how relatively easy these programs are to install.

#### Feature Rich

Of course, you get more than a cozily familiar electronic mail room for your money. You can run any of these programs except *cc:Mail* like a memory-resident utility: Press a definable hot key, jump into the E-mail program, send and receive messages, and then jump back into the underlying application. You can even cut data out of a file and paste it into an outgoing letter composed with the E-mail package's built-in (though usually crude) text editor. But there are limits.

For example, only *cc:Mail* can pull both ASCII data and graphics into a message; the rest of the programs are limited to ASCII data. Then there's *The Network Courier*, which works as a RAM-resident program but can't cut and paste data from the active, underlying application, only from a static file. *InBox/PC*, on the other hand, takes data only from an active application.

The issue may be moot anyway. Most users will probably jot a short note with the package's text editor, attach a word processed document plus any supporting graphics files, and send the result along. Attaching files is simple with all of these packages. Once you've created a message, you just supply the path and name of *any* file—worksheet, *PageMaker* document, 1-2-3 .PIC file,

## FEATURES EVALUATION

## LAN E-Mail Packages

Third-party mail packages aren't necessarily cheap, but they provide far more functions than E-mail programs bundled with network operating systems.

	ccMail 1.2	The Network Courier 1.0	InBox/PC 1.2A	Do Vind eMail 1.2
<b>Messaging</b>				
Memory resident	○	●	●	●
Attaches graphics and formatted files to message	●	●	●	●
Number of attachments	20	10	1	△
Graphics within message	●	○	○	○ <sup>1</sup>
Forwards mail	●	●	●	●
Return receipt	●	●	●	●
Carbon copies	●	●	○	●
Blind carbon copies	○	○	○	○
Bulletin board	●	○	●	○
Private mail lists	●	○	●	●
Public mail lists	●	●	●	●
Ready-made electronic forms	○	○	●	○
Priority classifications	○	●	○ <sup>2</sup>	●
Automatic file encryption	●	●	●	●
Password by mailbox	●	●	●	●
Password by message	○	○	○	●
<b>Text editing</b>				
Text editor	●	●	●	●
Built-in graphics utility	●	○	○	○
Changes text attributes	●	○	○	○
Screen snapshot utility	●	○	○	○ <sup>1</sup>
<b>Cuts and pastes</b>				
ASCII	●	●	●	●
graphics	●	○	○	○ <sup>3</sup>
from current application	○ <sup>4</sup>	○	●	●
from static files into application	●	●	○	●

	ccMail 1.2	The Network Courier 1.0	InBox/PC 1.2A	Do Vind eMail 1.2
<b>Message management</b>				
Stores mail in folders	●	○	○	○
Global processing of files	○	●	●	●
Saves copies of outgoing mail	●	●	●	●
<b>Sorts mail by</b>				
sender	●	●	○	●
date	●	●	○	●
date range	●	○	○	●
priority	○	●	○	●
subject	●	●	○	●
keyword	○	○	○	○
attachment	●	○	○	●
<b>Connectivity</b>				
Links with external networks	●	●	○	○
Links with on-line mail systems	●	●	○	○
Links with PROFS mainframe	●	●	○	○
Links with remote PCs	●	●	○	○

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

<sup>1</sup> Via Windows' print-screen function.

<sup>2</sup> Only via "urgent" phone message form.

<sup>3</sup> Print-screen images only; stored in Windows' Clipboard, which must be attached to message.

<sup>4</sup> Similar result possible with program's built-in screen snapshot utility.

Harvard Graphics pie chart, whatever—and issue a few commands to strap it to your message. You can typically attach any combination of files to a message, but most of the reviewed packages limit the size of files or the number of attachments. Make sure the package you choose meets your messaging requirements.

Getting your messages across the LAN is also pretty easy. You can create mailing lists with all the packages, so a single missive is

delivered to many users simultaneously. *The Network Courier* restricts you to public lists created by the network administrator, but the rest let you design private lists. All the programs provide a "return receipt requested" feature that notifies you when your letter has been read, let you reply directly to a message and save a copy, and automatically encrypt files. All but *InBox/PC* issue carbon copies.

Message management has also taken a step forward. All of the reviewed programs display the date and sender of each message, and some let you enter subject descriptions and priority ratings. All but *InBox/PC* let you search and sort mail on such fields. Better still, most let you tag a number of files and then delete, print, or save them en masse. The winner in this category? *cc:Mail*, which does most of the above and lets you organize messages into distinct "folders"—a clever feature also used by *Lotus Express*.

Finally, if your messages need to reach other LANs, mainframes, remote PCs, or even MCI Mail, you'll want to focus on *cc:Mail* and *The Network Courier*, which offer numerous connectivity options. Just be prepared to pay the price. For example, a *cc:Mail* module that shuttles E-mail to gatewayed LANs costs \$1295 per network. *The Network Courier's* PROFS mainframe gateway costs a whopping \$5000. But don't count on making the PC-to-Macintosh connection just yet. PCs on an AppleShare network running *cc:Mail* can swap messages with Macs; PC and Mac versions of *InBox* will be able to communicate in the near future.

In making your buying decision, pay close attention to features and pricing options. Connectivity may not be an issue now, but it could be later. And an E-mail program might be priced right for a small network but not for a large one.

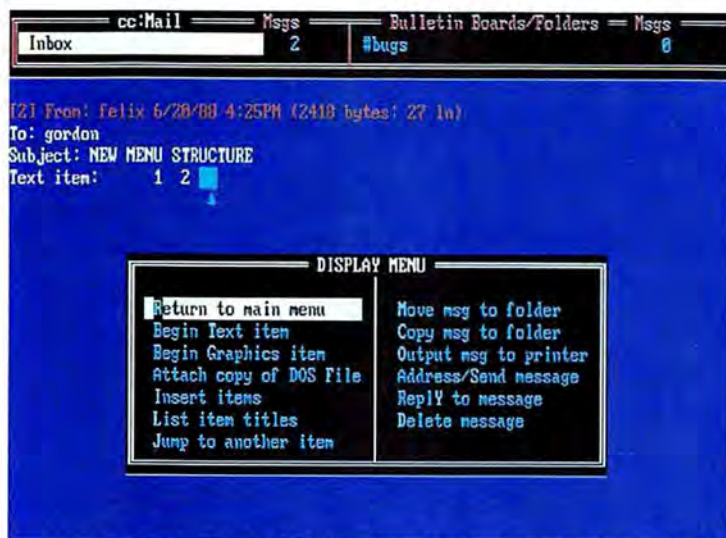
## EXECUTIVE SUMMARY

### cc:Mail

#### LAN E-mail package

The pick of the litter. *cc:Mail* includes a full set of messaging features, offers message folders, and is the only package that can incorporate both text and graphics in messages.

	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging			●	
Message management				●
Text editing				●
Connectivity			●	
Overall value			●	



↑ ↓ ← → to move highlight, F10 or ENTER to select option, F1 for help

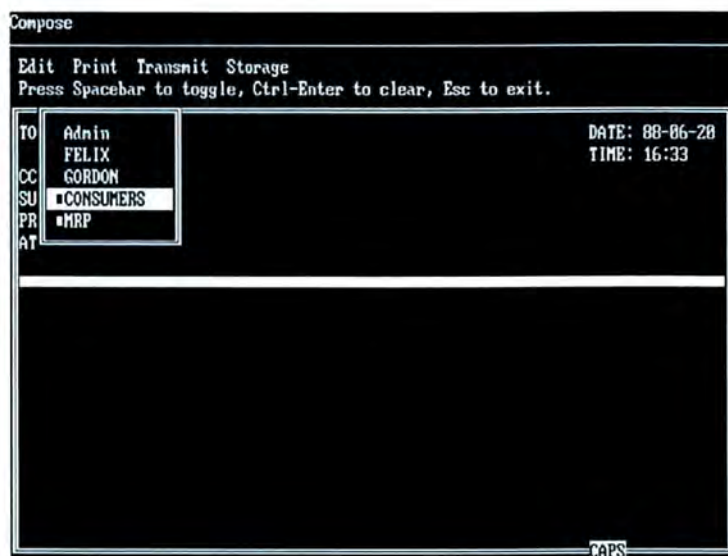
### cc:Mail

If money is no object, *cc:Mail* is the E-mail program of choice. The reviewed version couldn't run as a RAM-resident application, but the recently released version 3.0 does. More important, the program is clearly documented, includes in-context help, is easy to use, and offers innovative features and a large number of connectivity options. (An Import/Export module even lets you create a custom gateway to any system.) Due to *cc:Mail's* high cost, however (\$695 for 25 users and \$1290 for unlimited nodes), those with populous LANs may find *The Network Courier* a better deal. In overall value, the two packages tie for first place.

*cc:Mail's* straightforward opening screen contains a centrally placed main menu and two status windows at the top that list received messages and the number of messages stored in folders. You select options from the menu to retrieve, read, send, or store messages; you pick valid addresses, options for attaching files, and so on from pop-up menus. It's an uncluttered, hand-holding system that new users will pick up easily.

*cc:Mail's* built-in text editor is clearly the best of any reviewed here, providing search and replace, margin control, and extensive block move/delete functions. Unlike its competitors, *cc:Mail* can also incorporate graph-

*cc:Mail's* easy-to-use pop-up window interface hides a powerful E-mail program.



Strictly business, The Network Courier adopts a 1-2-3-style menu-bar interface.

ies in messages. Instead of using a cut-and-paste approach, however, you take a snapshot of a displayed image that converts it into a bit map. Once in the *cc:Mail* fold, you can edit the image, label it with color text, and add lines, boxes, circles, and shadings using *cc:Mail*'s built-in graphics utility. Similarly, text can be captured and manipulated with *cc:Mail*'s text editor.

*cc:Mail* also offers superior message management. You can sort messages by date, subject, title, or any combination thereof, and later store them in private, named folders or on a "bulletin board" where LAN-wide messages can be posted. You can have a maximum of 200 folders, each holding as many as 500 messages. On the downside, you can't assign priorities to messages, nor can you tag them for global deletion, copying, and so on.

Version 3.0 of *cc:Mail*, released at press time, not only adds a RAM-resident module for sending and receiving mail but expands or refines a number of features. According to the vendor, version 3.0 allows more and larger mailing lists, more bulletin boards, global tagging of messages, blind carbon copies, extra formatting features in the text editor, and gateways to Telex, EasyLink, and Tele-mail on-line systems.

## The Network Courier

Easy to learn and use, *The Network Courier* offers a good mix of message management, security, and connectivity features. Although the program doesn't top *cc:Mail*, the company's pricing scheme makes *The Network Courier* a better value for LANs with more than 25 users and for those who need connectivity options.

The program's numerous RAM-resident options should satisfy just about everyone. You can choose from the full-fledged standalone program, a 60K RAM-resident messaging version, and two small utilities (one resident and one not) that signal you when new mail arrives. An added plus: You can remove the programs from memory without rebooting the computer.

*The Network Courier*'s 1-2-3-style command line will make most users feel right at home; other options, message lists, and so on are typically relegated to pop-up windows. *The Network Courier* largely matches *cc:Mail*'s messaging features and adds some notable extras. For example, you can forward messages, have a message returned if it's not received, assign priorities (so that an urgent message is transmitted ahead of others), and dictate when messages are to be transmitted. Network administrators also have a fair

## EXECUTIVE SUMMARY

### The Network Courier

#### LAN E-mail package

With its solid lineup of messaging and security features, *The Network Courier* runs a close second to *cc:Mail*. Its reasonable price makes it a better deal for large networks with links to the outside world.

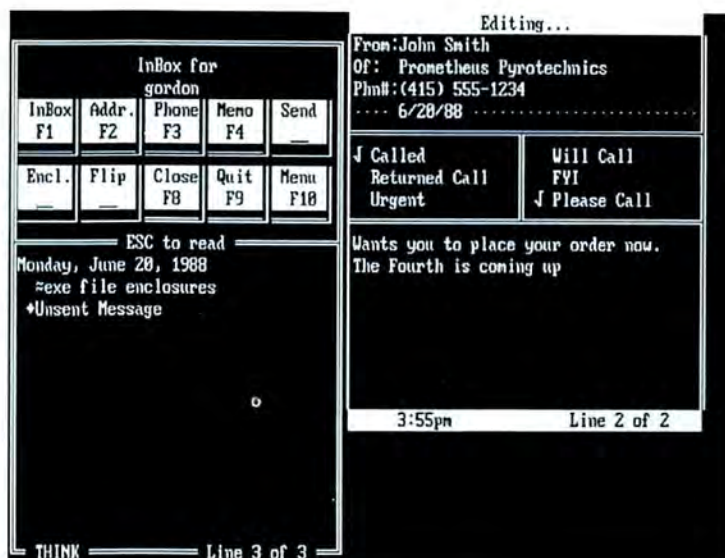
	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging			●	
Message management				●
Text editing	●			
Connectivity				●
Overall value			●	

amount of control and can restrict read/write privileges, use of priorities, and gateway access. However, *The Network Courier* lacks a network bulletin board and doesn't permit user-defined mailing lists.

*The Network Courier* can attach any kind of file to a message, but messages themselves can incorporate only ASCII data cut from static files. Adding ASCII data is straightforward: Select a few menu options to display the file, highlight the data you want, and it's pulled into the message. If you want to import data from a 1-2-3 worksheet, though, you must exit *The Network Courier*, load 1-2-3, load the worksheet, create a .PRN file, exit 1-2-3, reload or reinvoke *Courier*, display the .PRN file, and then cut and paste data from that. It's a laborious process few users will subject themselves to.

Message management options are on a par with *cc:Mail*'s. You can sort messages by sender, subject, date, and priority. You can also tag messages and manipulate them at the same time.

*The Network Courier* shines when it comes to connectivity, and the options are often cheaper than *cc:Mail*'s. If you buy the \$995, 150-user internetwork version, for example, you receive gateway software for accessing other LANs running *The Network Courier*. (*cc:Mail*, Inc., charges \$1295 for the equivalent function.) Remote PCs can access the LAN with *Modem Mail Remote User* for



only \$95 per PC, but you'll need to install the \$495 *Modem Mail Post Office* on the server. The company even offers a 150-user internetwork *Windows* version of the program, and a mixed *Windows*-based and character-based *Network Courier* setup. In short, if you've got a large network—or numerous connections with the outside computing world—*The Network Courier* is a superior choice.

## InBox/PC

Although Symantec stresses *InBox/PC*'s simplicity, it's not much easier to use than its more advanced rivals. At \$99 for a three-user system and \$599 for a 100-node setup, *InBox/PC* is a great deal for tiny and huge LANs. But work groups caught in between—say, a typical departmental LAN of 10 to 20 nodes—are penalized economically. However, *InBox/PC*'s poor file management features, lack of connectivity options, and absent on-line help probably won't attract many users anyway.

*InBox/PC* is based on a Macintosh version, but something got lost in the translation. Instead of a logical pulldown menu interface, you get a function key menu and a hodgepodge of <Alt>-key combinations. Inactive windows are not always cleared from the screen, making it difficult to figure out

Originally designed for the Macintosh, the character-based InBox/PC uses tiny icons to differentiate file types.

## EXECUTIVE SUMMARY

### InBox/PC

#### LAN E-mail package

Inexpensive and strong on essentials, *InBox/PC* lacks external links and falls short on file management. Its pricing scheme limits it to very small and very large LANs only.

	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging				●
Message management	●			
Text editing		●		
Connectivity		●		
Overall value			●	



The Windows-based Da Vinci eMail uses icons to help you keep track of its profusion of windows.

what to do next, and the lack of on-line help further complicates matters.

In matters of messaging and file management, *InBox/PC* is a mixed bag. You get automatic file encryption, a LAN-wide bulletin board, an option that greets users with "news flashes" when they log on, customizable phone-message and memo forms, and an easy Rolodex approach to viewing messages. But crucial basics are lacking: Messages are limited to a single attachment, and you can't send carbon copies or sort messages by date or sender labels.

*InBox/PC* may be a bargain in certain situations, but its somewhat confusing interface, total lack of connectivity options, and relative dearth of features rule it out for most LANs. The company claims that a new version will feature folders, more file management options, and gateways to other systems. Until then, save your money.

### Da Vinci eMail

*Da Vinci eMail* was the first E-mail program designed for *Windows*. Not surprisingly, it's the easiest package to use—and the slowest. *Da Vinci eMail* crawls on XTs and 8-MHz 80286 machines; even on a 386 computer the text editor is noticeably slow. When you fac-

tor in the company's pricing scheme and the program's lack of connectivity features, it's hard to recommend *Da Vinci eMail* to anyone except committed *Windows* users.

Before you consider *Da Vinci eMail*, take a hard look at your wallet. A five-user setup costs \$445, a 20-user setup costs \$895, and there are no price breaks for larger LANs. *Da Vinci eMail* requires a PC equipped with 640K of RAM, nearly 2MB of disk space (mostly for *Windows*), a graphics display, and a copy of *Windows*. For acceptable performance, though, you'll really need a fast 80286 or 80386 computer, 2MB of RAM, and an EGA or VGA display at each node.

Cost and speed issues aside, *Da Vinci eMail* is a pleasure to use. The mouse-driven, icon-oriented *Windows* interface has been sculpted to emulate traditional mail handling. To post a letter, for example, you place its icon in an on-screen envelope and attach files with a paper-clip icon.

You can't insert graphics directly into a message, but you can drop any image generated by a *Windows* application into the *Windows* clipboard and mail the clipboard. (If you want a graphic created with a DOS application, you can only capture and send the entire screen.) The recipient can view the image without having to run the original application.

## EXECUTIVE SUMMARY

### Da Vinci eMail

#### LAN E-mail package

A Microsoft *Windows* product, *Da Vinci eMail* has excellent features, but they are overshadowed by its high price, sluggish speed, and lack of connectivity options.

	POOR	FAIR	GOOD	EXCELLENT
Interface				●
Messaging			●	
Message management				●
Text editing	●			
Connectivity	●			
Overall value		●		

*Da Vinci eMail's* messaging and file management options are tops. You can assign three different priority ratings to messages and even encrypt messages with passwords. Pop up a dialog box, and you can sort and filter messages by sender and subject (or portions of either), priority, date, date range, carbon copy, read or unread status, and whether a paper clip was attached.

Though *Da Vinci eMail* is not recommended for LANs that haven't switched to *Windows*, keep your eyes open for a faster, cheaper, character-based version due before the end of the year and the addition of inter-network and on-line gateway options.

### The LAN E-Mail Lineup

Price issues aside, *cc:Mail* is the clear winner in this review. Yet in the real world of

tight budgets, the program's innovative extras (especially those found in version 3.0) may not be enough to keep you from choosing the very capable and cheaper *Network Courier*. If your network has 25 users or fewer, go with *cc:Mail*; if your network has numerous nodes and linking up with other systems is key, *The Network Courier* has the edge. If you're not ready to buy, wait out the market—all of the reviewed vendors have bigger and better (and even cheaper) updates coming. ●

*Gordon Haberfelde is a cofounder of Micro-MRP, a Foster City, California, maker of PC-based manufacturing software.*

### WHERE TO BUY

#### cc:Mail 1.2

cc:Mail, Inc.  
385 Sherman Ave.  
Palo Alto, CA 94306  
800/448-2500,  
415/321-0430  
**List price:** \$695 for 25 users, \$1290 for unlimited users; cc:Mail Gateway \$1295 per network; PROFSlink \$995; EasyLink \$695; Telelink \$695; cc:Mail Remote \$100 to \$295 per user based on number of users; cc:Mail Import/Export \$995  
**Requirements:** 280K, DOS 3.10 or a later version, IBM- or Epson-compatible printer  
Not copy protected  
**Technical support:** unlimited, toll-free number, M-F 8-5  
**Other support services:** E-mail support for gateway and remote users

**For more information, circle 640 on reader service card.**

#### Da Vinci eMail 1.2

Da Vinci Systems  
P.O. Box 5427  
Raleigh, NC 27650  
919/839-2000  
**List price:** \$445 for 5 users, \$895 for 20 users  
**Requirements:** 640K; DOS 3.00 or a later version; Windows 2.0, Windows/386, or a later version; graphics display; hard disk, 80286-based computer; mouse strongly recommended  
Not copy protected  
**Technical support:** unlimited, no toll-free number, M-F 9 a.m.-10 p.m.  
**Other support services:** none  
**For more information, circle 641 on reader service card.**

#### InBox/PC 1.24

Symantec Corp.  
135 South Rd.  
Bedford, MA 01730  
800/64THINK,  
617/275-4800  
**List price:** \$99 for 3 users, \$599 for 100 users  
**Requirements:** 256K, DOS 3.10 or a later version  
Not copy protected  
**Technical support:** unlimited, no toll-free number, M-F 9-5:30  
**Other support services:** CompuServe forum (GO THINK)  
**For more information, circle 642 on reader service card.**

#### The Network Courier 1.0

Consumers Software Inc.  
314 E. Holly St. #106  
Bellingham, WA 98225  
800/663-8935,  
604/688-4548  
**List price:** \$295 for 6 users, \$695 for 100 users, \$995 for 150-user internetwork (gateway) version; Modem Mail Post Office \$495 per server; Modem Mail Remote User software \$95 per user; Windows 2.0 internetwork version \$995 (\$1590 for mixed Windows and non-Windows); PROFS main-frame gateway \$5000; PROFS LAN server gateway \$1000; MCI Link \$695 per server; All-in-1 Link (to DEC VMS networks) \$2500 (host), \$2500 (server)

**Requirements:** 192K, DOS 3.10 or a later version  
Not copy protected  
**Technical support:** unlimited, no toll-free number, M-F 8-6  
**Other support services:** E-mail support for internetwork users, 30-day money-back guarantee  
**For more information, circle 643 on reader service card.**

# In Search of Forgotten Text

**When your hard disk is overrun with files, finding data can be tough.**

**Here are five software sleuths to help you track down lost text.**

**H**ard disks, like closets, weren't built with disorganized people in mind. Crucial information gets hidden easily under obscure file names or in forgotten subdirectories. Fortunately for those of us who lack photographic recall, there's a quick way to locate lost data. Using text retrieval programs you can search an entire hard disk for information and then edit or print retrieved material. *PC World* evaluates five of these text fetchers: *ZyIndex*, *SearchExpress*, *Memory Lane*, *Gofer*, and *The Text Collector*.

Text retrieval programs fall into two categories—those that index and those that don't. Indexing programs like *ZyIndex*, *Memory Lane*, and *SearchExpress* create a list of all the unique words in a text file and chart a path to them, much like data base management software. Building an index takes time and eats up disk space, but once the index is built, finding data is a breeze. In contrast, nonindexing programs such as *Gofer* and *The Text Collector* search sequentially through a file until they find the target word or phrase. This makes them better suited for searching smaller amounts of text.

Here are some other factors to keep in mind when matching text retrieval software to your particular needs: Does the program require document conversion, or can it read documents in their native file formats? Is the

program a TSR or a stand-alone? How much memory and disk space does the program devour? Finally, how competent is the software's cut-and-paste feature?

## **ZyIndex Professional 3.0**

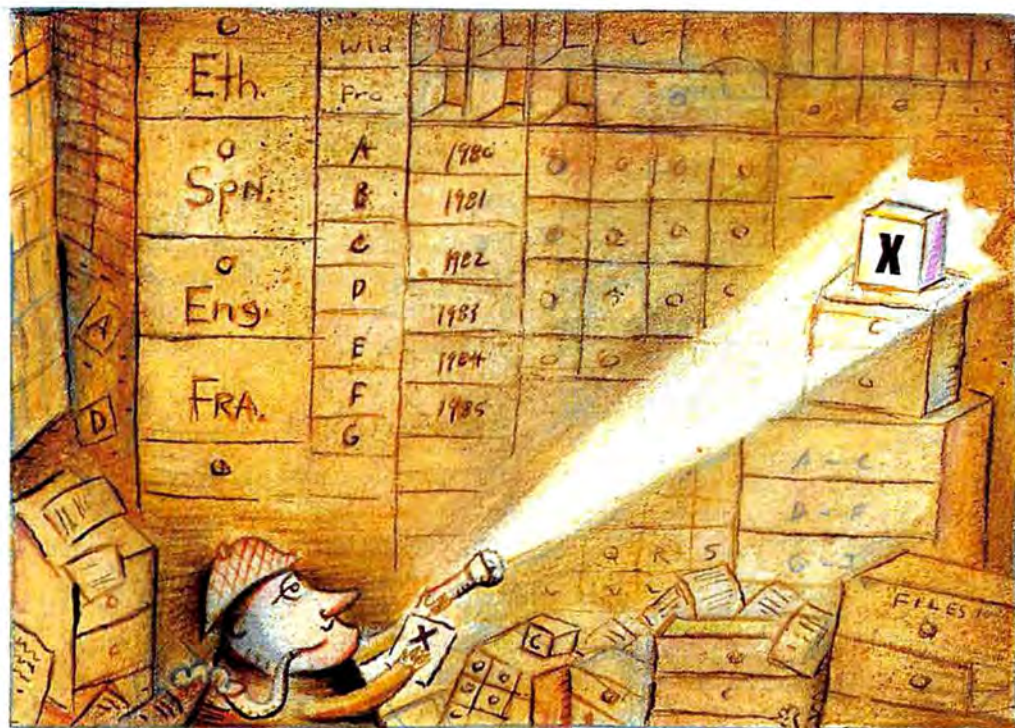
*ZyIndex Professional* is a powerful text retrieval program with an interface honed to essentials. The \$295 program requires indexing, so you wouldn't want to use it to track drafts that frequently change while you scurry to meet a tight deadline. Big, static text archives are the program's forte.

*ZyIndex* uses separate programs for indexing and searching. In practice this isn't as inconvenient as it sounds. Building an index is straightforward: You enter a target subdirectory, identify the file format, and mark the files to be indexed. Each index occupies about 20 percent of the space of the original file.

*ZyIndex* indexes files stored in a variety of formats including 1-2-3, dBASE, and WordStar. But to create multiflavored indexes you must index each file format separately.

Once your oldies but goodies are indexed, *ZyIndex* makes searching a breeze. Like all the programs reviewed, *ZyIndex* searches can include Boolean OR, AND, and NOT operators. Searches can contain wild cards, and you can use DOS file-creation dates and

**George  
Beinhorn**



file names in your requests. To locate a lost file, simply type the file name instead of entering a text string. *ZyIndex* can also search several indexes at once.

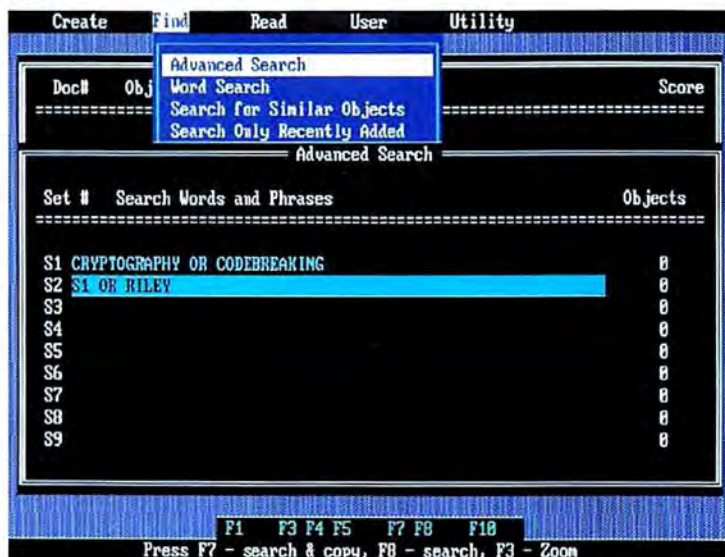
Once you've made your search, displaying the results is similarly painless—one key-stroke displays a neatly formatted list of retrieved files. Make a selection and *ZyIndex* displays the first 16 lines of text. You can move forward or backward and jump directly to the next and previous hits. To cut and paste a block to your application, simply mark it and save it to an ASCII file. *ZyIndex* can include the name and date of the source file in a saved block, along with the search request and a memo of up to 60 characters.

The indexing program's speed is barely adequate: It took more than 9 minutes to index a 32K file on a 4.77-MHz PC with a hard disk. Once the index is set up, search speed is a little more impressive; *ZyIndex* took only 10 seconds to set up the search and find the first hit.

*ZyIndex Professional* is a nice blend of search power and ease of use. For added search flexibility, *ZyFeatures*, a \$95 add-on, enables you to attach fields such as date and time to indexed files and create search macros. *ZyIndex*'s excellent design and modest disk space requirements make it the quintessential text-archiving program for seldom-changing file collections.

## Memory Lane 2.0

Although *Memory Lane* also requires indexing, the \$99 program goes *ZyIndex* one better. Once you've indexed files, *Memory Lane* sits in RAM like a traffic cop, tracking file changes and noting them in its to-do list. Whenever it's convenient, you can choose files from the list for indexing. Alternatively, *Memory Lane* automatically indexes all new or changed files in the background when it sees the DOS prompt. The only hint of *Memory Lane*'s presence in RAM is an almost imperceptible slowing of disk saves.



SearchExpress offers extensive search options, but you need to convert your files into the program's proprietary format.

*Memory Lane* is fast: It indexed a 32K file in 43 seconds. The program is also extremely economical in its use of disk space. When 1MB or more of data is indexed, the index file is just 15 percent of the size of the source files. Installing the program to use up to 30 percent overhead yields faster searches.

*Memory Lane's* search features are easy and versatile. You can search unindexed as well as indexed files. *Memory Lane* also lets you restrict searches to files created under a single program (such as *Microsoft Word*) and organize indexed files according to subject categories you define.

The program lets you scroll through the retrieved text and jump to the next and pre-

vious hits. Cutting and pasting is easy: You simply mark a block with the arrow keys, return to your application, and press <Alt>-P to insert the text. Remarkably, *Memory Lane* detects the file formats of both the cut block and the underlying document and automatically performs required data translations. This conversion feature supports over 20 popular word processor, data base management, and spreadsheet programs.

With its excellent speed, RAM residency, frugal use of disk space, flexible search capabilities, and reasonable price tag, *Memory Lane* offers the best balance of cost, power, and features of the programs reviewed.

### SearchExpress 2.30

Apparently designed for librarians and other professional information jockeys, *SearchExpress's* investigatory powers outclass office-level retrievers such as *Memory Lane* and *Gofer*. You can, for example, attach user-defined fields to graphics files and index them for later retrieval. But power, in this case, has a price—\$349 and 450K RAM. Add huge disk-space overhead and poky indexing to the high price tag, and the *SearchExpress* audience may drop to a select few.

Unlike with the other programs reviewed, you must translate your documents into the program's format before *SearchExpress* can root through them. *SearchExpress* took over 11 tedious minutes to convert and index a 32K *WordPerfect* file. Disk overhead for indexes amounts to 50 to 70 percent of the space occupied by the original file, far more than is required by either *Memory Lane* or *ZyIndex*. And while indexing, *SearchExpress* requires temporary workspace 2 to 10 times the size of the input file; a 2MB file can consume up to 20MB.

The program's simple menu interface belies its extensive search facility. You can search on up to nine statements or just a single word. Once it completes a search, *SearchExpress* displays the number of files that satisfy each request. In single-word searches, you can rank the retrieved files according to the number of occurrences. *SearchExpress* can also analyze a group of files for frequently occurring words and then search for files whose text content is similar.

## EXECUTIVE SUMMARY

### ZyIndex Professional 3.0

ZyIndex's uncomplicated design and more-than-adequate search options make it a good choice for office text files that don't change frequently.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing			●	
Searching			●	
Retrieval			●	
Overall value			●	

Retrieved documents are displayed in a document summary screen, where they're available for browsing. You can view the full text of retrieved files with search terms highlighted, then look at paragraphs or sentences containing search terms. However, *SearchExpress* has no cut-and-paste feature. You must use your word processor to open the file, find the text, and move it.

*SearchExpress* has extensive search capabilities, but unless you really need that kind of power, the program's system requirements, slow indexing, and lack of a text-transfer capability will leave you yearning for something faster and simpler.

## Gofer 1.0

*Gofer* couldn't be more aptly named. It's an easy-to-use \$79.95 program that snoozes in RAM until you whistle, then races down hard-disk burrows to chase after lost blocks of text.

When you press its hot key, *Gofer* displays two windows: one requesting the 'text to Go For', and a main menu with seven choices. At this point, you simply enter a search request—up to eight 20-character text strings—and the hunt begins. The program took 15 seconds to make its first hit in a 32K file.

## EXECUTIVE SUMMARY

### Memory Lane 2.0



Memory Lane has it all: TSR operation, vast file capacity, auto-indexing, a lucid interface, terrific speed, and flexible configuration options.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing				●
Searching			●	
Retrieval				●
Overall value				●

## FEATURES EVALUATION

### Text Retrieval Software

*Memory Lane blends versatility with usability for top-notch file searches.*

- Yes
- No
- △ Limited only by disk capacity

#### Standard features

	Zyindex Professional 3.0	Memory Lane 2.0	SearchExpress 2.30	Gofer 1.0	The Text Collector 1.5
RAM required	448K	100K	450K	91K	128K
TSR mode	○	●	○	●	○
Maximum files	5000 <sup>1</sup>	7500	1 million	△	△
Maximum document size (pages)	300 <sup>2</sup>	△	△	△	△

#### Import/export

Performs without file conversion	●	●	○	●	●
ASCII	●	●	●	●	●
EBCDIC	●	●	●	●	○
1-2-3	●	●	○	●	○
dBASE	●	●	○	●	●
WordPerfect	●	●	●	●	●
Microsoft Word	●	●	●	●	●

#### Data indexing

Automatically indexes multiple file formats	○	●	●	n/a	n/a
Optimizes index file size	●	●	●	n/a	n/a
Lists all indexed files	●	●	●	n/a	n/a
Tracks file changes	●	●	○	n/a	n/a

#### Searching

Searches across subdirectories	●	●	●	○	●
Searches across multiple indexes	●	○	○	n/a	n/a
Searches unindexed files	○	●	○	●	●
Boolean searches	●	● <sup>3</sup>	●	●	●
Proximity searches	●	●	●	●	○
Wild-card searches	●	●	●	●	●
Sound-alike searches	●	○	●	●	●
Searches user-defined fields	● <sup>4</sup>	○	●	○	●
Searches by file-creation date	●	●	●	○	●
Browse feature	○	○	○	●	●
Saves search criteria	○	○	●	○	●

#### Retrieval

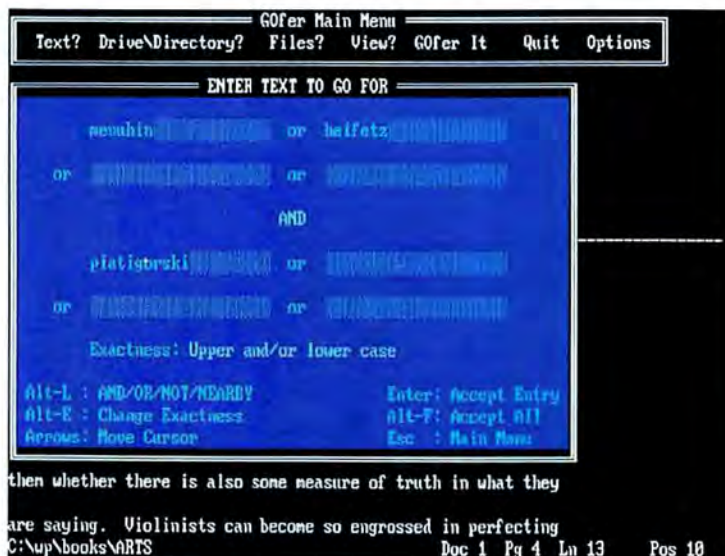
Cuts and pastes	●	●	○	●	●
Appends text to existing file	●	○	○	●	●
Inserts headers/search date	● <sup>4</sup>	●	●	○	●
Prints sentences containing keywords	○	○	●	○	●
Prints paragraphs containing keywords	○	○	●	○	●

<sup>1</sup> Per index list.

<sup>2</sup> Approximately; actual limit is 65,536 unique words per document.

<sup>3</sup> Two passes required for NOT searches.

<sup>4</sup> Requires separate program.



Gofer pops up in RAM for convenient searching; however, it searches only one directory at a time.

Gofer's search capabilities are limited compared to other programs'; for example, you can search only one directory and its subdirectories at a time. Once the program has scored a hit, you can send finds to disk, to a printer, or just have *Gofer* summarize the number of finds in each file. You can also browse files without searching—for instance, to peek at a spreadsheet from your word processor.

A file-compression utility squeezes files by as much as 50 percent and lets you search and export text from the compressed files. *Gofer* can search files from up to ten popular application programs, including 1-2-3, dBASE, Q&A, Word, WordPerfect, and any application that generates ASCII or EBCDIC files.

*Gofer* has the feel of *simpatico* software—a combination of thoughtful design, versatility, speed, and real-world usefulness. For monster file collections, indexing programs are faster. But for searching groups of files that occupy less than 1MB, *Gofer* is hard to beat.

### The Text Collector 1.5

*The Text Collector* is a \$69 stand-alone program that could give *Gofer* a run for the money in the nonindexing text retrieval race. In our tests it took only 10 seconds to make its first hit in a 32K file. But the program

hides its speed and extensive features behind a perplexing interface.

*The Text Collector*'s opening menu is deceptively compliant—screens pop up crisply, and a set of shortcut commands lets you speed through the menus. The menu prompts you for a search string, an input file, and an output file. But after that things get complicated; the menu's three choices lead to a labyrinth of options that'll send you scurrying for the manual.

*The Text Collector* lets you save and recall an amazing cornucopia of defaults including search criteria, names of files to search, and output parameters. It can sort output files, search files according to date, and limit searches to a range of dates. Unlike *Gofer*, *The Text Collector* also performs single searches across several drives and paths. It isn't easy, given *The Text Collector*'s unintuitive syntax and program structure, but it can be done.

Once you've uncovered data, however, the program's cut-and-paste feature is burdensome at best. *The Text Collector* writes its finds either to an output file in a *context block* (a word, sentence, or paragraph surrounding each find) or to a block you define with special delimiters. To write an amorphous, nondelimited chunk of text to an output file, you must locate the text, enter the browse mode, tell the program to format the file in context blocks (paragraphs, for example), and finally write the blocks you want to the output file.

## EXECUTIVE SUMMARY

### SearchExpress 2.30

Designed for super flexible retrievals from large, static file collections, *SearchExpress*'s conceptual advantages rapidly lose their appeal the first time you use its s-l-o-w indexing routine. The absence of a cut-and-paste feature is a glaring oversight.

	POOR	FIR	GOOD	EXCELLENT
Import/Export			●	
Indexing		●		
Searching				●
Retrieval			●	
Overall value			●	

*The Text Collector* forces you to learn its ways. The reward for your struggle is fast, flexible searching—but only if you've got the patience.

### Remembrance of Text Past

Choosing the right text retrieval software depends on the shape of your pool of words and how often you need to fish through it. *ZyIndex* offers acceptable speed and is especially adept at plucking text from static files. *Memory Lane's* auto-indexing and RAM residence are unsurpassed for searching through constantly changing files. *Search-*

## EXECUTIVE SUMMARY

### Gofer 1.0

Gofer is the choice for fast, fuss-free, nonindexed TSR scanning of subdirectories and floppies for the occasional mislaid file. For large text collections, however, an indexing program is faster.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing (n/a)				
Searching			●	
Retrieval			●	
Overall value			●	

## EXECUTIVE SUMMARY

### The Text Collector 1.5

It takes rugged dedication to survive *The Text Collector's* confusing maze of menu options, but the reward is fast, nonindexed searches with extremely flexible output formats. However, the cut-and-paste feature is much too rigid.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export			●	
Indexing (n/a)				
Searching			●	
Retrieval			●	
Overall value			●	

*Express* is harder to use and better suited to managing unchanging, oceanic file collections than subdirectories full of letter drafts and reports. *Gofer* is a likable little rascal, a hard-disk bike messenger with unexcelled short-distance power. And *The Text Collector*, though hard to learn, provides an immense variety of options for fast, non-TSR file searching. Next time you need to ferret out a lost bit of data, try a text retriever. ●

*George Beinhorn is a freelance writer in North San Juan, California.*

## WHERE TO BUY

### Gofer 1.0

Microlytics  
300 Main St.  
East Rochester, NY  
14445  
800/828-6293,  
716/377-0130  
**List price:** \$79.95  
**Requirements:** 91K,  
DOS 2.00 or later  
version  
Not copy protected  
**Technical support:**  
unlimited, no toll-free  
number, M-F 8:30-5:30  
**Other support services:** none  
For more information,  
circle 700 on  
reader service card.

### Memory Lane 2.0

Group L Corp.  
481 Carlisle Dr.  
Herndon, VA 22070  
703/471-0030  
**List price:** \$99  
**Requirements:** 100K,  
DOS 2.00 or later  
version  
Not copy protected  
**Technical support:**  
unlimited, no toll-free  
number, M-F 9:30-5  
**Other support services:** none  
For more information,  
circle 701 on  
reader service card.

### SearchExpress 2.30

Executive Technologies,  
Inc.  
2120 16th Ave. S  
Birmingham, AL 35205  
205/933-5494  
**List price:** \$349  
**Requirements:** 450K,  
500K of disk space  
Not copy protected  
**Technical support:**  
unlimited, no toll-free  
number, M-F 8-5  
**Other support services:** on-site training  
\$75/hr.  
For more information,  
circle 702 on  
reader service card.

### The Text Collector 1.5

O'Neill Software  
P.O. Box 26111  
San Francisco, CA  
94126  
415/398-2255  
**List price:** \$69  
**Requirements:** 128K,  
DOS 2.00 or later  
version  
Not copy protected  
**Technical support:**  
unlimited, no toll-free  
number, M-F 9-5  
**Other support services:** none  
For more information,  
circle 703 on  
reader service card.

### ZyIndex Professional 3.0

Zylob Corp.  
3105-T N. Frontage Rd.  
Arlington Heights, IL  
60004  
312/632-1100  
**List price:** \$295  
**Requirements:** 448K,  
DOS 2.00 or later  
version, two disk  
drives (hard disk  
recommended)  
Not copy protected  
**Technical support:**  
unlimited, no toll-free  
number, M-F 8-6  
**Other support services:** none  
For more information,  
circle 704 on  
reader service card.

# Project Management— For Professionals Only

**Project management software  
can help you plan, schedule,  
track, and report on an army of  
resources.**

**But it's not a casual management  
tool.**

**W**hen project management software first came out, it was touted as the latest and greatest general problem-solving tool. But this category of software continues to appeal mostly to project management professionals. A product that's intuitive enough to hook a more general audience has yet to be developed—with the possible exception of *Insta-Plan* (see *The Software Shelf*, PCW, April 1988).

Still, the serious project manager can select from an excellent assortment of mid-range tools. Unlike high-end vertical packages such as *Primavera*, these programs are relatively inexpensive and are geared toward professionals with generic project-management needs. In this review, *PC World* evaluates four of the most popular project managers that cost less than \$700—*SuperProject Expert 1.1*, *Time Line 3.0*, *Harvard Total Project Manager II 2.0*, and *Microsoft Project 4.0*—as well as *Micro Planner 6*, a popular Macintosh product now available under *Windows*.

## The Purchase Decision

Most of these products offer the four staple features of project management: the Gantt chart, the PERT chart, the critical path method (CPM) diagram, and the work break-

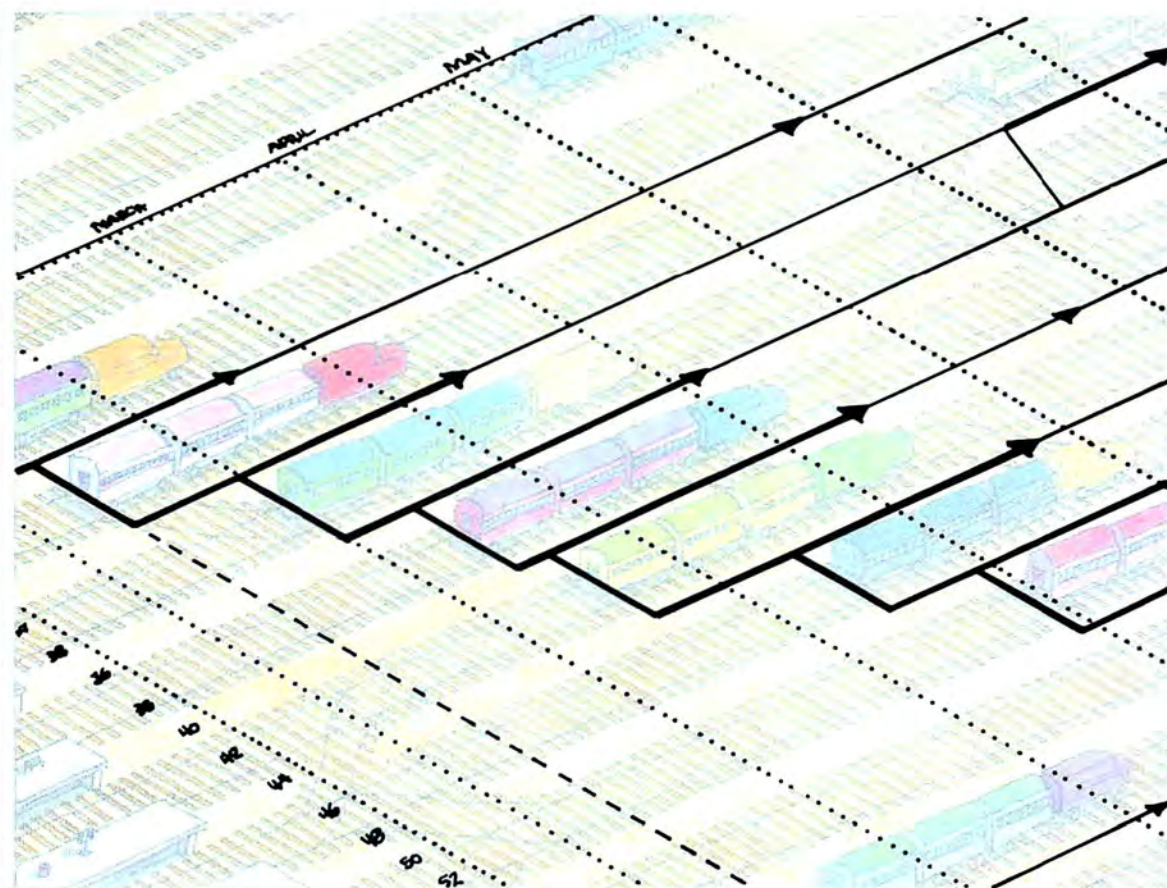
down structure (WBS) flowchart. Two of the programs, *SuperProject Expert* and *Time Line*, conveniently allow text entry and editing in a hierarchical outline. *Micro Planner*, in keeping with the Macintosh model, takes a unique graphic approach to project planning.

In addition to carefully considering a program's interface, buyers should appraise its capacity—the number of tasks it supports. *SuperProject Expert* is the clear winner in this category, allowing up to 2800 tasks in expanded memory.

Another key feature is resource management. Programs should be able to allocate a resource by the hour or by the minute and then schedule it flexibly over the lifetime of a given task. All the products reviewed have this ability, to various degrees. The programs also allow you to compare a baseline plan with actual resource use and costs.

Finally, superior reporting is critical for tracking a project's progress. All the programs offer standard report formats as well as custom-design capabilities. They all work with laser printers and plotters, but their support for color printers and sideways printing is spotty.

**Woody  
Liswood**



## SuperProject Expert 1.1

For \$695, you can have the most complete and complex package reviewed—*SuperProject Expert*. As an example of its flexibility, you can build a project from an outline, PERT chart, Gantt chart, or WBS, and switch between these views with a couple of keystrokes.

The program has a unique method of developing a PERT chart. When you create a task, the PERT box appears on screen. You then define the links between that task and all others and, using the cursor keys, position the box within the PERT network as you see fit. You can even forecast the probability that the task will be completed on schedule and then generate a report showing best-case, worst-case, and on-schedule scenarios.

*SuperProject Expert* provides a host of advanced scheduling features, such as the ability to split a variable resource assignment between two simultaneous tasks. The package supports resource leveling among linked sub-

projects; alternatively, you have the option of specifying that certain projects not be leveled.

You can have over 100 reporting fields, including task name, cost, duration, and rates. Version 1.1 adds the Cost/Schedule Statistics Report required of government contractors. The program prints reports sideways, but you must print first to disk and then use *Sideways* from the DOS prompt.

*SuperProject Expert* has three menu levels, from novice to expert, and a macro language complex enough to let you develop tutorials or automate visual displays. The program supports expanded memory and works on a LAN. An OS/2 version is available for \$795. *SuperProject Expert's* complex options may at first seem daunting, but if you need power and capacity it's the program of choice.

## FEATURES EVALUATION

## Project Management Roundup

In features and capacity, SuperProject Expert leads the pack.

- Yes
- No
- ◐ Deficient
- △ Limited only by available RAM

## Project analysis

	SuperProject Expert 1.1	Time Line 3.0	Micro Planner 6	Harvard Total Project 2.0	Microsoft Project 4.0
Maximum no. of tasks per project	1560	1000	1340	350	750
Maximum in expanded memory	2800	1600	1340	n/a	n/a
Maximum no. of resources per project	△	300	26	100	255
Maximum no. of resource calendars	△	1	26	1	255
PERT/Gantt/critical path method	●	●	●	●	●
Work breakdown structure (WBS)	●	◐ <sup>1</sup>	○	●	●
Best-/worst-/most-likely-case estimates	●	○	○	○	○
Resource leveling	●	●	●	●	●
Leveling within subprojects	●	●	◐ <sup>2</sup>	●	○
Leveling over multiple projects	●	●	●	●	○

## Data entry and editing

Mainframe program links	●	○	○	○	○
Outliner	●	●	○	○	○
Mouse support	○	○	●	○	●
Notes	●	●	○	●	●
Undo command	○	●	○	○	○
Macro capability	●	●	○	○	○
Imports					
ASCII	●	◐ <sup>3</sup>	◐ <sup>2</sup>	○	●
.WK1 or .WKS	●	○	○	○	○
.DBF	●	○	○	○	○
.CSV	●	○	○	○	○
Exports					
ASCII	●	●	●	●	●
.WK1 or .WKS	●	●	○	●	●
.DBF	●	●	○	●	●
.CSV	●	●	○	●	○

## Reporting

On-screen reports	●	●	●	○	●
Reports resources/costs by activity	●	●	●	●	●
Reports on actual vs. projected plan	●	●	●	●	●
Produces earned-value analysis	●	●	●	●	●
Supports color printers	●	○	●	●	○
Supports plotters	●	◐ <sup>4</sup>	●	●	●
Supports sideways printing	●	◐ <sup>5</sup>	●	●	●

<sup>1</sup> WBS codes are supported, but the WBS itself is not visible on screen.

<sup>2</sup> Requires Project Exchange, a \$100 add-on.

<sup>3</sup> Outlines in ASCII format can be imported.

<sup>4</sup> Requires Time Line Graphics, a \$195 add-on.

<sup>5</sup> Only in compressed mode on the LaserJet.

## EXECUTIVE SUMMARY

## SuperProject Expert 1.1

Project management software

This feature-rich product supports up to 2800 tasks in expanded memory and provides great flexibility for as-signing and tracking resources.

	POOR	FIR	GOOD	EXCELLENT
Project analysis				●
Data entry and editing				●
Reporting				●
Overall value				●

## Time Line 3.0

Time Line's forte is its easy-to-use interface. In addition, the \$595 program sports full outline control, a note-taking feature, macros, and handy data entry and what-if features such as an undo/redo command.

After you enter tasks, Time Line's convenient forms-oriented system prompts you to fill in data about the project, each task, and each resource. Although you can't work in a WBS as you can in SuperProject Expert and Harvard, you can enter a WBS code when you create tasks and then filter the tasks using that code.

Time Line will maintain up to 300 resource or cost categories. Resource leveling can be accomplished for all tasks in memory at the same time. However, if you wish to level subprojects, they must all fit within Time Line's 1000-task limit (1600 tasks in expanded memory).

Time Line's default calendar contains the standard federal government holidays. But the program doesn't allow you to create a separate calendar for each resource, which can present problems for long-term projects and vacation scheduling. There's a kludgy work-around, but flexible calendars really should be integral.

The program contains five standard report formats that can be customized extensively. Time Line Graphics, a separate \$195 module, provides plotter support and allows you to

print bit-mapped graphics and time-scaled PERT charts. A LAN version of *Time Line* is available for \$595 plus \$195 for each additional node.

For years *Time Line* and *SuperProject Expert* have been playing leapfrog for leadership in this software category. At the moment, *SuperProject Expert* has a slight edge in terms of capacity, while *Time Line*'s somewhat more intuitive interface is its strong point. Both programs are an excellent value and are capable enough to appeal to the professional project planner.

### Micro Planner 6

The \$595 *Micro Planner* was originally a Macintosh program but now runs under either *Windows 2.0* or *Windows/386*. If you're used to traditional project management on a PC, *Micro Planner* will come as a surprise. It uses a graphic, PERT-type interface for project design. To insert a task into a chain of events, for example, you click the mouse on an event "circle" and then stretch a line forward or backward, depending on whether the activity precedes or follows that event.

Modifying a *Micro Planner* chart can be a pain. In one plan, I wound up with an unconnected node that would not delete. When I tried to analyze the plan, the program told me the node wasn't connected and wouldn't let me continue—a real catch-22. Also, you can't move a block of related activities from place to place. *Project Exchange*, a \$100 add-

F1-Help F2-Graphs F3-Data F4-Edit F5-Format F6-Global				
↓ More →				
Name	Type	Planned duration	Earliest start	Responsible
Start	M		10-Jul-1988	
Prepare	M		10-Jul-1988	Manager
Review RFP		10.00 Dys W	11-Jul-1988	Manager
Review Past		10.00 Dys W	25-Jul-1988	Manager
Agenda		10.00 Dys W	8-Aug-1988	Manager
Proposal	M		19-Aug-1988	
Prepare End	M		19-Aug-1988	Manager
Client Mtg	M		19-Aug-1988	
DP Costs		10.00 Dys W	22-Aug-1988	DP Manager
Approved	M		2-Sep-1988	
Proposal End	M		2-Sep-1988	
Plan Mtg	M		2-Sep-1988	
Production \$		0.00 Hrs W	7-Sep-1988	Supervisor
GANIT		0.00 Hrs W	2-Sep-1988	Manager
Write		0.00 Hrs W	2-Sep-1988	Supervisor
Client		0.00 Hrs W	2-Sep-1988	
Review RFP		5.00 Dys W	5-Sep-1988	Manager
Task list				
PERT chart				
SURVEY1:8% full				

on that was under development at press time, is supposed to add this capability (and others).

*Micro Planner* handles up to 1340 activities and a maximum of 26 resources per project. But sometimes its procedures are unusual. For example, *Micro Planner* uses a special activity type known as a *hammock* to summarize tasks. This acts something like a subproject but is more limited; unlike with the other programs, you can't store subprojects separately on disk. Strictly speaking, *Micro Planner* is not a multiuser application; although it will run on a LAN, at press time all multiuser features were still under development.

Among project managers, *Micro Planner* is a middleweight. On the positive side, it offers numerous activity types, its *Windows* interface makes for excellent graphics and printer support, and its files work with the Macintosh version. But *Micro Planner* lacks *SuperProject Expert*'s capacity and flexibility, and the interface is a challenge if you're used to more traditional approaches.

### Harvard Total Project Manager II 2.0

*Harvard Total Project Manager II* version 2.0 is an easy-to-use \$595 package geared for midsize projects. Its *PFS*-style pulldown menus make using the program almost like working within the *Windows* environment.

Using Harvard's task list is like using a Gantt chart in other programs, except the Gantt isn't provided automatically. Tasks can be edited and filtered in this view.

## EXECUTIVE SUMMARY

### Time Line 3.0

#### Project management software

Along with an easy-to-use interface, *Time Line* provides excellent data entry tools and supports up to 1600 tasks in expanded memory. However, resource calendars aren't available.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis				●
Data entry and editing				●
Reporting				●
Overall value				●

**EXECUTIVE SUMMARY****Micro Planner 6***Project management software*

*Micro Planner*, a Windows product, takes a non-traditional approach to project management. Although its graphics and output are excellent, it makes the user adjust to its ways.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	

A planner can work from PERT, Gantt, or WBS formats, but the default method is WBS. Working from a *Harvard* task list is like working from a Gantt chart in the other programs, except that on-screen Gantt graphics aren't automatically provided. Within *Harvard's* actual Gantt chart you can edit and create tasks, but you can display only a few tasks at a time.

Only one calendar is available per project. However, you can enter resources and costs in just about any way that makes sense, and subprojects and resource leveling are both supported.

Project reporting is integrated, and *Harvard* provides 24 predesigned formats. If you want custom reports, you select the columns you wish in any order, then sort alphabetically, numerically, chronologically, or by special user-defined codes. Laser printers, plotters, and sideways printing are all supported. Like *Micro Planner*, *Harvard* can work on a LAN but doesn't provide any multiuser capabilities.

A new version of the program, renamed *Harvard Project Manager 3.0*, was announced at press time, too late to be included in this roundup. According to Software Publishing, the new version retails for \$695 and includes a WBS outline, unlimited resource calendars, data import, graphics scaling, automatic report templates, expanded memory support, and a simplified interface feature (see *Product Outlook* in this issue for more details).

**Microsoft Project 4.0**

The latest version of *Microsoft Project* offers all the necessities for competent project design, including resource leveling, filtering, custom reporting, and plotter support. The program runs on a LAN and includes an import/export facility for *Primavera* files.

Like the other programs, the \$495 *Microsoft Project* works from a task/Gantt view as well as from a PERT chart. As you add tasks, you can call up resource screens and enter costs. However, resource allocation is not as flexible as in *SuperProject Expert*—you can't assign a resource to work variable hours over a task's duration. Subproject support is adequate but somewhat rigid. You must create each subproject separately, save it to disk, then link it into the main project. Resource leveling is not supported within subprojects. If dates are changed in the master project after leveling, the planner must update all subprojects manually.

*Microsoft Project's* reporting module contains 18 standard reports and a new report writer that lets you custom-design reports and templates. A sideways-printing feature is also provided. For project planners who don't require support for thousands of tasks, extensive flexibility, or resource leveling within subprojects, *Microsoft Project* is a good, economical choice.

**EXECUTIVE SUMMARY****Harvard Total Project Manager II 2.0***Project management software*

*Harvard* is a fine midrange program that supports up to 350 tasks per project and provides very good graphics and reporting. An upgrade, close to release at press time, promises even better value.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	

## Satisfying a Planner's Needs

SuperProject Expert is complex, but it's a winner for large projects requiring super flexibility. *Time Line* follows close behind and sports a simpler interface. *Micro Planner* offers power under Windows but breaks tradition with its graphic interface and unusual terminology. *Harvard* and *Microsoft Project* are both capable programs at midrange, but they can't handle larger projects.

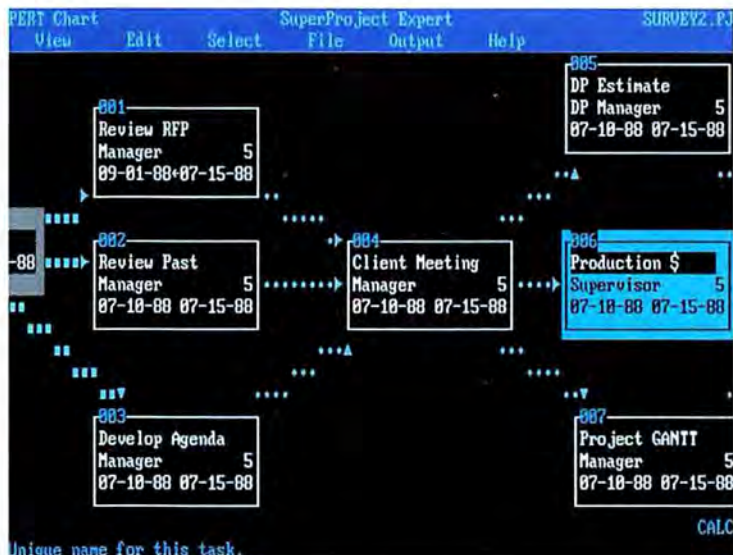
## EXECUTIVE SUMMARY

### Microsoft Project 4.0

Project management software

Microsoft Project 4.0 carries up to 750 tasks and sports a new report writer, plotter support, and resource leveling. What it lacks is extensive fine-tuning for resources.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	



If you're in charge of complex projects, project management software can help keep you on schedule and within budget. But despite optimistic claims to the contrary, most packages require more time to set up and use than the average manager will be willing to spend. ●

Woody Liswood is a human resource consultant in New York City.

With SuperProject Expert's interactive PERT chart, you can define links between tasks and use the cursor keys to position each task box.

## WHERE TO BUY

### Harvard Total Project Manager II 2.0

Software Publishing Corp.  
1901 Landings Dr.  
Mountain View, CA 94039  
415/962-8910  
**List price:** \$595, instructor training materials \$199  
**Requirements:** 512K, hard disk, DOS 2.00 or later version  
**Technical support:** unlimited, no toll-free number, M-F 7:30-4:30  
**Other support services:** 30-day money-back guarantee, newsletter, authorized training through Egg-head Discount Software  
**For more information,** circle 690 on reader service card.

### Micro Planner 6

Micro Planning Int'l  
235 Montgomery St.  
#840  
San Francisco, CA 94104  
415/788-3324  
**List price:** \$595, Project Exchange add-on \$100  
**Requirements:** 512K, hard disk, DOS 3.xx or later version, hard disk, Microsoft Windows  
**Technical support:** free for 90 days, then \$100 per year, no toll-free number, M-F 8-6  
**Other support services:** free newsletter, training available for a fee  
**For more information,** circle 691 on reader service card.

### Microsoft Project 4.0

Microsoft Corp.  
16011 N.E. 36th Way  
Redmond, WA 98073  
800/541-1261, 206/882-8080  
**List price:** \$495, Node Pack for networks \$245 each  
**Requirements:** 256K, DOS 2.00 or later version; hard disk recommended  
**Technical support:** unlimited, no toll-free number, M-F 6-6  
**Other support services:** newsletter, third-party training  
**For more information,** circle 692 on reader service card.

### SuperProject Expert 1.1

Computer Associates  
1240 McKay Dr.  
San Jose, CA 95131  
800/531-5236 (sales), 408/432-1727 (information)  
**List price:** \$695, Lan-Pak for three additional users \$695, OS/2 version \$795  
**Requirements:** 512K, DOS 2.00 or later version; hard disk recommended  
**Technical support:** free for six months, no toll-free number, M-F 7-5; then \$195 per year including toll-free telephone support, free upgrades, and user BBS  
**Other support services:** newsletter, training  
**For more information,** circle 693 on reader service card.

### Time Line 3.0

Symantec  
10201 Torre Ave.  
Cupertino, CA 95014  
408/446-9994 (information), 408/253-9600 (sales)  
**List price:** \$595, LAN version \$595 for file server plus \$195 for each node; Time Line Graphics \$195  
**Requirements:** 640K, hard disk, DOS 2.00 or later version; AT-class machine or better recommended  
**Technical support:** unlimited, no toll-free number, M-F 8-5  
**Other support services:** user BBS, newsletter, training  
**For more information,** circle 694 on reader service card.

# Multitasking Without OS/2

**Why wait for OS/2? Why  
abandon your familiar DOS  
applications?**

**Four operating environments  
use the virtual 8086 mode of  
Intel's 80386 microprocessor to  
offer DOS multitasking today.**

**B**usinesspeople often fantasize being able to do two (or more) things at the same time—especially around 3:15 on Friday afternoon. As it happens, the “virtual 8086” mode built into Intel’s 80386 microprocessor provides that very ability. With the proper operating environment to serve as arbitrator, the chip allows multiple DOS sessions to proceed at once, each in its own memory partition—or virtual machine (VM). Each partition acts like a separate PC, with its own memory-resident programs, memory size (up to 640K), and AUTOEXEC.BAT file.

DOS users who don’t want to wait for OS/2 applications to emerge from programmers’ workrooms can take advantage of four multitasking 80386 environments right now: *Windows/386*, *Desqview*, *VM/386*, and *PC-MOS/386*. All four let your computer work in the background—recalculating a spreadsheet, or sending a file over the modem—while you write a report or add sales figures in the foreground.

*PC World* takes a hard look at each of these operating environments in terms of installation, performance, usability, and compatibility with DOS applications. In the final analysis, *Desqview* comes up the clear winner.

Certain similarities unite the systems. In addition to running multiple DOS sessions, all four prevent program conflicts and allow you to switch among programs. All access extended memory; the more RAM there is in your computer, the more VMs you can install. All but *Windows* allow you to adjust time slicing (the percentage of processor time allocated to foreground and background sessions), which enables you to maximize foreground performance.

On the downside, applications run more slowly under all four environments than they do under DOS. Multitasking always degrades performance; there’s just no way to run two CPU-intensive tasks at the same time without slowing both of them down. But all these environments slow down applications (to varying degrees) even when there’s nothing happening in the background.

To evaluate performance, I ran two informal tests on each environment. First, to find out how much each environment slowed performance in a best-case, single-tasking scenario, I conducted a test suite—running a DIR in a crowded subdirectory, copying four 250K files in DOS, and executing a lengthy search-and-replace in *WordStar 4.0*—all with no background activity. Then I ran the same suite as a multitasking test, with two CPU-intensive tasks (loops that counted from 1 to 1 million in compiled QuickBASIC 4.0) run-

**Michael  
Goodwin**

ning in background windows. Default time slicing was used for all multitasking tests.

Usability is just as important as performance, and here the environments vary widely. For instance, the virtual 8086 mode lets only one VM access a given COM port at a time. Two of the environments swap the port automatically when you move from one VM to another, while two require you to make the exchange manually. Two insist that you generate a program information file (PIF) before you can run a DOS application for the first time, and two do not. Two support cut and paste between VMs, and two do not. Some environments offer crash isolation: If a program hangs up in one partition, you can simply do a warm boot to restart it while processing continues undisturbed in the other partitions; others do not provide this important feature.

Something else to consider. Your favorite applications may not run in some environments. Although it was not possible to perform an exhaustive compatibility test, I tried out *WordStar 4.0*, *Microsoft Word*, *Word For Word*, *Lotus Express*, *PC-Talk*, *ProComm Plus*, *SideKick*, *ProKey 4.0*, *QuickBASIC 4.0*, and a shareware key-repeat-rate utility called *Kbfix2*. A few problems surfaced in the course of this informal test.

Regardless of which 80386 environment you choose, multitasking takes some getting used to. A couple of these environments make the transition so difficult that it may not be worth the trouble, but the two that work well are not only efficient work boosters, they're big fun too.

## Windows/386 2.1

*Microsoft Windows* and *Windows/386* are widely used operating environments. In fact, many popular applications (like Aldus's *Page-*



*Maker* and *Owl's Guide 2.0*) can be run on a PC only under *Windows*.

Like version 2.03 (see "Still Waiting For Windows/386," *PCW*, April 1988), *Windows/386 2.1* (\$195) sports a Macintosh-like user interface with pulldown menus and dialog boxes that clearly inspired OS/2's Presentation Manager. Also like OS/2, the system implements *virtual memory*: It automatically swaps program code from memory to disk when you run out of RAM. It swaps only *Windows* itself, or *Windows*-specific programs like *PageMaker*, however. New features include access to an additional 60K of conventional memory, a built-in control for key repeat rate, improved setup, and support for 74 additional printers and plotters.

Thanks to clear documentation and a menu-driven setup utility, the system is extremely easy to install. Applications written specifically to work with *Windows* can be run simply by clicking the mouse on them. However, before you run a non-*Windows*-specific application for the first time, you must create a PIF file to tell *Windows* how much memory the application requires, whether it writes directly to the screen,

## EXECUTIVE SUMMARY

**Windows/386 2.1***Operating environment*

A seamless Mac-like interface, virtually indistinguishable from OS/2's Presentation Manager, makes this popular environment very easy to use, and it includes a package of handy software. But slow performance and awkward serial-port switching introduce unnecessary frustration.

	POOR	FAIR	GOOD	EXCELLENT
Application management				●
Installation and configuration			●	
Memory management				●
Overall value			●	

whether it will run in the background, whether it will allow *other* programs to run in the background, and so on. While the built-in PIF editor simplifies the process of filling in the blanks, figuring out what to put in the blanks is no trivial process. In many cases, only trial and error will reveal how much memory a given application needs; until you get it right, you'll face a barrage of error messages and program crashes.

Applications start from *Windows*' master control program, MS-DOS Executive. Each program runs in its own window, or partition, which can be as large as 640K. *Windows* can be resized and moved around the screen easily with the mouse. It was only possible to install three 640K partitions on a 4MB Compaq Deskpro/386 before *Windows* began swapping code to disk; this was the smallest number of VMs in the roundup.

Usability is uneven. Switching between partitions can be tricky at first, but once you learn the ropes it's relatively easy to step through program partitions by pressing <Alt>-<Tab> or <Alt>-<Esc>. *Windows/386* lets you cut and paste text and graphics from one partition to another with a well-designed clipboard function. True crash isolation is not provided; however, if a program crashes in one partition, a "terminate" option usually permits you to extricate yourself and save the files in the other VMs before restarting the system.

Swapping the serial port is tedious. Once the port is assigned, if you try to use it in another VM, a dialog box appears and demands to know which partition should get the port; unassigning it can be cumbersome. There were no compatibility problems.

*Windows/386* delivers only mixed performance. Even with no disk swapping to slow execution, single-tasking was still next-to-worst in the roundup. However, in multitasking mode *Windows/386* came in second.

*Windows/386*'s wide popularity is well deserved, thanks to its first-class user interface, well-implemented cut-and-paste function, extensive compatibility, and a software package that includes a bare-bones word processor, a competent paint program, and a gang of handy utilities. But for everyday business users, its tedious COM-port switching and relatively slow single-tasking are serious drawbacks.

**Desqview 2.01**

Quarterdeck's *Desqview* is a polished multitasking operating environment with an outstanding user interface; when run with the company's QEMM-386 memory manager, it's a seamless 386 multitasker. *Desqview* delivered the fastest performance, in both events, of any environment in the roundup. Like *Windows/386* and OS/2, it offers virtual memory—and even betters *Windows*, which swaps only *Windows*-specific applications, by swapping all programs.

A menu-driven utility makes installation of *Desqview* (\$190, including QEMM-386) a snap. However, before you can run DOS programs, *Desqview* requires you to create a PIF file for each one, a process that's even more complicated here than it is with *Windows*. Excellent documentation helps, but not enough. Once applications are installed, their names appear on a *Desqview* start-up menu.

The largest partition allowed was 525K, and I managed to fit six of these partitions in the 4MB Compaq—the highest number in the roundup.

*Desqview* provides an extremely well-designed, easy-to-use interface. A tap on the

## FEATURES EVALUATION

### Multitasking 80386 Operating Systems

*Desqview and Windows/386 lead the pack in application management. Desqview takes first place for installation and configuration, as well as for memory management.*

- Yes
- No
- ◐ Deficient

	Windows/386 2.1	Desqview 2.01	VM/386 1.1	PC-MOS/386 2.10
<b>Application management</b>				
Runs two or more programs in a virtual machine	●	●	●	●
Runs EGA applications	●	●	●	●
Specifies processor time per application	○	●	●	●
Swaps serial port automatically	○	●	○	●
Switches virtual machine easily	●	●	●	●
DOS operations from menu	●	●	○	○
Compatible with most major DOS applications	●	●	○	○
<b>Tasking</b>				
exclusive	●	●	●	●
background	●	●	●	●
background suspend	●	●	●	●
Crash isolation	◐ <sup>1</sup>	●	●	○
Overlapped windows	●	●	○	○
Tiled windows	●	●	○	○
<b>Cut and paste</b>				
text	●	●	○	○
graphics	◐ <sup>2</sup>	○	○	○
<b>Tools</b>				
auto-dialer	●	●	○	○
calculator	●	◐ <sup>3</sup>	○	○
calendar	●	◐ <sup>3</sup>	○	○
card file	●	○	○	○
clipboard	●	●	○	○
clock	●	○	○	○
command-line editor	○	○	○	●
communications program	●	◐ <sup>3</sup>	○	○

	Windows/386 2.1	Desqview 2.01	VM/386 1.1	PC-MOS/386 2.10
<b>Application management</b>				
disk cache	●	○	●	●
key-repeat speedup	●	○	○	○
macro processor	○	●	○	○
notepad	●	◐ <sup>3</sup>	○	○
paint program	●	○	○	○
print spooler	●	○	○	●
RAM disk	○	○	●	●
word processor	●	○	○	○

<b>Installation and configuration</b>				
Disk space required	1.7MB	303K	661K	700K
Minimum RAM required	1MB	256K	2MB	1MB
<b>Coprocessor support</b>				
8087	○	●	○	●
80287	●	●	●	●
80387	●	●	◐ <sup>4</sup>	●
Menu-driven installation	●	●	●	○
Clear documentation	●	●	●	○
Requires PIF files	●	●	○	○
On-line help	○	●	●	○

<b>Memory management</b>				
Virtual memory system	◐ <sup>5</sup>	●	○	○
Expanded memory support	●	●	●	●
EMS 4.0 support	●	●	○	○
Maximum virtual machine size	640K	525K	640K	580K
Sizes virtual machines	●	●	●	●

<sup>1</sup> Terminate function allows you to exit crashed VM and save files in other VMs before restarting computer.

<sup>2</sup> Between Windows applications or from some standard applications into Windows applications.

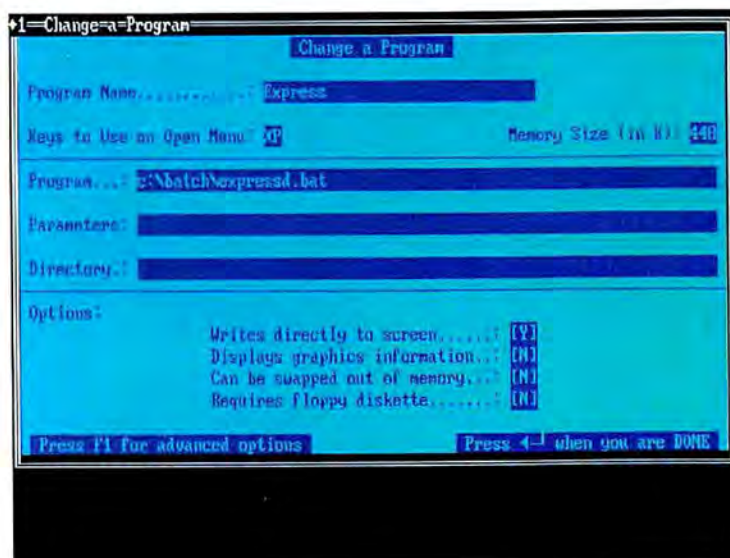
<sup>3</sup> Available as part of Desqview Companions, which costs \$100.

<sup>4</sup> May not work reliably when used with early 80386 chips.

<sup>5</sup> Swaps only Windows itself and Windows-specific applications.

<Alt> key brings up the *Desqview* menu, from which you can start a new application in a new VM, switch VMs, close down a VM, and resize or move a window. You can choose menu options with a mouse (by pointing and clicking) or cursor keys. Experienced users will appreciate the ability to switch rapidly between windows simply by typing a number from the Switcher menu.

A number of other well-designed features give *Desqview* a high usability rating. The program provides complete crash isolation and switches the serial port automatically when you change partitions. Although *Desqview* is known for some compatibility problems, none of the software tested had any



Desqview's complex Change a Program menu helps create program information files to optimize application performance.

trouble running. It lets you cut and paste text (but not graphics) between partitions.

*Desqview* seems designed to save time, instead of eating it up with serial port conflicts and slow performance. It may take you a while to master its configuration routine, but its speed and easy-to-use interface will win you over.

### VM/386 1.1

Intelligent Graphics' *VM/386* is simple to install and simpler to run. Best of all, it requires no PIF files. Unfortunately, it is also the slowest performer in the roundup in both tests, and (at \$245) the most expensive. Software conflicts and nonresizable, full-screen windows are additional shortcomings.

Easy-to-use installation software makes initial setup of *VM/386* a breeze. Once it's up and running, you use the Machine Control menu to install VMs as large as 640K in various combinations and sizes. Each VM can have its own CONFIG.SYS and AUTOEXEC.BAT; default versions of these files are provided if you don't want to customize them. Each VM comes up as an empty, full-screen window with a DOS command line, ready to run applications. Windows cannot be resized.

Once you've installed your VMs, you can save the setup; thereafter, when you boot *VM/386* it will start the VMs automatically.

This process does not always work flawlessly, however; on several occasions, when *VM/386* was trying to start several VMs at the same time, one or more failed and needed to be restarted.

The program itself gobbles a humongous 2MB of RAM, and due to a conflict with Compaq's memory management scheme, some of the RAM in the test PC was inaccessible. As a result, only four 640K VMs could be installed on a 4MB Compaq.

Usability is uneven. On the bright side, no PIF files are needed. Switching between VMs couldn't be easier: You can press <Alt>-<Sys Req> to bring up the Switcher menu, cursor down to the name of the desired machine, and press <Enter>; or simply press <Alt>-<Sys Req> number for a faster switch. *VM/386* provides complete crash isolation; you can reboot a virtual machine without restarting the entire system.

On the downside, no cut and paste is available. Reassigning the serial and parallel ports is a tedious process, requiring you to use the Hardware Control menu every time. More distressing, compatibility was spotty. *ProComm Plus* ran fine; *PC-Talk* wouldn't load at all; *Express* loaded, logged on to MCI, and uploaded messages nicely, but then it refused to download and trashed program and data files on the hard disk. (Intelligent

## EXECUTIVE SUMMARY

### Desqview 2.01

#### Operating environment



Excellent performance, a convenient user interface, virtual memory, full crash isolation, automatic serial-port switching, and reliable operation make this trouble-free multitasker a clear winner. Cut and paste works for text but not graphics.

	POOR	FAIR	GOOD	EXCELLENT
Application management				●
Installation and configuration				●
Memory management			●	
Overall value				●

Graphics claims that *VM-386's* problems with *Express* have been solved in the forthcoming version 1.12.)

*VM/386* costs a bit more than the other environments, but its ease of use is tempting, especially for users who don't have time to figure out PIF files for every DOS application. Documentation is decent, and the user interface is attractive. But *VM-386's* relative slowness is frustrating, and its destruction of *Express* disk files is disturbing to say the least. Wait until they fix the bugs before you buy.

## PC-MOS/386 2.10

PC-MOS/386 from The Software Link is the odd-environment-out in this roundup; unlike the other three, which work with DOS, PC-MOS/386 replaces it completely. It's designed as a multiuser operating environment, but it works as a single-user multitasking system as well. Once you get it running it performs decently enough, but installation and configuration are difficult, and it won't run some popular applications like *ProKey* and *SuperKey*.

PC-MOS/386 (\$195) comes with a hard disk installation utility that leaves a number of critical tasks for the user. Most people will

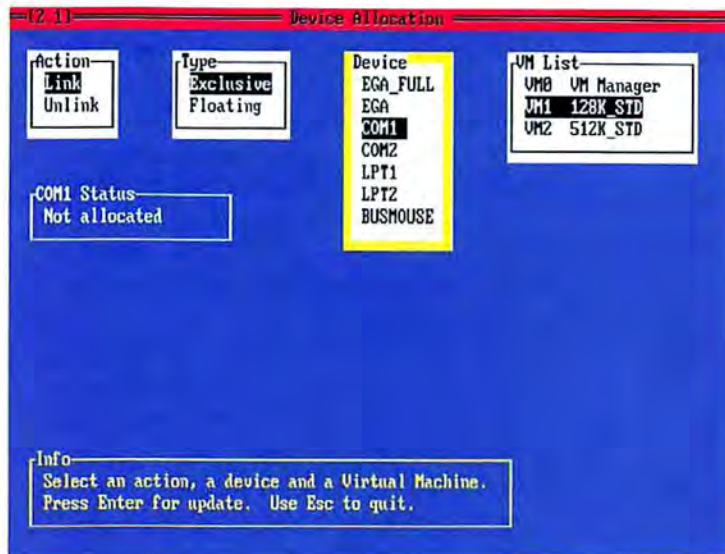
## EXECUTIVE SUMMARY

### VM/386 1.1

#### Operating environment

Easy to install and operate, this environment boasts an attractive, menu-driven interface and allows you to run DOS applications without tedious PIF files. Unfortunately, it's a slow performer, requires manual serial port reassignment, and destroys Lotus *Express* disk files.

	POOR	FAIR	GOOD	EXCELLENT
Application management			●	
Installation and configuration				●
Memory management			●	
Overall value		●		



find it tough to get started. Many important features, like the print spooler and the disk cache, won't work until you specify memory addresses and segment sizes—and the documentation is technical and hard to understand. I could not get the operating system up without hand-holding from tech support—and I decided to leave some handy features (like that print spooler) uninstalled. One nice touch: No PIF files are needed.

The process of installing VMs is a bit clunky, but you can automate the entire procedure with an easily edited AUTOEXEC.BAT file. A system-level command, .ADD-TASK, creates VMs and assigns memory to them. Each partition can have its own AUTOEXEC.BAT file, but not a CONFIG.SYS file. The largest VM I was able to install on my 4MB Compaq was 580K, but five such VMs went in without any out-of-memory messages. VMs come up as full-screen (non-resizable) windows, and you run programs from a command line prompt, as in DOS.

PC-MOS's usability is unimpressive. While switching between partitions is easy (all you do is press <Alt>-number), you cannot cut and paste between partitions; nor is crash isolation provided. PC-MOS handles serial port arbitration automatically, but it is far from trouble free. An XMODEM transmission under *ProComm* ran fine in the background, but when another application tried to access the serial port, *ProComm's* XMODEM routine crashed and could not recover.

**VM/386's Device Allocation menu is used to swap access to COM and LPT ports from one virtual machine to another.**

A review of PC-MOS version 1.01 (see *The Software Shelf*, PCW, December 1987) complained about limited compatibility with DOS applications. The Software Link claims that version 2.10 will run most popular applications, including *dBASE III Plus*, *1-2-3*, and *R:base*. However, macro processors like *ProKey* and *SuperKey* still won't run, *SideKick* requires special patching, and *Express* refused to load at all.

Performance was mixed. In single-tasking mode, PC-MOS/386 had the second-fastest score in the roundup; however, in multitasking mode it came in next to last.

PC-MOS/386 is an interesting environment, but it seems best suited for people who aren't daunted by having to manipulate memory segments. Its inability to run applications like *ProKey* and *Express* and its hazardous COM port arbitration support make it a poor choice for business users.

#### 80386 System Winners

There is no question which environment is the most useful for today's business user. *Desqview*, which has been around long enough to have worked all the bugs out of its system, is fast, powerful, easy to use, and trouble free. *Windows/386* is deservedly popular and features a highly polished user interface, but it's a bit slow, and swapping the serial port from partition to partition grows tedious. *VM/386* runs DOS applications without PIF files, and it will be a serious

## EXECUTIVE SUMMARY

### PC-MOS/386 2.10

#### Operating environment

Seemingly designed more for the technically oriented user than the business user, this command-line-driven environment is highly flexible and can be started from an easily edited batch file. But it's difficult to install and won't run some popular applications.

	POOR	FAIR	GOOD	EXCELLENT
Application management			●	
Installation and configuration			●	
Memory management			●	
Overall value			●	

contender once it speeds up, simplifies its serial port switching, and solves its compatibility problems. PC-MOS/386 is simply too difficult to install and use.

If you're tired of waiting for OS/2 and want to start increasing your productivity today, there's no reason to delay any longer. You *can* do two things at the same time—even more—as long as you choose the right operating environment. ●

*Michael Goodwin is an associate editor for PC World.*

## WHERE TO BUY

### Desqview 2.01

Quarterdeck Office Systems  
150 Pico Blvd.  
Santa Monica, CA 90405  
213/392-9701

**Price:** \$190 (includes QEMM-386)

**Accessories:** Desqview Companions \$100

**Requirements:** 256K (640K and expanded memory recommended), DOS 2.00 or later version

**Technical support:** no toll-free number, M-F 9-5, 24-hour fax number

### Other support services:

12-month Priority Service \$30, forums on CompuServe and BIX

**For more information, circle 630 on reader service card.**

### PC-MOS/386 2.10

The Software Link  
3577 Parkway Ln.  
Atlanta, GA 30092  
404/448-5465

**Price:** single-user version \$195

**Requirements:** 1MB (2MB recommended)

**Technical support:** no toll-free number,

M-F 8:30-6:15

**Other support services:** 24-hour bulletin board (no toll-free number)

**For more information, circle 631 on reader service card.**

### VM/386 1.1

Intelligent Graphics Corp.  
4800 Great America Pkwy.  
Santa Clara, CA 95054-1221  
408/986-8373

**Price:** single-user version \$245

**Requirements:** 2MB,

DOS 3.00 or later version

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

**Other support services:** none

**For more information, circle 632 on reader service card.**

### Windows/386 2.1

Microsoft Corp.  
16011 N.E. 36th Way  
Box 97017  
Redmond, WA 98073-9717  
206/882-8080

**Price:** \$195

**Requirements:** 1MB (2MB recommended), DOS 3.10 or later version

**Technical support:** no toll-free number, M-F 7-4

**Other support services:** none

**For more information, circle 633 on reader service card.**

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*"The Dell System 220 runs most PC Labs system benchmark tests at speeds that would make you think you're running a 386."*

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—WILL FASTIE, PC WEEK

*"...includes a year's on-site support...in the price of the computer. This is the sweetest support deal offered by any computer vendor in the industry."*

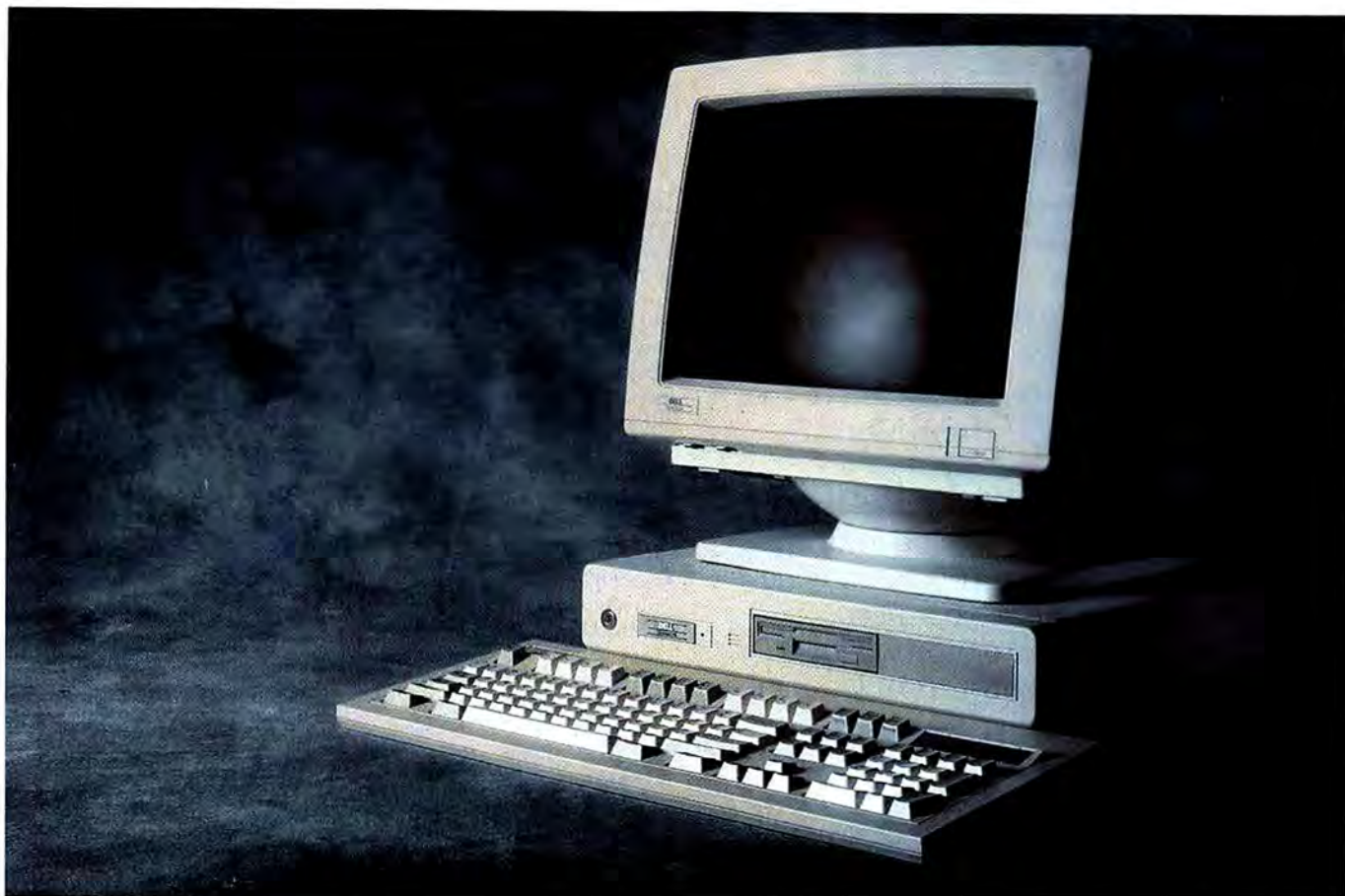
—ERIC KNORR, PC WORLD

*"The hot item from a technical point of view is the System 220. This machine runs a 286 processor at 20 MHz, which is its major claim to fame."*

—WILL FASTIE, PC WEEK

*"...the System 220 has more going for it than just speed."*

—PC WORLD



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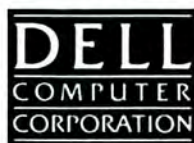
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322 MB - 18 ms ESDI	\$7,399	\$7,699



## THE NEW 20 MHz 286 SYSTEM 220.

As fast as most 386 computers, at less than half the price—more power for the money than any other system. An 80286 system that runs at 20 MHz, with less than one wait state. Completely compatible for both MS-DOS<sup>®</sup> and MS<sup>®</sup> OS/2 applications (it runs faster than IBM PS/2 Model 80), and with a remarkably small footprint, the System 220 is the ideal executive workstation.

### Standard Features:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM (640K usable) expandable to 16 MB (8 MB\* on system board).
- Page mode interleaved memory.
- Integrated diskette and VGA video controller on system board.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- LIM 4.0 support for memory over 1 MB.
- Three full-sized AT<sup>†</sup> compatible expansion slots available.
- Socket for 80287 coprocessor.

### Options:

- External 5.25" 1.2 MB diskette drive.
- 3.5" 1.44 MB diskette drive.
- Intel 80287 coprocessor.
- 1 MB RAM upgrade kit.

*\*\*Lease for as low as \$85/Month.*

System 220	With Monitor		
	VGA Mono	VGA Color	VGA Color Plus
One Diskette Drive	\$2,299	\$2,499	\$2,599
40 MB - 29 ms Hard Disk	\$2,999	\$3,199	\$3,299
100 MB - 29 ms Hard Disk	\$3,799	\$3,999	\$4,099



# THE 12.5 MHz SYSTEM 200.

A great value in a full-featured AT compatible. An 80286 computer running at 12.5 MHz, this computer is completely MS-DOS and MS OS/2 compatible. The System 200 offers high speed drive options, industry standard compatible BIOS and on-site service. As Executive Computing said of this computer's predecessor, "If faster processing speed and low cost are two key issues affecting your purchase decision, this machine might be the ideal choice for your office."

- Standard Features:**
- Intel 80286 microprocessor running at 12.5 MHz.
  - 640 KB of RAM expandable to 16 MB (4.6 MB\* on system board).
  - 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
  - Dual diskette and hard disk drive controller.
  - Enhanced 101-key keyboard.
  - 1 parallel and 2 serial ports.
  - 200 watt power supply.
  - Real-time clock.
  - 6 expansion slots. (4 available with hard disk drive controller and video adaptor installed).
  - Socket for 8 MHz 80287 coprocessor.

- Options:**
- 512 KB RAM upgrade kit.
  - 8 MHz Intel 80287 coprocessor.
- \*\*Lease for as low as \$78/Month.*

System 200	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
40 MB - 28 ms	\$2,699	\$2,999
90 MB - 18 ms ESDI	\$3,499	\$3,799
150 MB - 18 ms ESDI	\$3,999	\$4,299
322 MB - 18 ms ESDI	\$5,999	\$6,299



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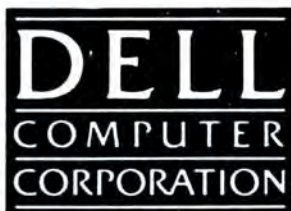
LASER SYSTEM 150; \$5,995. 15 pages per minute, text and full-page graphics. Dual 250 sheet-input trays.	LASER SYSTEM 80; \$3,295. 8 pages per minute, text and full-page graphics.	LASER SYSTEM 60; \$2,195. 6 pages per minute, text and full-page graphics.
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### DOT MATRIX PRINTERS.

PRINTER SYSTEM 800; \$699.95. Highest resolution text and graphics from a 24-wire dot matrix printer. Draft quality at 200 cps. Correspondence quality at 132 cps. Letter quality at 66 cps. Standard parallel and serial interfaces. Wide carriage.	PRINTER SYSTEM 600; \$499.95. 9-wire dot matrix. Draft quality at 240 cps. Near-letter quality at 60 cps. Standard parallel interface. Wide carriage.	PRINTER SYSTEM 300; \$199.95. 9-wire dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Paper parking. Standard parallel interface.
---	---	---

### OPERATING SYSTEMS.

Dell Enhanced MS-DOS 3.3 with disk cache and other utilities; \$119.95.  
Dell Enhanced MS OS/2 Standard Edition 1.0 \$324.95.



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AD CODE NO. 11DK8

## 162 **Micro 1 Tower 386-20MHz**

A true bargain among machines of its class, the Micro 1 blends solid construction and design with an extraordinarily low price.

## 164 **SnapShot**

Capture and edit images from any video source—including a TV—with the first fully realized image processing system for the PC.

## 172 **HP PaintJet**

Crisp, vivid color graphics; speedy text printing; and a reasonable price distinguish this briefcase-size ink jet printer.

## 176 **Zoom HC 2400**

If you need Hayes functionality but don't want to shell out for the real thing, consider a compatible modem-on-a-board that works even in the fastest computers.

## 184 **Panasonic KX-P4450 Laser Partner**

Basic business printing is the Panasonic's forte. It beats the price and the text-printing speed of the LaserJet Plus but falls down on graphics.

## Micro 1 Tower 386-20MHz

80386 system



**PROS:** Tower design, inexpensive, quiet

**CONS:** No disk-caching software, no 32-bit slots

Despite rocketing RAM costs, system prices keep coming down. Micro 1 has the latest steal, a 20-MHz 80386 at half the price of a Compaq Deskpro 386/20, \$1500 less than Dell's System 310, and even \$100 less than a comparable Blackship. Although the Micro 1 lacks 32-bit expansion slots and runs disk-intensive applications rather slowly due to its lack of disk-caching software, it is a solid, usable 20-MHz 80386 at one of the lowest prices ever.

The Micro 1 Tower's \$3335 base price includes 1MB of 32-bit motherboard RAM; a 28ms, 45MB Toshiba hard disk; a 1.2MB floppy drive; one serial and one parallel port; a 101-key Key Tronic keyboard; and a monochrome graphics monitor and adapter. (\$5025 will buy you the system we reviewed: 2MB of motherboard RAM; a 28ms, 110MB Mini-Scribe hard drive; a VGA adapter; a color analog monitor; and an 80387 math coprocessor.)

The Micro 1's only serious flaw is its lack of disk-caching software. As a result, in National Software Testing Laboratories (NSTL) tests not shown here, the machine ran disk-intensive applications like *dBASE III Plus* four times slower than did the Compaq 386/20—despite a fast, 28ms hard drive. In fact, it ran slower than many 16-MHz systems on these tests. When third-party disk-caching software was used, as in the NSTL tests shown, the Micro 1 pulled right up with the Compaq. At least compatibility isn't an issue—the Micro 1 aced the NSTL Crash Test.

The Micro 1's 20-MHz CPU (downshiftable to 6 MHz) alternates between zero and one wait state using an interleaved memory scheme that relies on a 64K cache of high-speed static RAM to intercede between the

CPU and the 100ns dynamic system RAM. You can upgrade system RAM in 1MB increments to a respectable 10MB of 32-bit memory, all socketed on a Mylex motherboard and all accessible at 20 MHz.

Expandability is average. The 8-MHz, one-wait-state expansion bus provides two 8-bit and six 8/16-bit slots. An Adaptec hard/floppy controller that permits 1:1 interleaving (a big advantage for applications like CAD/CAM that load large data files) takes up one 8/16-bit slot. An I/O board and a display adapter take up both 8-bit slots. All six half-height drive bays are externally accessible.

The Micro 1's ergonomics are decent. The sturdy, vertical-standing cabinet is easy to open, and the 220-watt power supply is remarkably quiet. Controls and indicator lights (power and reset switches, a keylock, and a disk activity light) are conveniently located on the front panel; unfortunately, they are placed halfway down the tower, making them a bit hard to reach. No CPU-speed indicator light is included, but the cursor changes shape when you downshift to 6 MHz with a keyboard command.

Peripherals are first-rate. The 101-key Key Tronic keyboard had a sure, quiet touch, while the Amdek VGA color monitor that arrived with the system was crisp and bright from edge to edge.

System extras are mostly impressive too. The Micro 1 comes with a ROM-based setup program and a package of utilities that includes an EMS 4.01 Expanded Memory Manager. The documentation was a bit sketchy, but Micro 1 promises a better set soon.

The Micro 1's price is so impressively low that if the system weren't such a drudge at *dBASE* it would be a total triumph. Even so, solid ergonomics, decent expandability, and a rock-bottom price make it a rare find. Users searching for top speed, bus-master capability, or 32-bit expansion slots should look elsewhere, but budget-minded users thinking about moving up to a 20-MHz 80386 will like what they see. —Eric Brown

#### WHERE TO BUY

##### Micro 1 Tower 386-20MHz

Micro 1  
557 Howard St.  
San Francisco, CA 94105  
800/338-4061, 415/974-5439

**List price:** with 1MB RAM, 45MB Toshiba hard disk drive, 1.2MB floppy drive, Adaptec 2372 controller, monochrome graphics monitor and adapter, one parallel and one serial port, 101-key Key Tronic keyboard, assorted utilities \$3335

**Accessories:** amber monochrome graphics monitor and adapter \$135, color monitor with Everex EGA \$534, color monitor with Paradise VGA Plus \$734, NEC MultiSync II with Paradise VGA Pro \$1150; 1MB RAM \$425; 80387-20 co-processor \$735; 1.44MB 3½-inch floppy drive \$139, 1.2MB 5¼-inch floppy drive \$125, 360K 5¼-inch floppy drive \$95; 45MB Toshiba hard drive \$499, Mini-Scribe 110MB hard drive \$774, 330MB

The Micro 1 Tower 386-20MHz is a fast, fully functional 80386-based computer at a rock-bottom price.



## FEATURES EVALUATION

## Micro 1 Measures Up

The Micro 1 Tower 386-20MHz lacks forward-looking extras such as 32-bit slots or a multi-mastering bus, but for the features that count today, it stands up well to systems that cost more than twice as much.

	Micro 1 Tower 386-20MHz	IBM PS/2 Model 80-111
● Yes ○ No		
<b>Standard features</b>		
Price <sup>1</sup>	\$4424	\$10,995
CPU	80386	80386
Clock speed	20 MHz	20 MHz
Built into motherboard		
Parallel port	○	●
Serial port	○	●
Floppy disk controller	○	●
Video adapter	○	●
Coprocessor support	80387	80387
32-bit memory bus capacity		
Amount shipped with basic unit	1MB	2MB
Maximum installable	10MB	4MB
<b>Expandability</b>		
32-bit expansion slots/number free	0	2/2
8/16-bit expansion slots/number free	6/5	5/4 <sup>2</sup>
8-bit expansion slots/number free	2/0	0
Half-/full-height storage device bays	6/0	2/2 <sup>3</sup>
120MB or larger hard disk available from manufacturer	●	●
<b>Ergonomic design</b>		
Front-panel reset button	●	○
Front-panel on/off switch	●	●
Front-panel keyboard socket	○	○
ROM-based setup software	●	○
Tilt-and-swivel monitor	●	●
Compact footprint	● <sup>4</sup>	● <sup>4</sup>
Complete documentation	●	●

<sup>1</sup> Price based on 2MB RAM, one floppy drive, one 110MB (Micro 1) or 115MB (IBM) hard disk and controller, VGA (monitor not included), one parallel port, one serial port, and a 101-key keyboard.

<sup>2</sup> Slots accept only MCA-compatible boards.

<sup>3</sup> Half-height bays accept only 3½-inch devices.

<sup>4</sup> Floor-standing model.

Toshiba SCSI hard drive \$2195; 60MB Irwin internal tape backup \$665; serial port \$45; parallel port \$30; MS-DOS 3.30 and GW BASIC 3.3 \$89

**Warranty:** one year parts and labor, 30-day money-back guarantee

**Extended warranty:** 10 percent of original cost each year

**Technical support:** no toll-free number, M-Sat 8-5

**Other support services:** none  
For more information, circle 601 on reader service card.

## SnapShot

Image processing system

**PROS:** Easy to use, digitizes live images

**CONS:** Cannot produce ASCII file from scanned text, generates only TIF and EPS graphic files

If you are thinking of spending \$1700 to \$4000 for a scanner that digitizes flat artwork and photographs for desktop publishing, think again. Aldus's *SnapShot* system (\$2300 to \$2900) captures and freezes pictures from any video source—a video camera, VCR, videodisk, or even a live TV broadcast—to create a digital image of virtually anything: flat, round, or moving.

*SnapShot* is the first full-featured PC product of its kind. Not only does its output compare favorably with that of similarly priced scanners, but the TIF and EPS files it generates are significantly smaller than comparable files from a scanner.

The heart of the system is Aldus's Windows-based *SnapShot* software (\$495). You'll also need to spend between \$700 and \$1500 for an image processing board (or "frame grabber") like those sold by Matrox or Imaging Technology, and buy an analog monitor (in addition to your system monitor) and an image source—probably a video camera. You can buy the elements separately or as a package from Micro D (with a relatively expensive Ikegami camera) for around \$2900.

Using *SnapShot* is a three-step process: capture an image, freeze and edit it, and save it to disk. To get started, all you do is connect the video source and analog monitor to the frame-grabber board, load *Microsoft Windows* (a run-time version is included), and run *SnapShot*.

Displaying a captured image takes two mouse clicks; nothing happens on the regular

# Optical Winner



## COREL WORM Drives

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### ■ WORM vs Erasables

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- Available NOW

### ■ Total PC Compatibility

COREL WORM drives are 100% PC compatible. Use them with all your existing applications and standard DOS commands just like your floppy drive.

### ■ "Plug and Play"

Everything you need is included: Drive, Software, Cable, and SCSI Interface Card and Manual. Your WORM can be running minutes after opening the box.

### ■ Low cost/Mbyte

Under \$15/Mbyte of on-line capacity. This is almost as low in cost as tape but with random access, greater reliability and longer life media.

### ■ Proven Software

COREL leads the way in PC compatible WORM drives with thousands of installations

### ■ Proven Hardware

COREL uses proven drive mechanisms from industry leaders such as Panasonic, Ricoh and Maxtor.

### ■ Hot Line Support

Just in case you have any problems, COREL provides Hotline and Bulletin Board support to help find the solution quickly and efficiently.

### ■ Dozens of Applications

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- Bernoulli replacement
- Security Systems
- Digitized voice
- Multi-media

### ■ Choices of Drive

Each COREL drive is a complete ready-to-go subsystem.

- **COREL PC400 \$2,895**  
400 Mbyte capacity (2 x 200/side)  
Cartridges \$99 each.
- **COREL PC600 \$3,795**  
600 Mbyte capacity (2 x 300/side)  
Cartridges \$180 each
- **COREL PC800 \$3,995**  
800 Mbyte capacity (2 x 400/side)  
Cartridges \$160 each.

### ■ Optional Developer's Kit

Allows easy modification of COREL software for custom applications

- **COREL SW76 \$1,500**

### ■ Other Systems Available

COREL has WORM subsystems for:

- Macintosh
- Novell LAN Fileservers
- 3COM LAN Fileservers
- UNIX (Available soon)
- Rugged Military

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Logi Buss Mouse with Publisher	\$ 99		

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MS Buss Mouse w/Windows	121
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Lotus Manuscript	285
Lotus Report Writer	57
MS Excel	280
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PFS Professional Plan	52
Quattro	140
Supercalc 4	278
Twin Classic	32
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**\$555**

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<b>PC 286 12 Mhz Zero Wait State w/1024K, 1.2 Floppy Drive</b>	<b>1240</b>
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## PRINTERS

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300	485
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<b>Panasonic 1080 I M2</b>	<b>159</b>
1091 I M2	180
1092 I	325
1524	560
1592	409
1595	429
3131	305
3151	475
Lazer 4450	1635
<b>Star Micronics</b>	Call
<b>Toshiba 321 SL</b>	<b>489</b>
341 SL	709
351 SX	999
Pace Lazer	2415

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Beta Ext	1015
Beta Int	775
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Other Models	Call
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## MODEMS

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2400 Ext	130
2400B w/Software	115
<b>Hayes 1200</b>	<b>275</b>
1200B	245
2400B	389
<b>Prometheus</b>	
1200B w/Software	70
2400B w/Software	125
Other Models	Call
<b>US Robotics</b>	
Password 1200	175
Courier 2400	289
Courier 2400E	335
HST 9600	635
<b>Spoorster PC 2400B w/Software</b>	<b>125</b>

## TERMINALS

Wyse 30	\$285
50	369
85	439

## BOARDS

AST Hot Shot	\$359
Six Pack Plus	115
Xlormer	579
3G + II	219
VGA	249
VGA +	320
Other Models	Call
ATI EGA Wonder	220
VIP VGA	260
Hercules Color Card	145
Graphics Card Plus	170
Incolor	199
Intel Inboard 386 PC	935
Inboard 386 AT w/cable	1025
4020	325
80287-6 New	155
Orchid Designer VGA	299
Tiny Turbo 286	249
VGA	220
Paradise Autoswitch 350	159
Autoswitch 480	170
VGA +	259
VGA Professional	Call
Video-7 Fastwrite	355
VGA	269
Vega Deluxe	180
V-RAM	475
Zenith 449 VGA	239

## NOVELL

Altec Passive Hub	\$29
AQUILA 8 Port Active Hub	279
AQUILA Arcnet Card	99
SMC 110 Arcnet	129
All Others	Call

## HARD CARDS

Plus 20 MG	\$515
Plus 40 MG	650

## COMPUTERS

AST Model 80	\$1440
Model 140	2685
Model 340	3999
Model 390	5409
Other Models	Call
NEC Multispeed EL II	1469
Multispeed Hd	2329
Toshiba T-1000	785
T-1200F	1565
T-3120	3068
T-3200	3785
T-5100	4899
Zenith	
Supersport/2	1655
Supersport 20 MG	2479
Supersport 286/Model 20	3445

## MONITORS

Amdek 410	\$130
432	149
210A	80
NEC	
Monograph System	1299
Multisync II	\$595
Multisync Plus	899
Multisync XL	2065
Other Models	Call
Princeton Ultrasync	485
Samsung	Call
Sony Multiscan (1303)	535
Mitsubishi Diamond Scan	499
Zenith 1490	599

## KEYBOARDS

<b>Keytronics KB5151</b> . . . . .	<b>\$119</b>
KB5153 . . . . .	<b>149</b>
KB101 . . . . .	<b>85</b>



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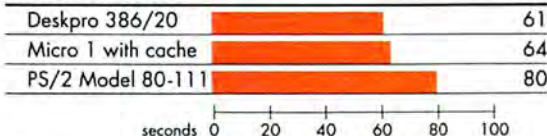
Circle 178 on reader service card

## NSTL TEST REPORT

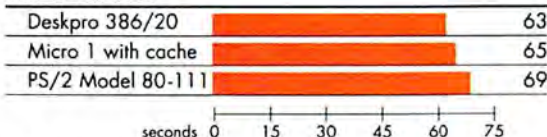
## Micro 1 Tower 386-20MHz

The Micro 1 hangs in there with the 20-MHz pack on most tests when a third-party disk cache, is used.

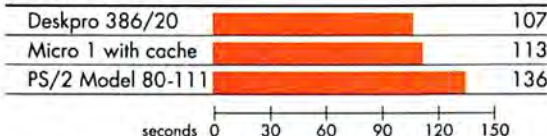
## Microsoft Word



## dBASE III Plus



## 1-2-3



The Micro 1 was tested with a 110MB hard disk, 2MB of RAM, and a 64K memory cache. Super PC-Kwik was used to provide a disk cache of 256K of extended memory. The IBM PS/2 Model 80-111 was tested with a 115MB hard disk, 4MB of RAM, and a disk cache of 256K in extended memory. The Compaq Deskpro 386/20 was tested with a 135MB hard disk, 4MB of RAM, a 32K memory cache, and a disk cache of 256K in extended memory.

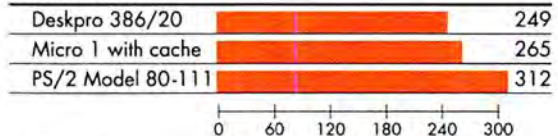
## Microsoft Word 4.0

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

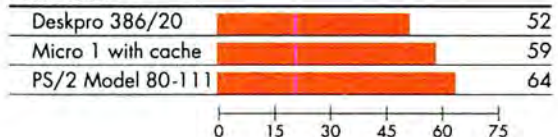
## dBASE III Plus 1.1

The dBASE III Plus test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

## Microsoft C



## AutoCAD



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

## AutoCAD 9

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

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

monitor, but the analog screen snaps to life with a live black-and-white image. The Auto-Gain option optimizes contrast and brightness automatically, or you can adjust the picture manually, just as you would on a TV. An impressive array of image controls can be accessed simply by popping open a menu and clicking.

Next you freeze and edit the image. *Snap-Shot* offers a number of handy options to sharpen and touch up image quality; filter

color input; digitally remove unwanted elements; crop, enlarge, rotate, and combine images; create special effects such as solarization; and paint and blend pixels. For example, the blend option erases blemishes by combining values of neighboring pixels. Editing changes are displayed on the analog monitor.

Once you're satisfied, you can save the image as a TIF or EPS file, which can be used

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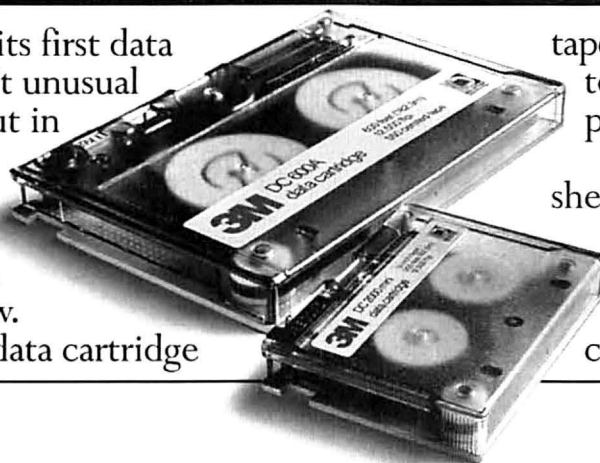
Circle 297 on reader service card



# To create the world's first data cartridge tape, our engineers had to give up a lot of dreams.

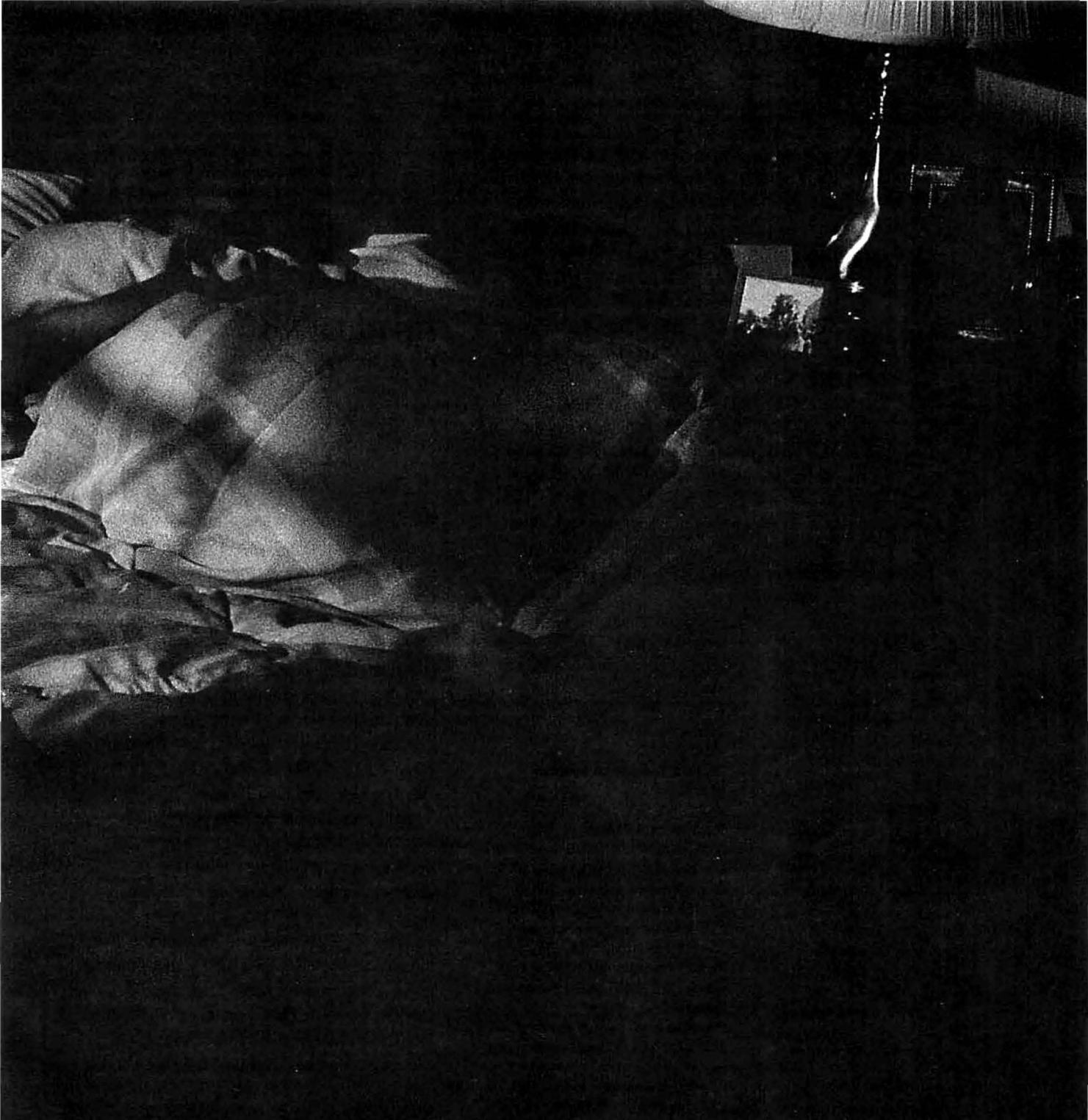
To bring the world its first data cartridge tape, it wasn't unusual for our engineers to put in a little overtime on their overtime. Or occasionally miss the late show. Or even miss the late, late show.

And even after the data cartridge



tape was born, they still refused to lay low. It had to be perfected.

So, instead of counting sheep, our engineers counted patents. In fact, over ten of them are in use today. A number no other data cartridge tape manufacturer



can even come close to matching.

During other sleepless nights, they'd toss and turn over technological breakthroughs like proprietary Blackwatch™ back-coating, No End Play (NEP) hub designs, Dura-Stat™ drive rollers and one piece tape guides for precision tracking.

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Circle 124 on reader service card

by compatible programs such as *WordPerfect 5.0*, *PageMaker*, *Ventura Publisher 2.0*, and *IBM Interleaf Publisher* and printed with PostScript devices such as IBM's Personal Pageprinter and Apple's LaserWriter. *SnapShot*'s default is an 8-bit gray-scale TIF; if your target program requires less data, you can use a lower resolution gray-scale format.

The *SnapShot* system is a pleasure to use. In fact, scanner manufacturers have reason to worry. The only drawbacks to *SnapShot* are that, unlike some scanners, it lacks OCR capability, and that it is more difficult to use for flat artwork and photos. Nonetheless, if you are a desktop publisher and need a jack-of-all-trades image digitizer, take a look at *SnapShot*; it may turn you into a video pioneer sooner than you think. —Alan Southerton

#### WHERE TO BUY

##### **SnapShot**

Aldus Corp.  
411 First Ave. S  
Seattle, WA 98104  
206/622-5500

##### **Micro D SnapShot System**

Micro D  
2801 S. Yale St.  
Santa Ana, CA 92704  
800/642-7631

**List price:** SnapShot software \$495; Micro D system (software, Matrox PIP512B frame grabber, Sony 13-inch CPD-1310 Trinitron monitor, Ikegami ICD-200 video camera) \$2905

**Requirements:** IBM PC AT or compatible, 512K RAM, 2MB free space on hard disk

**Warranty:** 90 days on SnapShot disk

**Manufacturers' warranties:** one year parts and labor for Matrox PIP512B; one year parts and 90 days labor for Trinitron CPD-1310, two years for cathode-ray tube; two years parts and labor for Ikegami ICD-200

**Extended warranty:** none for any part of the system

**Technical support:** 45 days only for SnapShot disk, no toll-free number, M-F 7-6

**Manufacturers' support:** free for lifetime of product for Matrox PIP512B, no toll-free number, M-F 9-5; free for lifetime of product for Trinitron monitor, toll-free number, M-F 9-5; free for lifetime of product for Ikegami ICD-200, no toll-free number, M-F 9-5

**Extended support:** one year support for SnapShot disk \$100, toll-free number, CompuServe forum; no extend-

ed support for other parts of the system

**Other support services:** none

For more information on SnapShot, circle 602 on reader service card; for more information on Micro D system, circle 603.

## HP PaintJet

*Color ink jet printer*

**PROS:** Sharp color graphics, good text printing speed, no smearing

**CONS:** Print features accessible only via software, no emulations

Colorized black-and-white movies may be déclassé, but a splash of color can add a touch of class to a boardroom-presentation transparency, a CAD/CAM printout, or an otherwise dreary *document noir*. One way to give your output Technicolor punch is with the \$1395 Hewlett-Packard PaintJet, a moderately priced, 80-column, ink jet printer that produces sharp, vibrant color text and graphics. It's faster than Xerox's wide-carriage 4020 (see *The Hardware Shelf*, PCW, October 1988) and \$100 cheaper.

HP's engineering acumen is evident in most aspects of the printer's design. The briefcase-size unit weighs in at only 11 pounds. Connections, DIP switches, panel controls, and ink cartridges are all easily accessible. The top-mounted control panel has membrane switches, plus LEDs that indicate paper-out and paper jams. Like the HP DeskJet (see *The Hardware Shelf*, PCW, June 1988), the PaintJet uses an innovative ink cartridge/printhead combination that elimi-

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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.

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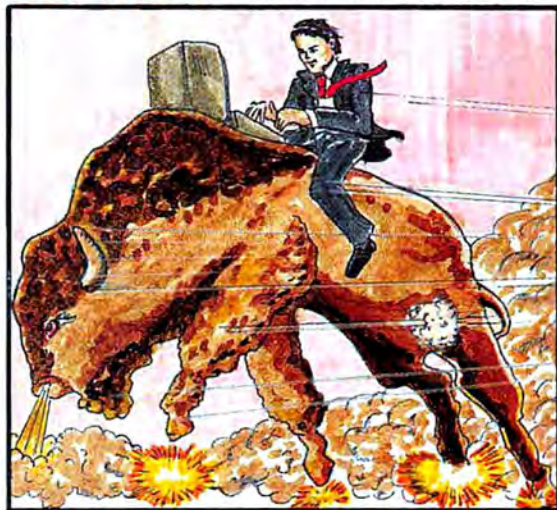
**Next available printer:** Automatic routing of data to next available printer, if desired.

**Warranty:** One year

**Guarantee:** 45 day money back satisfaction guaranteed.



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Circle 215 on reader service card



Hewlett-Packard's PaintJet uses 60 nozzles and two ink cartridges to print crisp color text and graphics.

nates messy refills. Unfortunately, the printer's paltry 8K buffer is not expandable.

Precision craftsmanship is also reflected in the PaintJet's gorgeous color output. The printer uses two ink cartridges and 60 nozzles to produce up to 330 distinct shades. It can generate graphics with a resolution of 180 dots per inch, and unlike with many ink jet units, its NLQ text quality approaches that of a good 24-pin dot matrix printer. However, it's no speed demon—at least not at graphics; the PaintJet takes a full 4 minutes to print a page of color graphics. Text mode is much quicker; a 250-word, double-spaced page churns out in 30 seconds.

The PaintJet packs three built-in fonts: 10-pitch Courier and 12- and 18-pitch Letter Gothic. It offers nine foreign-language character sets as well, plus boldface, underlining, and expanded and compressed text styles. On the downside, these features are accessible only via your applications or escape codes.

Unlike many ink jet printers, the PaintJet doesn't *require* special paper, but output quality does vary widely depending on the grade you use. HP recommends its own coated paper, which comes in cut sheets and fanfold. When you use this stock, the PaintJet's output is similar in quality to that of the Xerox 4020.

The PaintJet is obviously slower and produces lower resolution output than a high-end thermal-wax color printer like the \$8000 Tektronix 4693D. While it's faster and cheaper

than the Xerox 4020, it has a narrower carriage, and per-page costs are higher. Still, if you're looking for a printer that produces quality color graphics, and a low sticker price is your highest priority, give the PaintJet a look. —Wes Nihei

#### WHERE TO BUY

##### HP PaintJet

Hewlett-Packard  
1820 Embarcadero Rd.  
Palo Alto, CA 94303  
800/752-0900

**List price:** with one parallel, serial, or HP-IB port \$1395

**Accessories:** 8½-by-11-inch coated paper \$23 (250 sheets), 9½-by-11-inch coated fanfold paper \$18 (250 sheets), transparencies \$65 (50 sheets); black ink cartridges \$28 each, color ink cartridges \$35 each

**Warranty:** one year parts and labor  
**Extended warranty:** \$96 per year for on-site service (within 4 hours of service center), \$60 per year for next-day service, \$36 per year for carry-in service

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

**Other support services:** none  
For more information, circle 604 on reader service card.

## Zoom HC 2400

*Internal 2400-bps modem*



**PROS:** Low price, works in high-speed buses, ProComm included free

**CONS:** Transmission errors over very noisy lines

The Zoom HC 2400 is a low-priced (\$199), Hayes-compatible, internal 2400-bps modem designed to work in even the fastest computers. This half-length board includes a number of tempting features, such as a built-in speaker with an external volume control, a free copy of *ProComm*, and over \$275 worth of discounts and on-line connect time. Considering that you can easily spend over \$500 for a similar unit from Hayes, the Zoom HC is well worth a close look.

What's to say about an internal modem? You slide it into an 8-bit or 8/16-bit slot, put the cover back on your PC, and if it works, you forget about it. The Zoom HC 2400

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- ALPHA/three 1.1 (dBase file compatible) ... 219.

### American Small Business Computers

- Design CAD 3.0 (NCP) ... 159.
- Design CAD 3D 1.1 (NCP) ... 159.

### Application Techniques ... NCP

- Pizazz Plus ... 75.

### Ashton-Tate ... NCP

- dBASE III Plus 1.1 ... call
- MultiMate Advantage II 1.0 ... 299.
- Framework III ... 479.

### Best Programs ... NCP

- Label Master 3.1 (mailing label program) ... 29.

### Bloc Publishing ... NCP

- FormTool 2.01 ... 55.

### Borland International ... NCP

- Turbo BASIC 1.1 ... 67.
- Superkey 1.1 ... 67.
- Turbo C 2.0 ... 95.
- Turbo Pascal 5.0 ... 95.
- Turbo Assembler & Debugger 1.0 ... 95.
- Reflex 1.1 ... 99.
- Eureka 1.0 ... 99.
- Sidekick Plus 1.0 ... 129.
- Sprint 1.0 ... 129.
- Quattro 1.0 w/SQZ!Plus 1.0 ... 159.
- Paradox 2.0 ... call

### Broderbund ... CP

- Print Shop ... 39.
- Memory Mate 3.01 (NCP) ... 45.

### Computer Associates ... NCP

- SuperCalc 4 1.1 ... 299.

### Core International ... NCP

- Corefast 2.0 ... 99.

### Crosstalk Communications ... NCP

- Crosstalk XVI 3.61 ... 95.
- Crosstalk MK.4 1.0 ... 124.

### Dac Software ... NCP

- Dac-Easy Payroll 3.0 ... 59.
- Dac-Easy Light 1.0 ... 45.
- Dac-Easy Accounting 3.0 ... 59.
- Dac-Easy Bonus Pak 3.0 ... 115.

### Digital Research ... NCP

- Gem Draw Plus 2.01 ... 189.
- Gem Desktop Publisher 1.1 ... 179.

### 5th Generation ... NCP

- Fastback Plus 2.0 ... 99.

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Managing Your Money 4.0 ... \$119.

### Fox Software ... NCP

- Foxbase Plus 2.1 ... 209.

### Funk Software ... NCP

- Sideways 3.21 (creates wide printouts) ... 42.
- Worksheet Utilities 1.0 (1-2-3 utilities) ... 59.

### General Information ... NCP

- Hot Line Two ... 57.

### Generic Software ... NCP

- Generic CADD Level 3 1.01 ... 109.
- Dot Plot 3.0 ... 35.

### Harvard Associates ... NCP

- PC LOGO 2.0 ... 89.

### Hayes ... NCP

- Smartcom II 3.0 ... 89.

### Hilgraeve Software ... NCP

- HyperACCESS 3.3 ... 89.

### Individual Software ... NCP

- Typing Instructor Encore ... 26.
- Professor DOS (with Smartguide) ... 33.

### 101 Macros for:

- 1-2-3 dBASE III Plus WordPerfect
- Excel ... each 42.

### Intuit ... NCP

- Quicken 2.0 ... 35.

### Javelin Software ... NCP

- Javelin Plus 2.02 ... 249.

### Lotus ... NCP

- Agenda 1.0 ... 289.
- 1-2-3 2.01 (now not copy-protected) ... call
- Symphony ... call

### MECA ... CP

- Managing Your Money 4.0 ... special

### Meridian Technology ... NCP

- CarbonCopy Plus 5.0 ... 115.

### Micro Logic ... NCP

- Tornado 1.8 ... 55.

### Microlytics ... NCP

- Gofer 1.0 (text retrieval system) ... \$45.
- Wordfinder 4.0 (electronic thesaurus) ... 35.

### MicroPro ... NCP

- WordStar Professional Release 5 ... 259.
- WordStar 2000 Plus Rel. 3 (Personal Ed.) ... 259.

### Microrim ... NCP

- R:BASE for DOS (version 2.1) ... 449.

### Microsoft ... NCP

- Learning DOS (for any DOS version) ... 35.
- Windows 286 2.1 ... 69.
- Windows 286 2.1 w/Mouse ... 145.
- Works 1.05 ... 99.
- Windows 386 2.1 ... 129.
- Bookshelf 1.0 w/Amdek Laser Drive ... 799.
- Word 4.0 ... 209.
- Excel 2.0 (requires 80286/80386 CPU) ... 319.
- Quick BASIC 4.0 ... 69.
- Quick C 1.01 ... 69.
- Macro Assembler 5.0 ... 99.
- C Compiler 5.1 ... 299.

### Migent ... NCP

- Ability Plus 1.0 ... 149.

### Monogram ... NCP

- Dollars & Sense 3.1 ... 105.

### Nantucket Software ... NCP

- Clipper (Summer '87, dBase Plus compiler) ... 459.

### New England Software ... NCP

- Graph-in-the-Box Release 2 ... 75.

### Nolo Press ... NCP

- WillMaker 3.0 ... 35.

### North Edge Software ... NCP

- Timeslips III 3.3 ... 119.

### Owl International ... NCP

- Guide 2.0 ... 143.

### Paperback Software ... NCP

- VP-Planner Plus 2.0 ... 145.
- VP-Expert 2.0 (expert system) ... 145.

### Paul Mace ... NCP

- H/Test-H/Format 2.0 (hard-disk tools) ... 49.
- Mace Utilities 4.1 (DOS utilities) ... 55.

### Personal Computer Support Group ... NCP

- Lightning 4.80 ... 57.
- Lucid 3-D 1.22 ... 89.

### Personics ... NCP

- SmartNotes 2.0 ... 49.
- SeeMORE 1.0 ... 49.
- @BASE 1.1 ... 119.

### Peter Norton ... NCP

- Norton Commander 2.0 ... 45.
- Advanced Utilities 1.0 ... 79.
- Dan Bricklin's Demo Program 2 ... 99.

### Quarterdeck ... NCP

- DESQView 2.02 ... 79.
- Expanded Memory Manager 4.1 ... 39.

### Revolution Software ... NCP

- Cruise Control 3.02 ... 39.

### Simon & Schuster ... NCP

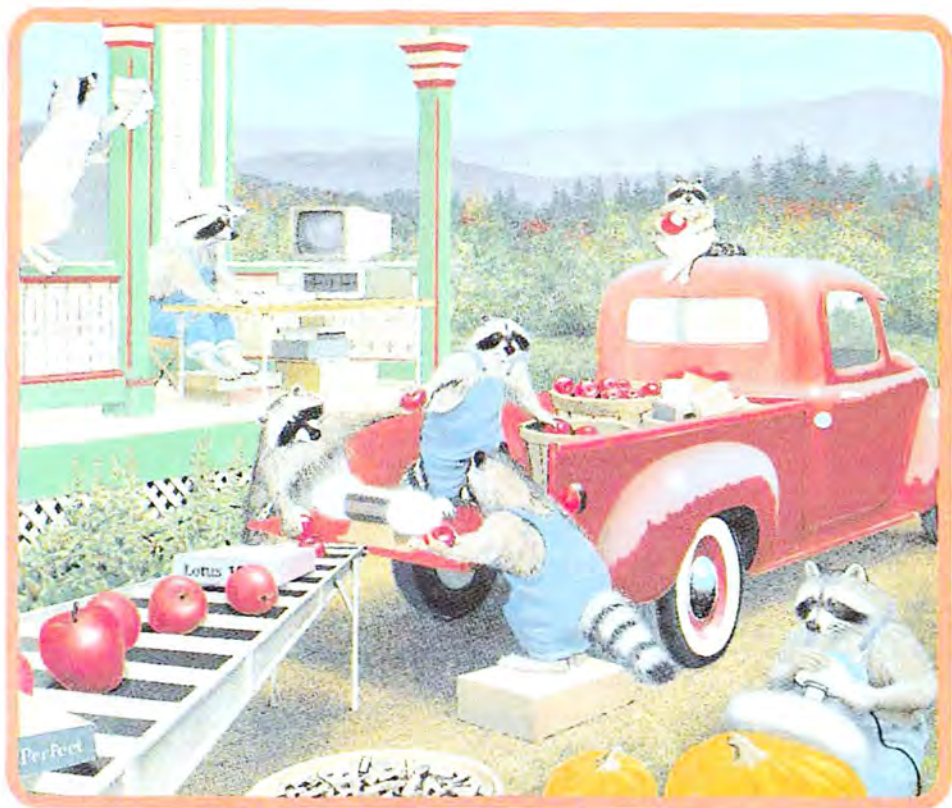
- Typing Tutor IV ... 33.
- New World Writer II 1.0 ... 65.

### Softlogic Solutions ... NCP

- Software Carousel 2.02 ... 49.

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Over the years, PC owners of every persuasion (PC, XT, AT, PS/2) have taken a shine to the way we do business here in Marlow. Orders fly out with blazing speed. Our product ads dazzle with details about copy protection and warranties. And every sales rep is primed with a profusion of particulars pertaining to

the power and performance of every product we peddle. So, next time your PC starts to lose its luster, give us a call. Remember, we have a special crew of technical titans to give customers toll-free support. They've explored the pinnacles and perimeters of printer performance. They can clarify the most convoluted cable connections. Rumor has it, they even know who put the RAM in the Ram-a-lam-a-ding-dong.

## What's this about free macs?

At PC Connection we know that all that glitters need not be sold. Some of it should be given away. Like this month's delicious offer. An assortment of premium macs and other apples from nearby glitzy groves, packed in a classy, made-in-New Hampshire gift crate. It's free with any order of \$500 or more between now and November 30.

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<b>MSC Technologies ... lifetime</b>	
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PC Mouse w/Autosketch (bus or serial)	105.
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Breakthrough 286 Accelerator Board (8 MHz)	299.
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<b>Practical Peripherals ... 5 years</b>	
Microbuffer Inline (par. print buffer w/32k)	135.
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T5100 (80386, 16 MHz, 40 Meg)	call
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FastWrite VGA	399.
VRAM VGA	529.

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Bernoulli II Dual 20 Meg External (5 1/4")	1659.
20 Meg cartridge (5 1/4")	59.
PC2 Card	169.
PC2B Card (bootable card for PC/XT/AT)	229.
PC4 Card (for PS/2 Model 50/60/80)	299.
<b>Mountain Computer ... 1 year</b>	
40 Meg Internal Tape Drive (XT, AT or PS/2)	379.
40 Meg External Tape Drive (XT, AT or PS/2)	479.
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<b>Plus Development ... 1 year</b>	
Hardcard 20 Meg (49 ms)	549.
Hardcard 40 Meg (39 ms)	699.
Passport (20 or 40 Meg removable drives)	call
<b>Seagate ... 1 year</b>	
FREE PCTV® Hard Drive Installation Tape with the purchase of 20, 30 or 40 Meg Seagate drive for the IBM PC (not for AT). Specify Beta or VHS.	
20 Meg Internal Hard Drive ST225 (w/controller and cables, 65 ms)	299.
30 Meg Internal Hard Drive ST238 (w/controller and cables, 65 ms)	329.
40 Meg Internal Hard Drive for AT (40 ms)	439.
40 Meg Internal Hard Drive for XT (w/controller and cables, 40 ms)	499.
<b>TEAC ... 1 year</b>	
PC, XT 360k Drive (5 1/4" half-height)	89.
720k Drive (3 1/2" half-height, specify XT or AT)	95.
<b>Toshiba ... 1 year</b>	
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All disks have a lifetime warranty.	
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Sony (10 disks per box)	23.
Maxell MD2-DD (10 disks per box)	23.
Verbatim Datalife (10 disks per box)	22.
<b>3 1/2" DS/DD Diskettes (720k)</b>	
Sony (10 disks per box)	19.
Fuji (10 disks per box)	19.
Maxell (10 disks per box)	20.
<b>3 1/2" DS/High-Density Diskettes (1.44 Meg)</b>	
Sony (10 disks per box)	55.
Fuji (10 disks per box)	55.
Maxell (10 disks per box)	59.

## MISCELLANEOUS

<b>CompuServe</b>	
CompuServe Information Service	24.
Grolier's OnLine Encyclopedia	32.
<b>Cables ... lifetime</b>	
Smartmodem-to-AT cable (9 feet)	15.
Parallel Printer cable (15 feet)	19.

## OUR POLICY

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- To order, call us Monday through Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

## SHIPPING

**Note:** Accounts on net terms pay actual shipping.

### Continental US:

- For monitors, printers, Bernoulli Boxes, computers, and hard drives, 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, and computers, 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.

# 1-800/243-8088



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□ Disk Optimizer 4.01 (w/Data Guardian) ...	\$45.
<b>Software Publishing ... NCP</b>	
□ Professional Plan 1.01 .....	63.
□ PFS:First Publisher 2.0 .....	79.
□ PFS:First Choice 3.0 .....	99.
□ Professional Write 2.0 .....	125.
□ Professional File 2.0 .....	189.
□ Harvard Graphics 2.1 .....	309.
□ Harvard Graphics Accessories .....	call
□ Harvard Project Manager 3.0 .....	439.
<b>Stone &amp; Assoc. ... NCP (reqs. graph. brd.)</b>	
My Letters, Numbers, Words (ages 2 to 6) ..	27.
Kids Stuff (ages 2 to 6) ..	27.
<b>Symantec ... NCP</b>	
□ SQZ!Plus 1.01 .....	59.
□ 4Word 2.0 .....	59.
□ Q & A Write 1.01 .....	119.
□ Grandview 1.0 .....	175.
□ Q & A 3.0 (database, word processor) ..	209.
□ Inbox (E-mail; up to 100 users) ..	349.
□ Breakthrough Timeline 3.0 ..	349.
<b>T/Maker ... NCP</b>	
□ Scrapbook+ .....	79.
□ ClickArt Business Images .....	28.
<b>The XTREE Co. ... NCP</b>	
□ XTREE Pro 1.0 .....	69.
<b>TOPS ... NCP</b>	
Flashcard (AppleTalk network card; 1 year warranty) .....	169.
NetPrint 1.08 (share printers) ..	119.
TOPS 2.0 .....	119.
<b>Traveling Software ... NCP</b>	
Battery Watch (3 1/2" only) .....	27.
□ LAP-LINK Plus 1.0 .....	85.
□ Desklink 2.0 .....	99.
<b>True BASIC, Inc. ... NCP</b>	
□ True BASIC 2.03 (now includes Runtime) ..	57.
□ Algebra (includes both I & II) ..	32.
<b>Vericom ... NCP</b>	
□ SoftBytes 2.0 .....	35.
□ SoftBytes 386 2.53 .....	49.
<b>WordPerfect Corp. ... NCP</b>	
□ WordPerfect Library 2.0 .....	69.
□ WordPerfect 5.0 .....	255.
□ WordPerfect Office 2.0 .....	269.
<b>Xerox ... NCP</b>	
□ Ventura Publisher 2.0 .....	549.

## RECREATIONAL

<b>Accolade ... CP (reqs. graphics brd.)</b>	
□ Hardball (baseball simulation) .....	11.
□ Testdrive (driving simulation) .....	24.
<b>Electronic Arts ... CP (reqs. graphics brd.)</b>	
□ Chuck Yeager's Flight Simulator .....	32.
<b>Infocom ... NCP</b>	
□ Zork Trilogy .....	33.
<b>Microprose ... CP</b>	
□ F-15 Strike Eagle (requires CGA) .....	22.
□ Gunship (requires CGA or EGA) .....	32.
<b>Microsoft ... NCP</b>	
□ Flight Simulator 3.0 (reqs. graphics brd.) ..	35.

## PC Connection Hardware Special

through November 30, 1988

### Intel ... 5 years

#### Inboard 386/PC w/Free Windows/386

The INTEL Inboard 386/PC will provide your PC or XT system with 386 processing power and up to 3 Meg of memory expansion all in one slot. Best of all, when you purchase an Inboard 386/PC during the month of November, PC Connection will include a FREE copy of Microsoft Windows/386 for the Inboard.

#### Inboard 386/PC

- 16 MHz 80386 processor
- 1 Meg standard; upgradeable to 2 Meg

#### Windows/386 for the Inboard 386/PC

- Multitasking environment allows you to switch between Windows and DOS applications

Inboard 386/PC 1 Meg

w/Free Windows/386 ..... \$799.

### Mindscape ... CP

□ Balance of Power (reqs. graphics brd.) ... 30.

□ Deja Vu (reqs. graphics brd.) ... 30.

### Parlor Software ... CP

□ Bridge Parlor (best Bridge simulation) ... 49.

### Sierra On-Line ... CP

□ Leisure Suit Larry (requires CGA or EGA) ... 25.

□ Space Quest II (requires CGA or EGA) ... 33.

□ King's Quest III (requires CGA or EGA) ... 33.

□ Police Quest (requires CGA or EGA) ... 33.

### Sphere, Inc. ... NCP

□ Tetris (addicting mind teaser) ... 24.

□ Falcon (F-16 simulation, reqs. graphics brd.) 32.

### Sublogic ... NCP

□ Jet 2.1 (requires EGA or CGA) ... 33.

### XOR ... NCP

□ NFL Challenge 2.0 .....

## 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.

### Alloy ... 1 year

Tape System/2 (for PS/2 MicroChannel) ... 299.

Retriever/40 (for IBM AT & compatibles) ... 349.

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### AST Research ... 2 years

I/O Mini 2 C/S/P ..... \$89.

SixPakPlus 64k C/S/P

(now upgrades to 576k) ..... 129.

Advantage Premium 512k S/P

(upgrades to 1 Meg or 2 Meg w/Piggyback) call

Advantage 2 512k (for PS/2 Models 50/60) ... call

Advantage 2-386 (for PS/2 Model 80) ... call

RAMpage Plus 286 512k (for XT/XT286/AT) call

RAMpage! Plus MicroChannel 512k

(for PS/2 Models 50/60) ..... call

### Amdex ... 90 days

LaserDrive-1 (CD-ROM Drive) ..... 629.

### Compucable ... 2 years

2-Position switch box ..... 29.

3-Position switch box ..... 39.

### Cuesta ... 1 year

Datasaver 400 Watt (standby power unit) 459.

### Curtis ... lifetime

#### ACCESSORIES

Disk Holder DB-1 (holds 50 5 1/4" disks) ... 8.

Printer Stand PS-1 .....

Universal System Stand SS-3 ..... 25.

DS-1 Switch Box (controls 2 printers) ... 33.

#### CABLES

Smartmodem-to-PC Cable (9 feet) ..... 17.

Printer-to-IBM cable (9 feet) ..... 17.

#### SURGE SUPPRESSORS

Safestrip SP-3 (6 outlets; 1 year wrty.) ... 21.

Diamond SP-1 (6 outlets) ..... 32.

Ruby (6 outlets; EMI/RFI filtered; 6 ft cord) 59.

Ruby-Plus (w/FAX & modem protection) ... 69.

### DCA ... 1 year

Irma 2 (3270 emulation board) ..... 729.

### Epson ... 1 year

We are an authorized Epson Service Center.

FX-850 (80 col., 264 cps, 9 pin) ..... call

FX-1050 (136 col., 264 cps, 9 pin) ..... call

LQ-500 (80 col., 180 cps, 24 pin) ..... call

LQ-850 printer (80 col., 264 cps, 24 pin) ... call

LQ-1050 printer (136 col., 264 cps, 24 pin) ... call

LQ-2550 printer (136 col., 400 cps, 24 pin) ... call

LX-800 printer (80 col., 180 cps, 9 pin) ... call

Printer-to-IBM cable (6 feet) ..... 15.

### Everex ... 1 year

1200 Baud Internal Modem ..... 79.

2400 Baud Internal Modem ..... 149.

### 5th Generation ... 1 year

Logical Connection 256k ..... 449.

Logical Connection 512k ..... 499.

### Hayes ... 2 years

Smartmodem 1200 ..... 299.

Smartmodem 1200B (with Smartcom II) ... 299.

Smartmodem 1200B (no software) ..... 265.

Smartmodem 2400 ..... 449.

Smartmodem 2400B (with Smartcom II) ... 449.

### Hercules ... 2 years

Graphics Card Plus .....

Network Card Plus (with TOPS DOS) ... 349.

### Intel ... 5 years

2400B Modem 2 (internal modem for PS/2

Models 50/60/80) ..... 279.

For IBM Personal Computers exclusively.

# PC CONNECTION®

ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

## NSTL TEST REPORT

## Zoom HC 2400 Modem

Under noisy line conditions, the Zoom HC 2400 is more likely to develop errors while sending a file than the Hayes Smartmodem, but as this chart shows, in answer mode the Zoom matches or beats the Hayes.

## Answer mode

## Signal-to-white-noise ratio

Impairment level	7:1	8:1	9:1	10:1	11:1	12:1	13:1	14:1	15:1	16:1	17:1	18:1	19:1
Zoom HC 2400	—	100	100	100	98	85	59	21	9	3	0	0	0
Hayes Smartmodem	—	—	100	100	100	83	48	14	7	0	0	0	0

— = no connection

## Phase jitter

Impairment level (in degrees)	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
Zoom HC 2400	100	100	100	99	98	93	84	71	58	45	32	19	7	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Hayes Smartmodem	100	99	99	100	98	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73

## Amplitude jitter

Impairment level (in percent)	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
Zoom HC 2400	100	99	100	99	99	98	85	71	58	74	70	54	38	31	16	12	7	4	2	0	0	0	0	0	0	0	0	0	1	1
Hayes Smartmodem	100	100	100	100	99	100	98	85	86	83	72	59	53	38	24	20	9	4	5	0	0	0	0	0	0	0	0	0	0	0
errors	91-100		81-90		71-80		61-70		51-60		41-50		31-40		21-30		11-20		1-10											

errors 91-100 81-90 71-80 61-70 51-60 41-50 31-40 21-30 11-20 1-10

NSTL tested each modem's ability to accurately transmit data over noisy telephone lines using the TAS 1010 VoiceBand Channel Simulator. The system includes the Network Simulator, which mimics public and leased lines, and the Modem Test Unit, which automatically runs desired data back and forth between the test modem and a control Hayes Smartmodem 2400 and calculates resulting data transmission errors. In these tests, 10K simulated test files in 100-byte blocks were received by each examined modem and the block errors measured and reported. All tests were performed in answer mode. Starting values for the

key impairments tested—white noise, phase jitter, and amplitude jitter—were based on AT&T Bell Labs' 1982-1983 *End Office Connection Study*. White-noise impairments ranged from 7:1 to 19:1. An impairment was lessened one step at a time to determine the point at which a modem could correct all the errors in a transmitted block. (In the Zoom HC 2400 white-noise test, for example, at the 13:1 signal-to-noise ratio, an average of 59 out of every 100 blocks received contained errors. The error rate dropped to 0 at 17:1.) Amplitude jitter tests were conducted in the same manner. The intensity of the impairment ranged

from a maximum of 44 percent of amplitude jitter to 15 percent. Phase jitter intensities spanned 43 degrees to 15 degrees.

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

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

works. It responded quickly and reliably to all Hayes AT commands, going on and off line smoothly, dialing and downloading without incident.

Performance is fine under normal phone line conditions. When the line gets unusually noisy, the Zoom is more finicky sending files than the pricier Hayes 2400. In answer mode, however, as NSTL tests show, the Zoom matches or beats the Hayes.

Several nice design touches are built in. A speaker (often left off internal modems) keeps you informed of what the modem is doing—and thanks to the external volume con-

trol, there's no problem making the Zoom heard. A jumper lets you address the modem as COM3: or COM4: if your first two COM ports are tied up by printers or mice. And while some internal modems may not work in machines like the Packard-Bell, which boast bus speeds in excess of 8 MHz, the HC 2400 is designed to accommodate bus speeds of up to 12 MHz.

A copy of the popular *ProComm* communications package is also included. It offers all the standard telecommunications features

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**Network Solutions.** Backup a server across your network to either a diskette, tape or hard disk. Be secure that **CORE** backup systems support major LAN networks including Novell, 3Com and IBM Token Ring.



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International Sales:  
407/997-6044,      FAX: 407/997-6009

Distribution through Kenfil, MICRO D, Gates, GBC Distributors and VITRONIX. In Canada, contact Markham International Limited.



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**Circle 254 on reader service card**



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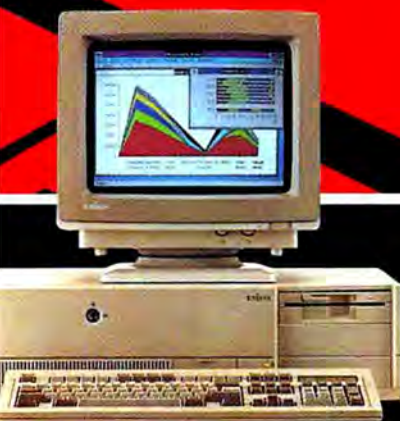
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# UNISYS

The power of <sup>2</sup>

plus a few unusual ones, such as the ability to set up a fully featured BBS.

Installation is a snap. There are no DIP switches, and unless you have to change the COM port setup, you won't need to move any jumpers. It took less than 20 minutes to get the modem installed and running, and it worked perfectly the first time out. Most of the installation manual is extremely clear, with plenty of pictures and a blessed absence of technical jargon.

So if you're in the market for a low-priced 2400-bps modem with free telecommunications software and on-line-service discounts, there is something to say about the Zoom HC 2400 internal modem: Buy it. —*Sam Hagerty-Hammond*

#### WHERE TO BUY

##### **Zoom HC 2400**

Zoom Telephonics  
207 South St.  
Boston, MA 02111  
617/423-1072

**List price:** \$199 (includes ProComm)

**Accessories:** none

**Requirements:** none

**Warranty:** two years limited, parts and labor; 90 days on defects in ProComm disk

**Technical support:** no toll-free number, M-F 9-5

**Other support services:** none

For more information, circle 605 on reader service card.

## Panasonic KX-P4450 Laser Partner

*Laser printer*

**PROS:** Fast text printing, convenient front-panel controls

**CONS:** Limited software support, poor gray-scale graphics reproduction, a pain to install

If you need a quick and convenient way to print business letters, Panasonic's KX-P4450 Laser Partner may be exactly what you're looking for. This \$2595 LaserJet Plus clone comes with 512K RAM, costs \$100 less than HP's LaserJet II, and prints text 3 pages per minute faster. On the downside, it's a bit

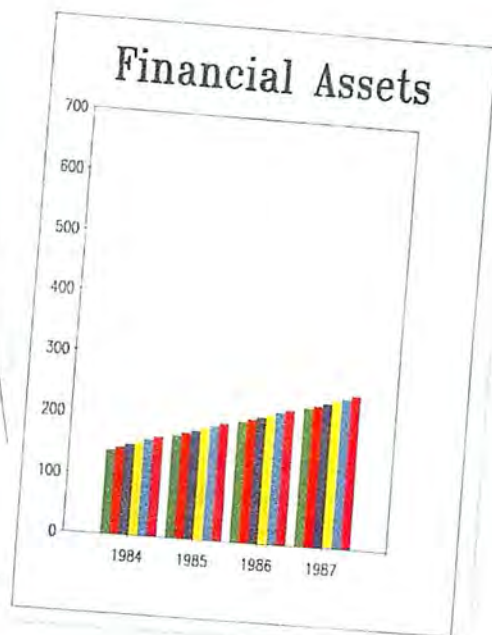
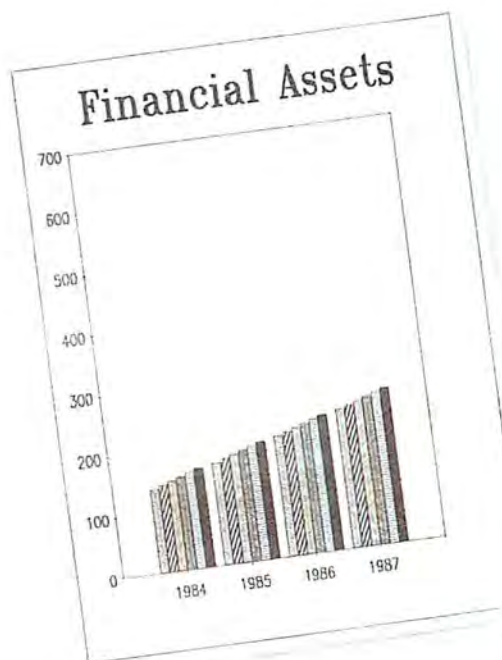
slower at printing graphics, has problems reproducing grays, lacks broad software support, and is limited to a total 1.5MB RAM versus the LaserJet's 4.5MB.

The Panasonic KX-P4450 is built for a 5000-pages-per-month duty cycle (as opposed to the HP's 4000). Its front panel is easy to use, letting you choose among fonts and emulation modes and telling you exactly where paper is jammed. It comes with two easily loaded letter-size paper trays that hold a total of 500 sheets; the face-down output tray accommodates 250 pages, and output costs less than 3 cents per page.

The Laser Partner has 11 resident fonts—5 more than the LaserJet II—including several sizes of Courier and Courier Italic (none exceeding 12 point) and proportionally spaced Century and Century Italic. (Several optional font cards from Panasonic will be available soon.) However, unless you own *WordPerfect 5.0*, you won't be able to use more than one internal font. *WordPerfect 5.0* is the only package that supports the Laser Partner by name. With other software, you must fall back on the printer's LaserJet Plus, Epson, IBM Proprinter, or Diablo emulations. As with many LaserJet clones, the Laser Partner's LaserJet emulation does not extend to built-in fonts, so you're stuck with the default Courier typeface.

Fortunately, desktop publishers have another way to get at fonts. With the 1MB memory upgrade (\$449) installed and LaserJet emulation, they can use downloadable fonts for the LaserJet Plus, including Bitstream's *Fontware* system for *PageMaker*, *Ventura*, *Microsoft Word*, and *WordPerfect*. However, like the LaserJet Plus it emulates, the Laser Partner limits all fonts to a maximum size of 30 points.

The Laser Partner does a splendid job of printing black-and-white line art, but graphics that depend on subtle variations of gray are a problem. A printout of a two-tone Corvette emerged in one tone only: muddy. Bars in a *Microsoft Chart* graph that were supposedly distinguished by their shades of gray proved indistinguishable. Panasonic claims the gray reproduction has been tweaked



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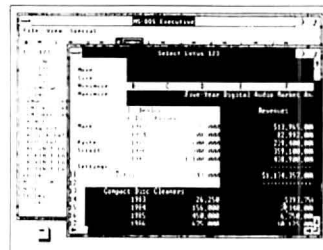
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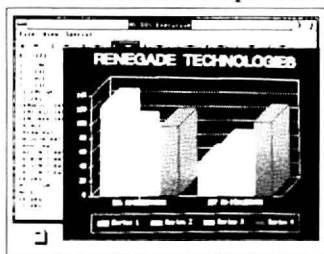
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# UR MOTHER

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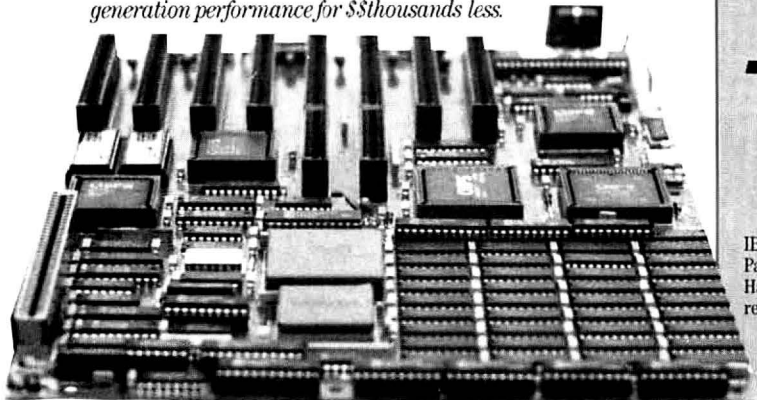
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## NSTL TEST REPORT

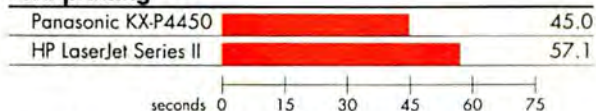
## Panasonic KX-P4450

The Panasonic KX-P4450, a LaserJet Plus-compatible printer, leaves the HP far behind when printing text but fails to match the LaserJet's graphics performance.

## Pages per minute



## Text printing



## Graphics printing



## Objective blackness



An IBM PC AT with 640K of RAM was used to perform all tests. Both printers were configured with maximum allowable memory, and connected to the AT via the parallel port.

## Pages per minute

This benchmark measured the number of pages each printer could produce in the second, third, and fourth minutes of printing. A 40-page document was sent to the printer, and at the end of the first minute the pages in the output tray were removed. Then the total number of pages produced in the following three minutes was divided by 3 to determine the average number of pages per minute.

## Text printing

This benchmark measured the time it took to print a five-page text document, which was sent to the printer using XyQuest's XyWrite III.

## Graphics printing

This benchmark measured the time it took to print a four-page document created using Xerox's Ventura Publisher. Each page was different, and each included a scanned photograph, raster graphics, and text.

## Objective blackness

To perform this test, a large black rectangle was printed on a white background and a densitometer was used to gauge the relative blackness at each corner and the center of that rectangle. These measurements yielded five results that were then averaged. The higher the number, the blacker the rectangle. The possible range of scores was from 0, no light absorption, to 2.5, or 99.99 percent light absorption.

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

since our review unit was built, but more than a tweak will be needed.

Finally, the Laser Partner has a dirty secret: Its developer cartridge leaks if you're not *very* careful. In fact, the printer is a pain to install. Worse yet, while the documentation is decent, there's nothing in the manual about how to prepare the unit for shipping. All a technical support representative had to say on the subject was, "We don't recommend moving it much."

Panasonic's ads claim the Laser Partner is "ahead of its time." Actually, in some respects it's still back in the bad old days when letters were all an office printer needed to produce. The Laser Partner is an exemplary text performer, but its slow, muddy graphics output, limited font access, 1.5MB RAM limit, and awkward installation render it less attractive for a broader range of office tasks.

—Bill Taborehek

## WHERE TO BUY

## Panasonic KX-P4450 Laser Partner

Panasonic Industrial Co.  
Computer Products Division  
Two Panasonic Way  
Secaucus, NJ 07094  
800/222-0584

List price: \$2595

Accessories: 1MB memory upgrade \$449; legal-size paper cassette \$59; letter-size paper cassette \$49; envelope cassette \$85; toner kit \$45; drum unit \$190; developer unit \$120

Warranty: one year parts and labor, 90 days on consumables

Extended warranty: none

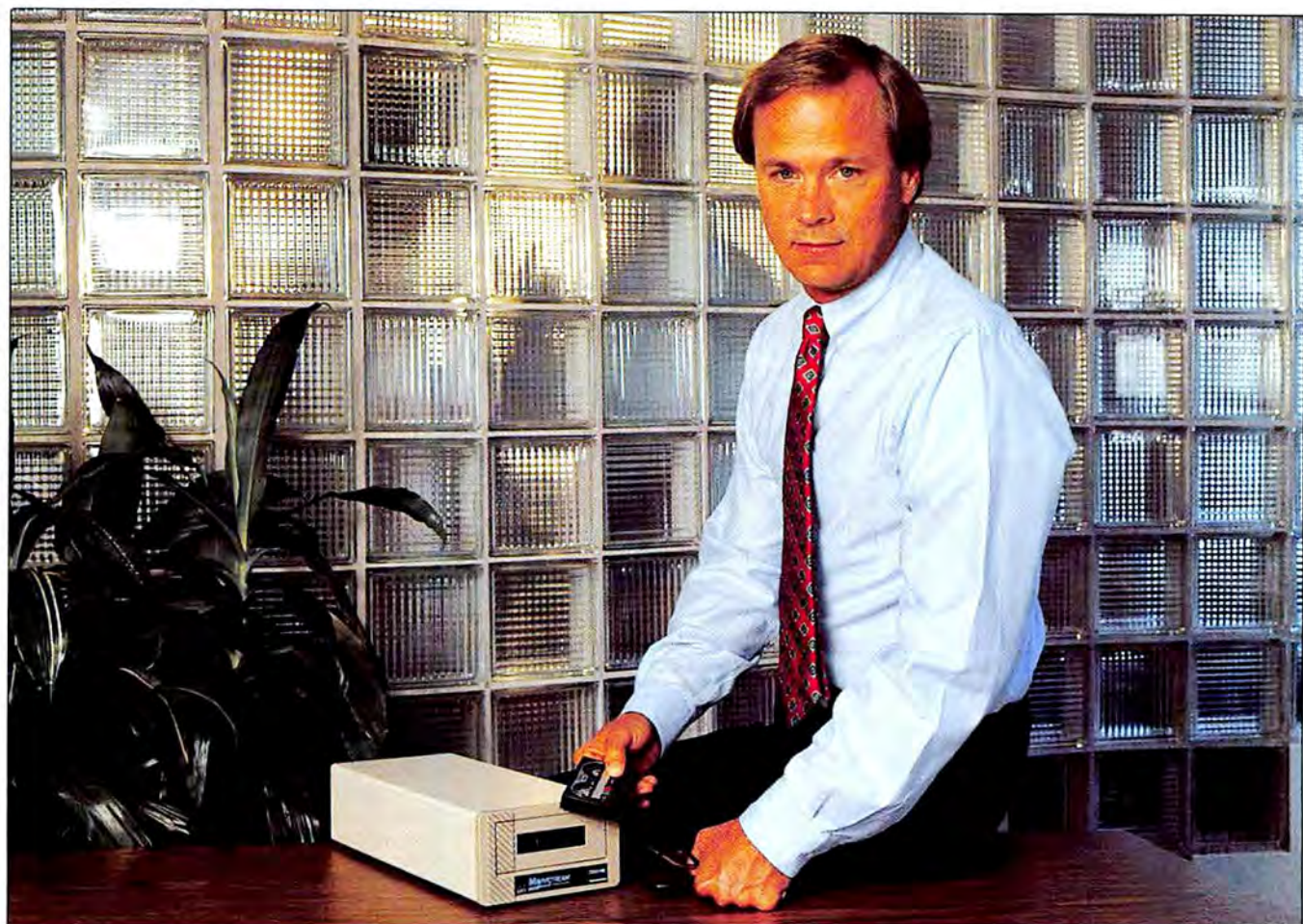
Technical support: toll-free number, M-F 9-5

Other support services: none

For more information, circle 606 on reader service card.

*Eric Brown is an associate editor for PC World. Alan Southerton is a senior technical writer for Progress Software in Bedford, Massachusetts. Wes Nihei is an assistant editor for PC World. Sam Hagerty-Hammond is a San Francisco Bay Area computer consultant specializing in financial data base programming. Bill Taborehek is a New York-based consultant and computer writer. ●*

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## 192 **Sprint 1.0**

Borland's new budget word processor is crammed with features, but complicated formatting and a limited previewer will make potential buyers think twice.

## 194 **VP-Planner Plus 2.0**

Already a Best Buy in our eyes, this multidimensional spreadsheet's enhanced speed and new features make it look even better the second time around.

## 208 **PFS: First Publisher 2.0**

New templates for everything from business cards to multicolumn newsletters, along with improved printer support, fill out this low-end desktop publisher.

## 212 **GrandView 1.0**

Symantec dubs it a personal information manager, but *GrandView* is really a top-notch outliner with strong project-tracking tools built in.

## 218 **EasyCAD 2 2.05**

Feature-rich, fast, and flexible, the new release of this easy-to-learn drafting program equals much costlier rivals.

## 220 **HB-Browser**

Peek at data base records from your spreadsheet or word processor with Cauldron's RAM-resident utility. *Browser* comes in two configurations—both with healthy appetites for RAM.

## **Sprint 1.0**

### *Word processor*

**PROS:** Low price, permits multiple open files, easy to customize, choice of user interfaces

**CONS:** Awkward formatting, limited previewer, bugs

**F**or a scant \$200, Borland's *Sprint* stands up to word processors costing twice as much. Snap-on user interfaces give it the quick-change wardrobe of a chameleon, and a potent macro-programming language gives users unparalleled power to customize the program. Unfortunately, *Sprint's* formatting is awkward and difficult, and the limited previewer fails to compensate for the editor's poor approximation of printed results. *Sprint's* initial release is further hampered by a number of annoying bugs.

If formatting isn't a major concern, *Sprint* could be your ticket to fly. Loosely based on *WordStar* but with much more functionality, the editor is largely free of the bugs and design flaws that hamper the formatter. Block operations are well implemented, cursor movement is flexible, and as NSTL tests indicate, performance is fast. *Sprint's* file management features are some of the best in the business. An auto-save feature saves text every 3 seconds, and the program loads into memory the last 24 files worked on, letting you quickly switch files and cut and paste among them.

More advanced editing tools are somewhat flawed. For example, the 100,000-word spelling checker includes a handy proof-as-you-type option, but it runs slowly and won't fix repeat misspellings. And the thesaurus is unable to adjust for plural or adverbial endings.

Much of *Sprint* incorporates a rich macro programming language, so the program offers a high level of customization. Any user can easily redefine command sequences, record macros and boilerplate text, or choose from 40 predefined macros. More experi-

enced hands can write and edit macros, customize menus, and even create new features and interfaces.

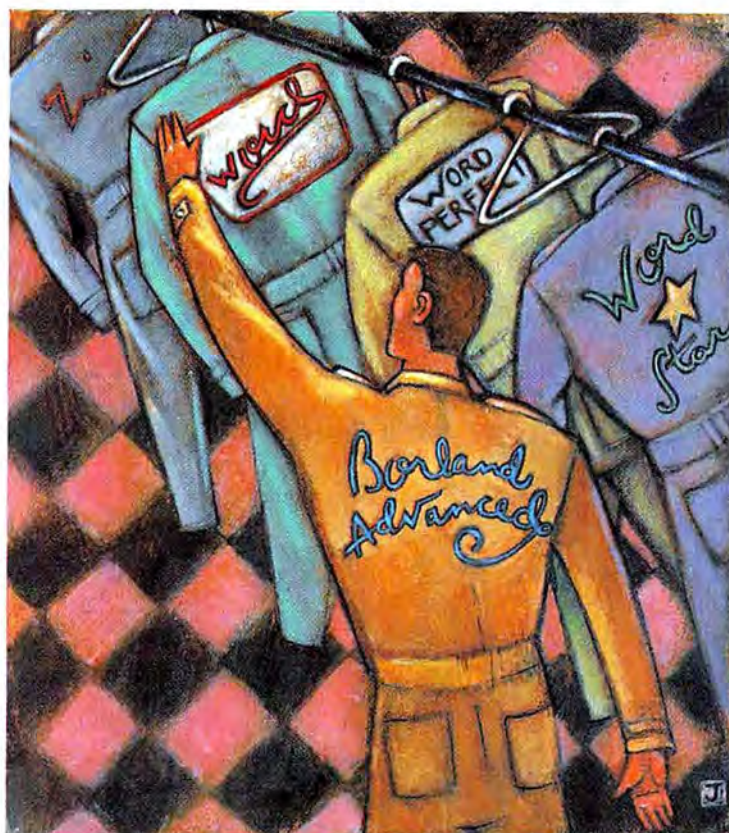
Such flexibility makes possible a feature unique to *Sprint*: alternative menu interfaces that mimic the command structures of *WordPerfect*, *Microsoft Word*, *WordStar*, *SideKick*, *FinalWord II*, and *EMACS*. These interfaces don't offer all the functionality of the originals—and in some cases won't let you access all of *Sprint*'s advanced features—but they could be useful for offices that hire temporary workers.

*Sprint*'s three native interfaces (Tutorial, Basic, and Advanced) use Borland's trademark pop-up menus. Type a command's first letter (or highlight the command and press <Enter>), and well-designed menus cascade across the screen. But when you reach the twigs of the menu tree, defaults are frequently lacking, and you often have to type in programming commands.

Because *Sprint* is split between editing and formatting modules, what you see is nothing like what you get. To view even the most basic text formatting (such as double-spacing), users will find themselves constantly switching to a separate previewer. That utility is sadly lacking—you can't scroll backward, jump to a page, view a full page, display graphics, or preview specific elements. When you enter the previewer, *Sprint* lists formatting errors along with offending line numbers, but the error messages are cryptic and sometimes inaccurate. Annoyingly, if *Sprint* deems the errors severe, it won't let you print or even preview the file.

*Sprint*'s editor/formatter split also spawns a messy screen display. Do a little formatting, and the screen quickly clogs with chunks of inverse video, displaying headers and footnotes verbatim at your cursor location. This makes it hard to read and edit text, and it's easy to pollute your layout with accidental additions or deletions.

The program's various formatting techniques are poorly integrated. After inserting a new ruler line to change formats, you then must cursor through it to specify margins or tabs. More precise settings can be chosen



from a menu, but the changes aren't reflected on the ruler line or editing screen. And while *Sprint* provides some document-wide formatting, it lacks some key settings. If you want to justify or double-space your file, for example, you must repeat the command under each ruler line. You can also create tagged style sheets, but they require a firm grasp of the programming language; you can't create styles by example or via menus.

*Sprint*'s many formatting options include page-break controls, snaking columns, and long-document features, but they're hard to use. Importing graphics requires Encapsulated PostScript (EPS) files, and you must embed PostScript commands to manipulate them. The print formatter supports numerous output devices, but it lacks both batch and background printing.

## FEATURES EVALUATION

**Sprint 1.0: Full-Featured but Awkward**

*Sprint's high-end features are attractive, but they aren't always easy to use.*

	1.0 Sprint	4.0 Microsoft Word	5.0 WordPerfect
<b>Editing</b>			
Maximum number of windows	6	8	2
Undo command	☐ <sup>1</sup>	●	☐ <sup>1</sup>
Jumps to bookmark	●	○	○
Temporarily exits to DOS	●	●	●
Wild-card search	●	●	●
Searches control characters	●	●	●
Spelling checker/thesaurus	●	●	●
Cross-referencing	●	○	●
Redlining	○	●	●
Outliner	☐ <sup>2</sup>	●	☐ <sup>2</sup>
Mail merge	●	●	●
Creates index/table of contents	●	●	●
Macro learn mode/editor	●	●	●
Macro programming language	●	●	●
<b>Formatting</b>			
Style sheets	●	●	●
Conditional page breaks	●	●	●
Widow/orphan control	●	●	●
Automatic hyphenation	○	●	●
Leading control	●	●	●
Decimal tabs	●	●	●
Side-by-side/snaking columns	●	●	●
Both styles on same page	●	○	●
<b>Graphics</b>			
Imports graphics	☐ <sup>3</sup>	☐ <sup>3</sup>	●
Sizes, crops, rotates graphics	☐ <sup>4</sup>	☐ <sup>5</sup>	●
Automatic text flow around graphics	○	○	●
Page preview	●	☐ <sup>5</sup>	●
Draws lines/text boxes/borders	●	●	●
Text boxes/borders	●	●	●
<b>Printing</b>			
Proportional spacing	●	●	●
Queues documents	○	●	●
Prints in background	○	●	●
Landscape printing	●	●	●
Supports PostScript	●	●	●

● Yes ○ No ☐ Deficient

<sup>1</sup> Recovers deleted text but does not reverse.

<sup>2</sup> Outliner doesn't support collapsible headings.

<sup>3</sup> Graphics can be imported at time of printing, but not viewed or manipulated.

<sup>4</sup> Automatically sizes graphics, but scaling, cropping, and rotating require PostScript commands.

<sup>5</sup> With included PageView utility.

Although a few opening-day jitters are to be expected in any initial release, *Sprint* proved unusually troublesome. Among other problems, screen refresh was unreliable, text occasionally overprinted, and margins often disappeared. File conversions sporadically failed to work, and when they did, tended to produce irrelevant ruler lines. Even if the bugs are squashed, *Sprint's* awkward formatting interface may limit its appeal to budget-minded users who produce unadorned text. —Eric Brown

## WHERE TO BUY

**Sprint 1.0**

Borland Int'l  
1800 Green Hills Rd.  
Scotts Valley, CA 95066  
408/438-8400

**List price:** \$199.95, six-user Network Pack \$595

**Requirements:** 384K, DOS 2.00 or later version

Not copy protected

**Technical support:** unlimited, no toll-free number, M-F 8-5

**Other support services:** Compu-Serve forum (GO BORLAND), message service on MCI Mail

For more information, circle 670 on reader service card.

**VP-Planner Plus 2.0**

*Multidimensional spreadsheet*



**PROS:** Very fast, imports ASCII data base files, inexpensive

**CONS:** Doesn't support extended memory

This spring, we ran a glowing review of Paperback Software's *VP-Planner Plus 1.0* and dubbed it a Best Buy (see *The Software Shelf*, PCW, May 1988). However, due to an editing error, we mistakenly headlined our review version 2.0. So when the new \$249 version came out, we sent it to NSTL for testing using our upgraded benchmarks (see the sidebar "New Spreadsheet Tests—A Better Method"). The results are pretty impressive. Where version 1.0 consistently trailed 1-2-3, version 2.0 gives it a run for the money.

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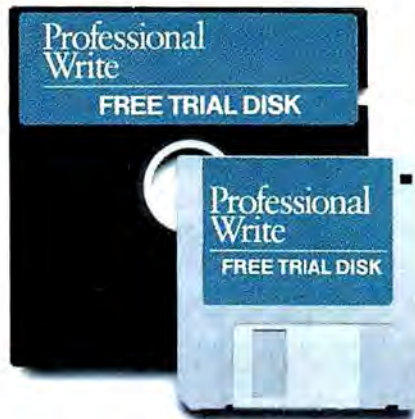
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## NSTL TEST REPORT

## Sprint 1.0: True to its Name

In most speed tests with other word processors, Sprint keeps up with the best of them.

## Scroll by line



## Reformat document



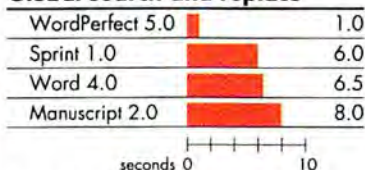
<sup>1</sup> This test measures the time required to issue the reformatting command and move to the end of the document. This command sequence compensates for WordPerfect's background reformatting.

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

## Print a file



## Global search and replace



## Scroll by line

This test measured the time required to scroll line by line from the top of the file to the end and then from the end back to the top. The two times were then averaged. The size of the keyboard buffer was increased with a utility program to allow 30-keystrokes-per-second input without filling the buffer. Without such a utility, times would have been greater.

## Reformat document

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

## Print a file

This benchmark used a device that simulates an infinitely fast printer, one not slowed by paper or

## Spelling check



printhead movement. The text file was "printed" to the device at the maximum speed supported by the program. Times with an actual printer would be greater.

## Global search and replace

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

## Spelling check

This benchmark recorded the time a program's spelling checker required to proof a 28,051-character ASCII file (thirty 14-line paragraphs) after the file had been read into each program and saved in that program's format.

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

*VP-Planner Plus 2.0's* speed is due mainly to the pairing of background with what Paperback calls *priority* recalculation. The first is pretty straightforward: The spreadsheet recalculates in the background while you continue to enter data and issue commands in the worksheet. Priority recalc is more intriguing: The program first recalculates the result of a command and whatever cells its operation depends on. (For example, if you choose a graph view and press <F10> to display it, *VP-Planner Plus 2.0* immediately recalculates the cells used for the graph ranges.) Next it recalculates all on-screen cells, and finally the rest of the worksheet. The effect? Users get recalc results

when they need them and also quickly regain keyboard control.

Version 2.0's other improvements are welcome. It has gained an undo command, which reverses the effects of most previous operations—including accidentally erasing the entire worksheet. You can undo an undo, and even use undo to repeat macros, but the undo command itself can't be included in a macro; nor does it work with any operation that saves data to disk. Macro maniacs will love version 2.0's macro transcriber. It records keystrokes, stores them in a 240-byte buffer, then flushes them to a .PRN file. You can create up to ten Autokey macros (one *continues*)



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We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the word processor now has a spelling checker and text outliner. And how database and communications have been improved.

The bottom line is that Symphony is one high performance package that's made to be opened up.



## Lotus Symphony 2.0

## NEW SPREADSHEET TESTS—A BETTER METHOD

Starting with this issue, *PC World* deploys an all-new suite of spreadsheet benchmarks. These tests were designed by National Software Testing Laboratories (NSTL), an independent test center in Philadelphia, to provide a more accurate picture of how well a spreadsheet will perform once it's installed in your working environment.

In support of our real-world benchmarking philosophy, the new test worksheet is a typical three-year business plan. With this worksheet as the guinea pig,

NSTL tests spreadsheets in four critical areas: file-loading speed, data-editing speed, recalculation speed, and capacity.

### BOTTOM-LINE RESULTS

The results are sometimes unexpected. For example, in our file-loading test of four popular spreadsheets—1-2-3, Excel, Quattro, and VP-Planner Plus—VP-Planner Plus bested all the others (although 1-2-3 and

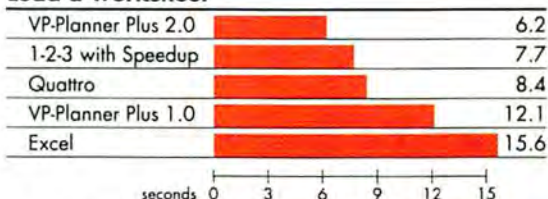
## NSTL TEST REPORT

### VP-Planner Plus 2.0: Faster Than Ever

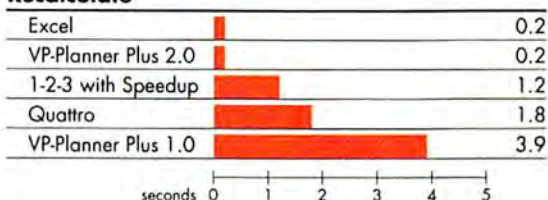
Version 2.0 of VP-Planner Plus pulls ahead of 1-2-3 in two out of three speed tests.

#### Conventional memory

##### Load a worksheet



##### Recalculate



Benchmarks were performed on a 12-MHz Compaq Deskpro 286 with 640K of RAM and a 40MB hard disk; all tests were repeated using an Intel AboveBoard with 2.5MB of EMS4.0 memory and with an 80287 coprocessor installed. The conventional memory tests were performed on a worksheet containing a three-year business plan. For the expanded memory tests, the business plan was expanded to include data for eight years. For all speed tests, time was measured until control was returned to the user.

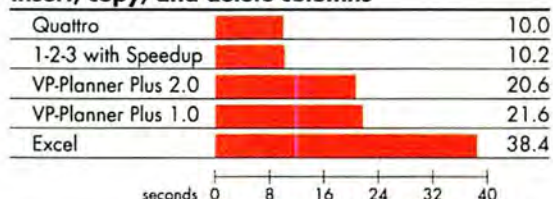
##### Load a worksheet

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

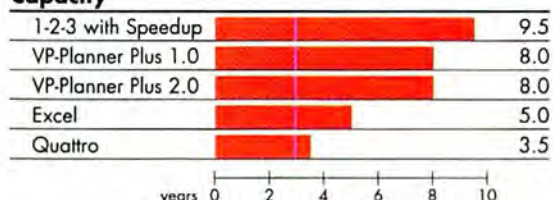
##### Recalculate

This test measured how long it took the spreadsheet to recalculate after a new value was entered into cell B18 (Sales).

##### Insert, copy, and delete columns



##### Capacity



##### Insert, copy, and delete columns

This test measured the time required to insert blank columns (P1..AD195), copy other columns into the new columns (AE1..AR195 to P1..AD195), and then delete the copied columns. Each step was timed separately; then the times were added.

##### 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.

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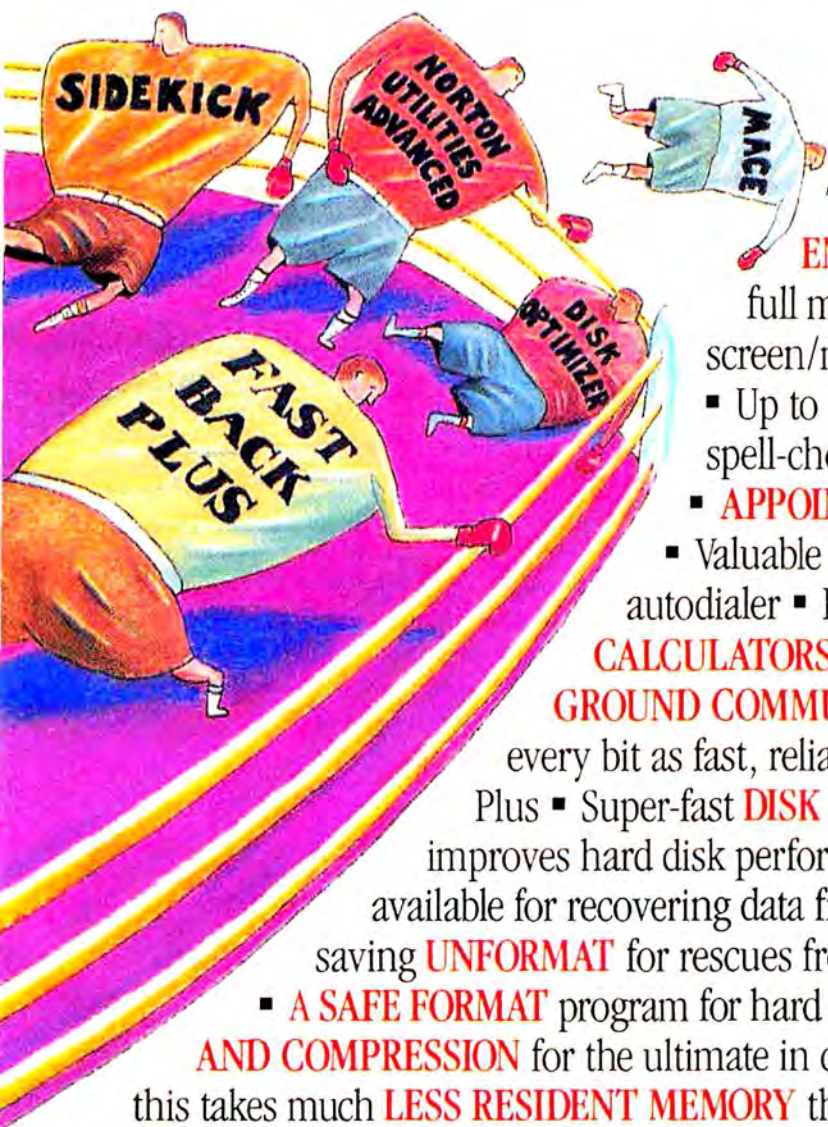
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# PC Tools Deluxe.

## NEW SPREADSHEET TESTS

(continued)

*Quattro* were just seconds behind). File-loading tests in expanded memory told quite a different story: *Quattro*, for instance, slipped to last place.

To evaluate performance on a set of common editing tasks—inserting, copying, and deleting data—NSTL benchmarked how long each spreadsheet took to perform these operations on a group of columns. *Quattro* and *1-2-3* were neck and neck on this one, with *VP-Planner Plus* twice as slow and *Excel* almost four times as slow. In expanded memory tests *Quattro* outperformed *1-2-3*, while *Excel* continued to lag far behind. (*VP-Planner Plus* doesn't support expanded memory.)

## SUMMING UP

In NSTL's new recalculation test, a key Sales cell is changed in the business plan worksheet; then the worksheet is recalculated. Because all tests are timed until cursor control is returned to the user, *Excel* and *VP-Planner Plus*, which support background recalculation, whipped the others on this test.

*1-2-3* and *Quattro* were also fast, with speeds of less than 2 seconds. But in ex-

panded memory, *Excel* was by far the fastest; *1-2-3* and *Quattro* once again were almost tied.

## EVALUATING MEMORY USE

As worksheets grow, memory management becomes a key issue. In the capacity test, NSTL measured how many years of data could be added to the business plan. In conventional memory *1-2-3* did better than all the others, allowing 9.5 business years to be added; *VP-Planner Plus* came in second at 8 years. In expanded memory *Excel* performed far better than the others, with 71.5 years.

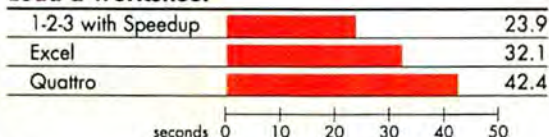
Our conclusions? If you have expanded memory, *Excel* is best for huge worksheets with heavy-duty recalculation requirements. *Quattro* is fast at data editing tasks but falls down in conventional memory capacity. *VP-Planner Plus 2.0* significantly surpasses version 1.0 in file loading and recalculation tests. Finally, *1-2-3* remains a strong overall performer. Of course, benchmarks are only one part of the story; for some users, power and ease of use may rival mere speed. —Anita Amirrezvani

## NSTL TEST REPORT

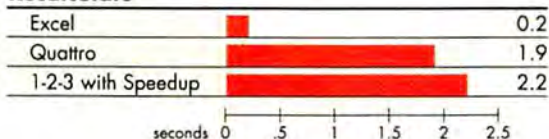
VP-Planner Plus continued

Expanded memory<sup>1</sup>

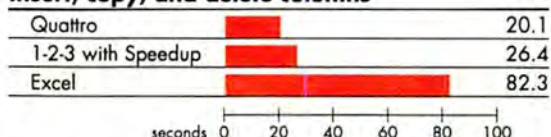
## Load a worksheet



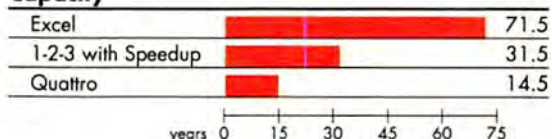
## Recalculate

<sup>1</sup>VP-Planner does not support expanded memory.

## Insert, copy, and delete columns



## Capacity



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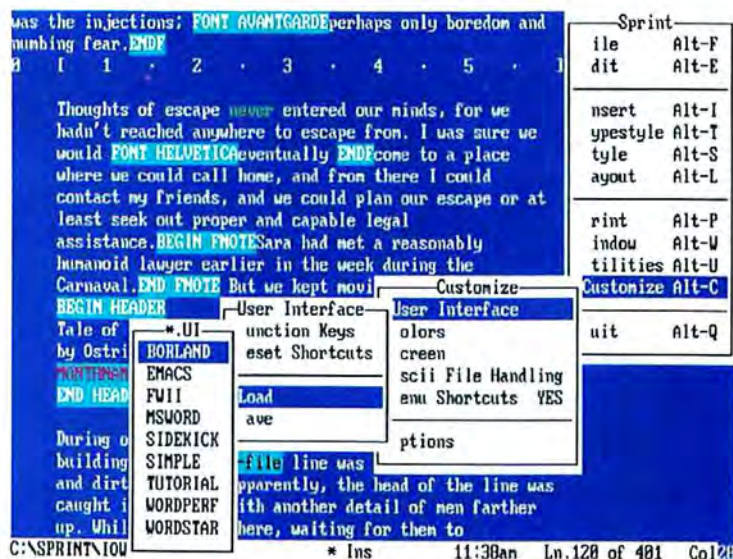
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Sprint's menus are well designed, but a little formatting can clutter the editing screen with inverse video. Even worse, headers and footnotes are inserted at the cursor location.

per function key) for each .PRN file, and tie traditional label macros to them. Finally, *VP-Planner Plus*'s excellent multidimensional data base now reads ASCII data base files, provided they contain standard fields—either label, record, numeric, value, time, date, or skip column.

*VP-Planner Plus* still doesn't support extended memory. Since the program requires 384K RAM, this can limit the size of your worksheets, unless you use the program's multidimensional data base, which is limited in size only by free disk space.

Considering *VP-Planner Plus*'s reasonable price, speed, and excellent multidimensional data base, we're awarding it our Best Buy tag for the second time. —Alan Southerton

#### WHERE TO BUY

##### VP-Planner Plus 2.0

Paperback Software Int'l  
2830 9th St.  
Berkeley, CA 94710  
415/644-2116

**List price:** \$249

**Requirements:** 384K (448K for multidimensional data base), DOS 2.00 or later version

Not copy protected

**Technical support:** 90 days free (then \$5 for first 5 minutes, \$1 each additional minute), no toll-free number, M-F 9-5

**Other support services:** newsletter

For more information, circle 671 on reader service card.

## PFS: First Publisher 2.0

Low-end desktop publishing program

**PROS:** Fast, easy page layout for short documents; good laser printer and Hewlett-Packard DeskJet support; inexpensive

**CONS:** Inadequate for long documents, lacks style sheets, unimpressive dot matrix output

When *PFS: First Publisher* came out, it impressed us as a fast, easy-to-learn package, ideal for generating short documents such as booklets and newsletters (see *The Software Shelf*, PCW, December 1987). Costing just \$99, Software Publishing's package boasted an accessible user interface and excellent design. However, *First Publisher 1.0* lacked full printer support and such long-document amenities as style sheets, multiple-page text flow, and running headers.

*First Publisher 2.0* is faster, has better text import and laser support, and includes context-sensitive help and a number of helpful templates. Its price has also risen to \$129.

*First Publisher*'s layout tools haven't changed, but then they didn't need to. They're wonderfully easy to learn and use, whether you drive the program with pull-down menus or speed keys. To help lay out a document with varying numbers of columns, version 2.0 includes five templates for the most common multiple-column formats. Software Publishing also supplies templates for newsletters, invoices, flyers, lists, stationery, business cards, menus, and greeting cards. But the program still lacks style sheets.

*First Publisher* imports images from scanners that can be set to 72 dots per inch (dpi), so long as they're stored in a format the program can read: *PC PaintPlus*, *PC Paintbrush*, *Windows Paint*, *Logipaint*, *Publisher's Paintbrush*, or .MAC format files. Images can now be rotated in 90-degree increments, inverted, resized, and flipped. Version 2.0 ships with 150 clip-art images and a selection of 60 fonts, with more available in 2 font and 7 clip-art portfolios for \$39 each.

*First Publisher 2.0* supports the DeskJet (though not its soft fonts) and all Hewlett-Packard and Bitstream soft fonts. This is a

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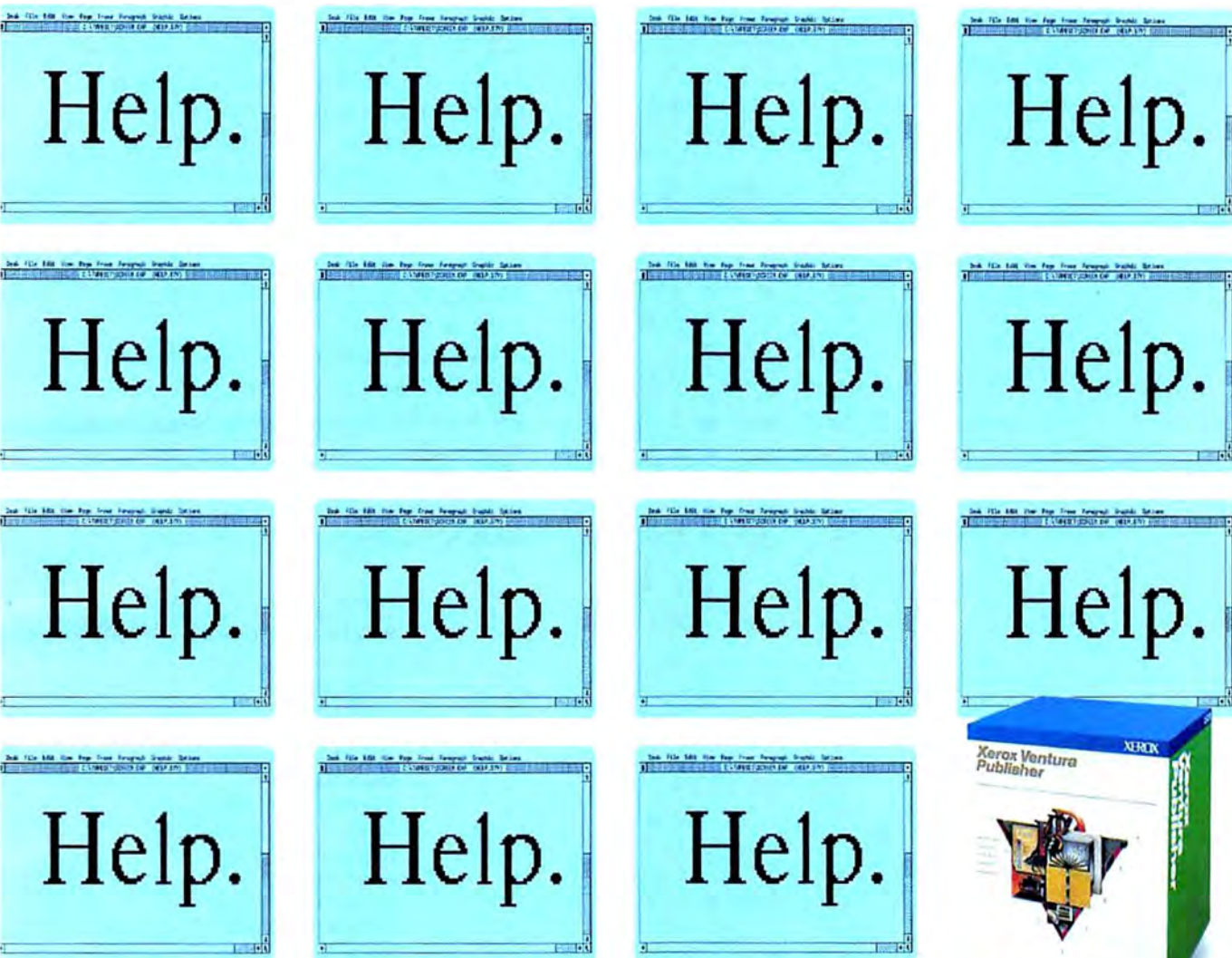
getting started to character kerning.

Just as importantly, Release 2.0 has 70 new features that give you more control than ever. It supports more typestyles and printers. It even gives you grey scaling, full color, and the ability to produce color separations on compatible printers.

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## FEATURES EVALUATION

VP-Planner Plus 2.0:  
Handy Additions

Version 2.0 has gained an undo command, priority and background recalc, and macro transcripts.

	VP-Planner plus 2.0	VP-Planner plus 1.0	1-2-3 2.01
<b>Data entry and editing</b>			
Reads/writes ASCII	●	●	●
Reads/writes .WKS and .WK1	●	●	●
Reads/writes .DBF	●	●	○
Undo command	●	○	☉ <sup>1</sup>
Goto feature	●	●	●
Global search and replace	●	●	○
Wild-card searches	●	●	●
Underlining/boldface in cells	○	○	○
Invisible/hide feature	●	●	●
Background/priority recalculation	●	○	○
Minimal recalculation	○	○	☉ <sup>2</sup>
Password protection	●	●	●
Supports mouse	○	○	○
<b>Capacity</b>			
Maximum number of rows	9999	9999	8192
Maximum number of columns	256	256	256
Maximum number of windows per screen	6	6	2
Maximum number of keys sorted concurrently	4 <sup>3</sup>	4 <sup>3</sup>	2
Supports expanded memory	○	○	●
Supports multidimensional data bases	●	●	○
Supports dynamically linked files	○	○	☉ <sup>1</sup>
Supports math coprocessor	●	●	●
<b>Reporting and graphs</b>			
Maximum report width (in characters per line)	255	255	240
Automatic page numbering	●	●	●
Number of graph types	5	5	6
Number of colors supported	7	7	7
Free text on graphs	○	○	○
Prints sideways	●	●	○
Spooler	●	●	○
<b>Macro/programming</b>			
Macro libraries	●	●	○
Macro learn mode	●	●	☉ <sup>1</sup>
Creates macro transcript files	●	○	○
Input statements	●	●	●
Step mode/trace cells option	●	●	●
DOS access from macro procedure	●	●	○
Reads/writes 1-2-3 macros	●	●	●

● Yes ○ No ☉ Deficient

<sup>1</sup> With Lotus's HAL. <sup>3</sup> Each key can contain multiple columns.

<sup>2</sup> With Lotus's Speedup.

big improvement over the anemic catalog of HP fonts in version 1.0. However, the program's dot matrix output is still poor, and dot matrix users will be better served by the first-rate fonts of Digital Research's *GEM Desktop Publisher*. In response to customer demand, Software Publishing has also added a driver for the Star Gemini 10X printer.

The package's overall speed, which was satisfactory in version 1.0, has been noticeably enhanced. Tests showed a 150 to 300 percent speed gain in such tasks as jumping to the second page in a two-page ASCII file and placing a graphic in the corner of a page with text wraparound.

For a small business with a laser printer, *First Publisher* is an attractive, inexpensive way to produce occasional short-document layouts. If your work runs to double-digit pages or you're tied to dot matrix output, you'll need to consider a beefier (and more expensive) program. —George Beinhorn

## WHERE TO BUY

## PFS: First Publisher 2.0

Software Publishing Corp.  
1901 Landings Dr.  
P.O. Box 7210  
Mountain View, CA 94039-7210  
800/647-7403, 415/962-8910

List price: \$129

Requirements: 512K, two disk drives, DOS 2.10 or later version, graphics adapter (mouse recommended)

Not copy protected

Technical support: unlimited, no toll-free number, M-F 8-4

Other support services: quarterly newsletter free to registered users, CompuServe forum (GO SPCFORUM)

For more information, circle 672 on reader service card.

## GrandView 1.0

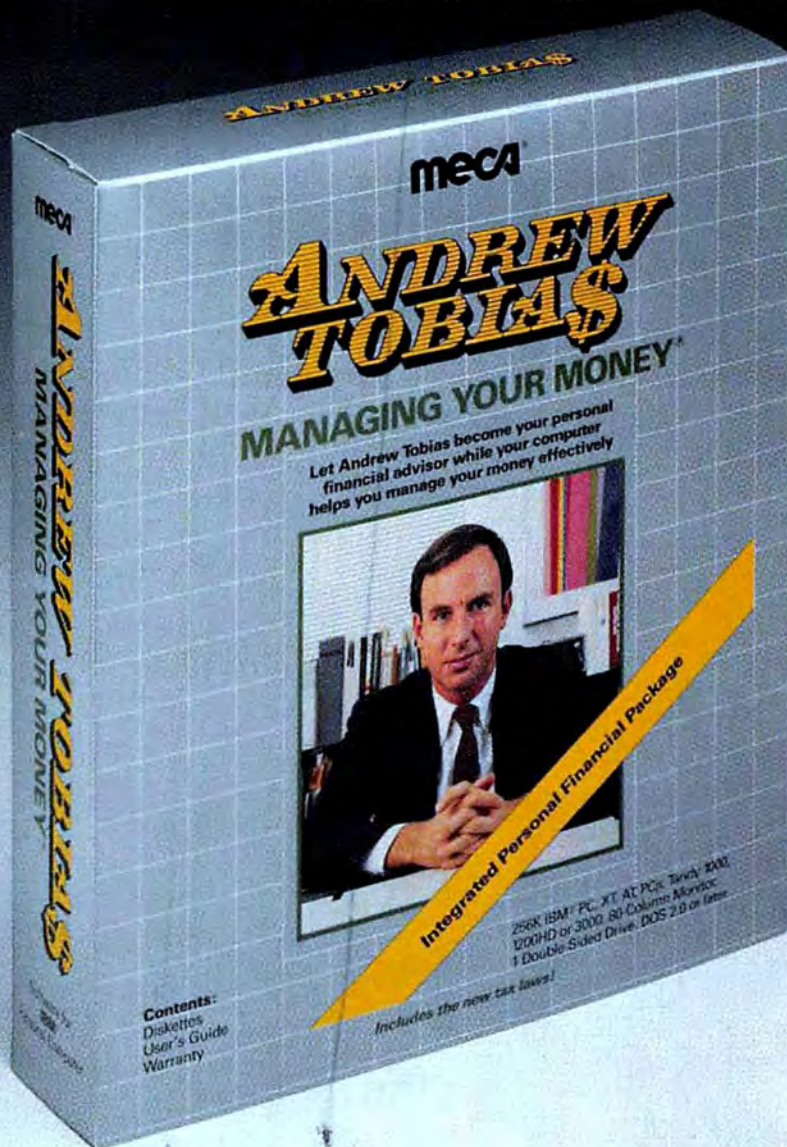
Personal information manager

PROS: Powerful outline and project-planning functions, excellent mouse support

CONS: Weak word processor, limited outline size

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New York Daily News, "Money Talks,"  
October 4, 1987

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Base System with Single 360K Drive, Assembled & Tested IBM® XT Compatible

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- Swan Setup & Utilities Diskette, Full Documentation

#### Options:

- Phoenix BIOS
- 8087 Coprocessor
- SWAN/MS-DOS (3.3) add \$89

XT10	VIDEO OPTIONS			
Drive Options	Mono <sup>1</sup>	CGA	EGA	VGA
Single Floppy	\$669	\$839	\$1068	\$1168
Dual Floppies	\$749	\$919	\$1148	\$1248
w/20MB Seagate #ST-225 HD*	\$949	\$1119	\$1348	\$1448
w/30MB Seagate #ST-238 HD*	\$995	\$1165	\$1394	\$1494

\* Includes Single 360K Floppy Drive

\* Add \$49 For 14" Flat Screen Monitor

## SWAN 386/16

**\$1969** Monitor not included

### 16MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80386 16/8 MHz Norton SI 17.6
- Phoenix BIOS V 3.1
- 1MB (expandable to 2MB) RAM on memory card
- 80287 & 80387 Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full Documentation

#### Options:

- Upgrade to 2MB
- 80387 Coprocessor
- SWAN/MS-DOS (3.3) add \$89

386/16	VIDEO OPTIONS			
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	\$2199	\$2168	\$2518	\$2618
w/40MB Seagate #ST-251 HD	\$2499	\$2548	\$2898	\$2998
w/80MB Seagate #ST-4096 HD	\$2799	\$2848	\$3198	\$3298

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## SWAN 286/10

**\$849** Monitor not included

### 10MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80286 10/6 MHz Norton SI 11.2
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- 200W Power Supply
- 1.2MB Floppy Drive
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- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full Documentation

#### Options:

- 80287 Coprocessor
- Upgrade to 640K or 1MB
- SWAN/MS-DOS (3.3) add \$89

286/10	VIDEO OPTIONS			
Drive Options	Mono <sup>1</sup>	CGA	EGA	VGA
Single Floppy	\$995	\$1165	\$1394	\$1494
w/20MB Seagate #ST-225 HD	\$1249	\$1419	\$1648	\$1748
w/40MB Seagate #ST-251 HD	\$1399	\$1569	\$1798	\$1898
w/80MB Seagate #ST-4096 HD	\$1699	\$1869	\$2098	\$2198

\* Add \$49 For 14" Flat Screen Monitor

## SWAN 386/20

**\$2349** Monitor not included

### 20MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80386 20/8 MHz Norton SI 22.0
- Phoenix BIOS V 3.1
- 1MB (expandable to 2MB) RAM on memory card
- 80287 & 80387 Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full Documentation

#### Options:

- Upgrade to 2MB
- 80387 Coprocessor
- SWAN/MS-DOS (3.3) add \$89

386/20	VIDEO OPTIONS			
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	\$2499	\$2548	\$2898	\$2998
w/40MB Seagate #ST-251 HD	\$2879	\$2928	\$3278	\$3378
w/80MB Seagate #ST-4096 HD	\$3179	\$3228	\$3578	\$3678

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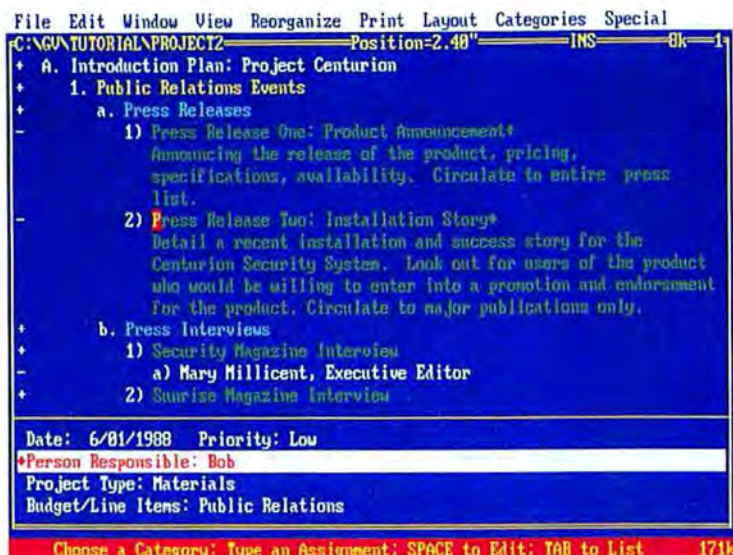


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Category assignments can be attached to each item in a *GrandView* outline, and you can create as many categories as you like, from completion dates to persons responsible for tasks.

and Symantec's *GrandView* is no exception. Designed to track sales reports, project plans, schedules, notes, and correspondence, the program grafts an indifferent word processor and a clever project-tracking feature onto what must be the most powerful outliner on the market. *GrandView* can't cross-reference data as elegantly as *Agenda*, but if you're neat by nature, it can help you keep on top of things.

Like Symantec's other outliner, *ThinkTank*, *GrandView* lets you make dynamic copies of headers: Change one and the clone changes as well. You can also expand and collapse subheads, zoom to a portion of an outline, sort and gather subheads, and so forth. But *GrandView* adds a lot more.

Mouse support makes manipulating headings a breeze. You can open up to nine outlines at once, view multiple outlines on screen, and easily switch between them. (A clipboard lets you move both headings and text.) Finally, the program offers a wide variety of preset outline modes.

But *GrandView*'s strength as a project planner stems from its Category function, which lets you instantly reorganize outlines according to criteria you define. This is where careful planning pays off. Say you're outlining the tasks involved in a major advertising campaign. As you enter items, you may assign each one a priority level, a completion date, a person responsible, and so on. Turn to the Category view, and you'll see a

group of boxes showing the categories you've created and the entries under each one.

Highlight the Person Responsible category, for example, and *GrandView* will display all the people you've assigned work to. Pick a name and any outline tasks assigned to that person will appear.

*GrandView* comes with a word processor and a 100,000-word spelling checker, but it's not going to wean anybody from *WordPerfect*. Function keys are unavailable for basic editing chores (they're reserved for outline use), and you'll search in vain for such features as a macro glossary, a ruler, a column mode, or windows. To get these, you're stuck using another word processor and copying the results in ASCII format to your outline.

*GrandView* offers excellent printer support, and it's easy to specify fonts for different levels of the outline. The program accepts *ThinkTank* and *Ready* files automatically and can convert files from *PC-Outline*. Unfortunately, *GrandView* outlines are limited by available RAM, and the program doesn't make use of expanded memory.

*GrandView* is a top-notch outliner, and its Category view is dandy for sorting anything from deadlines to people in charge of tasks. The program's word processor still needs major improvement, but *GrandView* will suit anyone whose management needs run to bulleted lists and extensive supporting references. —Patrick Marshall

#### WHERE TO BUY

##### **GrandView 1.0**

Symantec Corp.  
Living Videotext Division  
117 Easy St.  
Mountain View, CA 94043  
415/964-6300

**List price:** \$295

**Requirements:** 256K, two disk drives, DOS 2.00 or later version  
Not copy protected

**Technical support:** unlimited, no toll-free number, M-F 9-4

**Other support services:** 30-day money-back guarantee, CompuServe forum (GO LVTFORUM)

**For more information, circle 673 on reader service card.**

# Get your work done before 1991?

The future of personal computing is clear. More powerful PCs. Easier to use PCs. With graphics and character-based programs working side by side. Talking to each other. Multitasking. Windowing. Menuing. Mousing. Getting your work done easier and faster.

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DESQview™ is the operating environment that gives DOS the capabilities of OS/2.™ And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap to the productivity of the next generation. For not much money. And without throwing out your favorite software.

Add DESQview to your PC and it quickly finds your programs and lists them on menus. So you can just point to the program, using keyboard or mouse, to start it up. DESQview knows where that program lives. And what command loads it.

For those who have trouble remembering DOS commands, it adds menus to DOS. It even lets you sort your files and mark specific files to be copied, backed-up, or deleted—all without having to leave the program you're in.

Best of all, DESQview accomplishes all this with a substantial speed advantage over any alternative environment.

## Multitask beyond 640K.

When you want to use several programs

For programmers, DESQview's API, with its strengths in inter-task communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.

together, you don't have to leave your current program. Just open the next program. View your programs in windows or full screen. Open more programs than you have memory for. And multitask them. In 640K. Or if you own a special EMS 4.0 or EEMS memory board, or a 386 PC, DESQview lets you break

through the DOS 640K barrier for multitasking. You can start 1-2-3 calculating and tell Paradox to print mailing labels while you're writing a report in Word Perfect, or laying out a newsletter in Ventura Publisher, or designing a building in AutoCAD.

DESQview even lets you transfer text, numbers, and fields of information between programs.

## Fulfill the 386 promise.

For 80836 PC users, DESQview becomes a 386 control program when used in conjunction with Quarterdeck's Expanded Memory Manager (QEMM)-386—giving faster multitasking as well as virtual windowing support.

And when you use DESQview on an IBM PS/2™ Model 50 or 60 with QEMM-50/60 and the IBM Memory Expansion Option, DESQview gives you multitasking beyond 640K.

## Experts are voting for DESQview. And over a million users, too.

If all of this sounds like promises you've been hearing for future systems, then you can understand why over a million users have chosen DESQview. And why PC



Magazine gave DESQview its Editor's Choice Award for "The Best Alternative to OS/2," why readers of InfoWorld twice voted DESQview "Product of the Year" why, by popular vote at Comdex



Fall for the last two years in a row, DESQview was selected as "Best PC Environment" in PC Tech Journal's Systems Builder Contest.

DESQview lets you have it all now.

**DESQVIEW SYSTEM REQUIREMENTS:**  
IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2 Memory: 640K recommended; for DESQview itself 0-145K • Expanded Memory (Optional): expanded memory boards compatible with the Intel Aboveboard, enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards • Disk: two diskette drives or one diskette drive and a hard disk • Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA), IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA) • Mouse (Optional): Mouse Systems, Microsoft and compatibles • Modem for Auto-Dialer (Optional): Hayes or compatible • Operating System: PC-DOS 2.0-3.3; MS-DOS 2.0-3.2 • Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.03, GEM 1.1-3.0, IBM TopView 1.1 • Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

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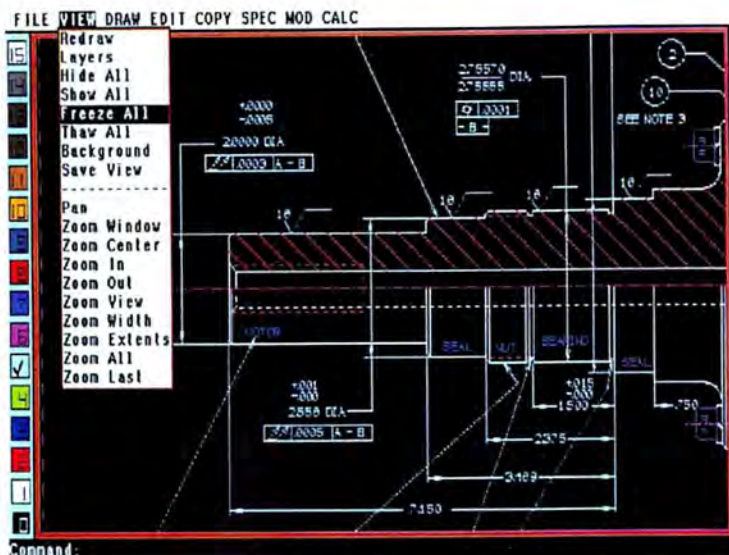
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	QEMM-50/60	<input type="checkbox"/> 5-1/4 <input type="checkbox"/> 3-1/2	\$59.95	
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In this mechanical detail drawing, EasyCAD 2's menu headings at the top of the screen can be changed to suit the user, and new headings can be added as required.

## EasyCAD 2 2.05

2-D design and drafting program



**PROS:** Fast, powerful, flexible, easy to learn, inexpensive

**CONS:** Lacks nested zooms, some cross-hatching limitations

With EasyCAD 2 version 2.05, Evolution Computing has not only revolutionized the low-end CAD market, it bids fair to threaten the high. The easy-to-learn program is blindingly fast, and its flexibility, wealth of features, and excellent user interface match those of professional programs costing thousands of dollars more. With EasyCAD 2 you can easily handle 8000 entity files in 640K of base memory, and you can use floppy-based systems just as effectively as hard disk systems for drawing and editing. However, the program lacks a nested zoom facility, which lets you zoom in and out while drawing.

EasyCAD 2 supports an array of digitizers, pen plotters, laser and dot matrix printers, and ultra-high-resolution graphics boards. A DOS shell is included, as are file translation utilities for Ventura Publisher and PageMaker. Unlike Foresight Resources' competing *Drafix*, EasyCAD 2 lets you modify its menus with any ASCII text editor.

Because EasyCAD 2 uses pulldown menus, practically the entire screen is open for drawing. When you need to change colors, a set of 16 color icons along the left edge lets you switch instantly, even while placing

a line or arc. A prompt line along the bottom of the screen echoes your commands and indicates the next input required. It also provides cursor feedback in either absolute, relative, or relative polar coordinates.

EasyCAD 2 provides a complete set of basic construction elements. Its 24 standard fill (hatch) patterns work with a variety of figures, whether bounded or not. Hatch patterns automatically match up whenever two hatched areas abut or overlap, and expand if the hatched entities are stretched or scaled. EasyCAD 2 can't build hatched areas out of simple lines and arcs, however.

In addition to the usual rectangular grids and snaps, the program offers an extensive set of object snaps (command modifiers) that let you pick off endpoints, centers, midpoints, intersections, angles on arcs and circles, and corners of polygons as needed.

The program's basic editing command set is quite complete, and its selection of Boolean options for choosing items to edit is outstanding. You can select items individually, by color, by layer, by window (box), or by item type, or simply reselect the last item worked on. Then you go on to chain or deduct these selection criteria indefinitely. Need to move all but two of the red polygons on layer #225? No sweat. You can always see exactly what items you've chosen, because once selected, they change to a preset color.

Nor does EasyCAD 2 skimp on dimensioning and text handling. All standard dimension types are associative, which means that the dimension text and witness lines change automatically to match geometry whenever a dimensioned entity is stretched or scaled—a tremendously useful, timesaving feature. Formats include vertical, horizontal, parallel, and angular dimensions, and the standard formats can be augmented with the program's macro language. You can edit text without erasing it, place it at any size or angle in several standard fonts, dynamically drag it into place, and even scale it on the fly.

Finally, EasyCAD 2 is quick. When loading files, regenerating circles and diagonals, and zooming in to a single line or letter, for example, EasyCAD 2 was over ten times faster in our tests than AutoCAD 9.0.

For 2-D design and drafting, EasyCAD 2 is very nearly the equal of such high-end

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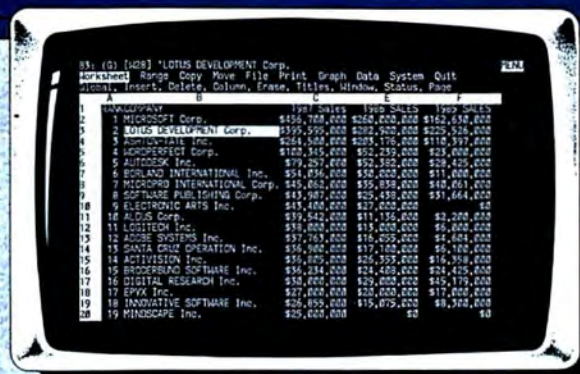
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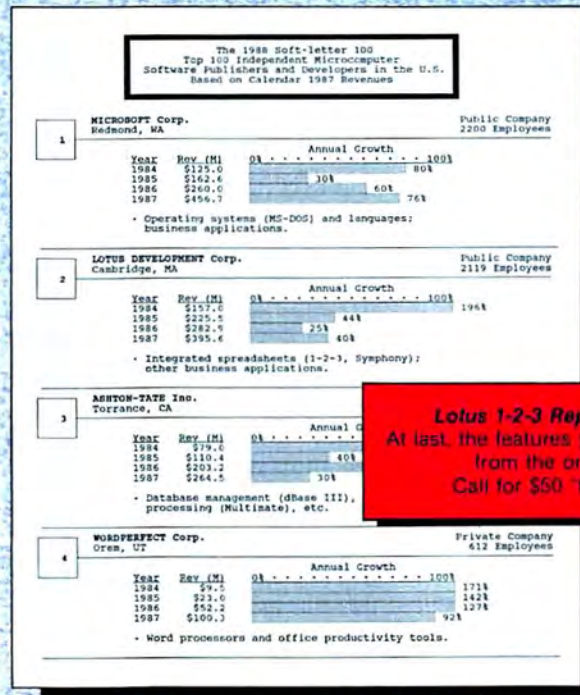
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programs as *AutoCAD*, *VersaCAD*, and *Anvil-1000*. Considering its low price and ease of use, it's an unbeatable value.

—Steven Lord

#### WHERE TO BUY

##### **EasyCAD 2 2.05**

Evolution Computing  
437 S. 48th St. #106  
Tempe, AZ 85281  
602/967-8633

**List price:** \$169.95

**Requirements:** 512K, DOS 2.00 or later version, graphics card, mouse (math coprocessor recommended)  
Not copy protected

**Technical support:** unlimited, no toll-free number, M–F 9–5:30

**Other support services:** none  
For more information, circle 674 on reader service card.

## HB-Browser

*RAM-resident dBASE browser*

**PROS:** Hot-key access to dBASE data from other applications, elegant and intuitive user interface

**CONS:** Requires a lot of RAM, doesn't support non-dBASE index formats

**E**ver long to pluck a customer address or invoice number from your dBASE files without leaving a spreadsheet or word processor? Meet Cauldron's *HB-Browser*, a slick RAM-resident utility that opens windows into .DBF data files. *Browser* is so easy to use, even dBASE novices will love it. But be warned: In its read-only configuration, *Browser* requires a healthy 155K of RAM (in a second configuration that lets you edit the data, it gobbles up 187K). In addition, it doesn't support such non-dBASE-compatible index formats as *Clipper* or *Foxbase +*.

*Browser's* user interface is elegant and logical, with pulldown menus and point-and-shoot file selection. You can open up to ten screen windows into as many as ten dBASE files (including multiple windows into the same file) and see the records in the order of any available index. Data appears in a row-and-column format, and the screen scrolls quickly and smoothly. You can execute instant FINDs, search through the data with LOCATE, and SET filter conditions for viewing records by entering a standard dBASE-

language logical expression. Beware of filtering out all but a few records in a large file, however; *Browser* is even worse than dBASE in spinning your hard disk through the entire file, resulting in infuriating delays.

*Browser* lets you cut and paste all the data from one record (or everything displayed in a window) directly into a worksheet or word processing document. This is a one-way facility, though; *Browser* can't move worksheet or text data from the screen to a dBASE record. If you select *Browser's* larger configuration, you can change the data in a selected record at will. Just be careful: There's no data validation feature. To speed data retrieval, you can use macros to automatically bring up a preset environment of data files, indexes, and window locations. Field names and structures are also available at a keystroke, a useful reference when creating dBASE programs and reports.

The only thing wrong with *Browser* is its appetite for memory. But if you can spare the RAM, you'll soon be spoiled by *Browser's* instant access to your dBASE data. —Alan Schwartz

#### WHERE TO BUY

##### **HB-Browser**

Cauldron  
3204 Adeline St.  
Berkeley, CA 94703  
415/654-3361

**List price:** \$99

**Requirements:** 512K (640K recommended), hard disk, DOS 2.00 or later version

Not copy protected

**Technical support:** unlimited, no toll-free number, M–F 9–5

**Other support:** 30-day money-back guarantee

For more information, circle 675 on reader service card.

*Eric Brown is an associate editor for PC World. Alan Southerton is a senior technical writer at Progress Software in Bedford, Massachusetts. George Beinhorn is a freelance writer in Nevada City, California. Patrick Marshall edits the Commentary Page of the Oakland Tribune. Steven Lord is a mechanical engineer and freelance writer living in Tewksbury, Massachusetts. Alan Schwartz is a data base programmer/analyst in the San Francisco Bay Area. ●*

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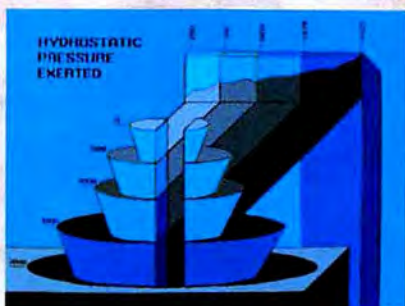
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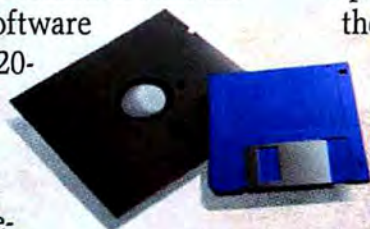
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## BEYOND E-MAIL: THE GROUPWARE POTENTIAL

PC NETWORKS HAVE  
HOUSED ONLY TRADI-  
TIONAL APPLICATIONS  
SO FAR, BUT "GROUP  
PRODUCTIVITY" PACK-  
AGES PROMISE TO PULL  
NEW TYPES OF OFFICE  
FUNCTIONS ON THE NET.

ERIC BENDER



As hundreds of thousands of PCs link up on local area networks, almost every package that can live on a net gets promoted as "group productivity" software. There's a reason for the hype—even rudimentary information sharing can provide significant benefits for work groups—and the reason will become clearer with the arrival of packages that build on net strengths in novel ways.

So far, most net packages are repeating patterns of evolution already well known on minicomputers and bigger machines. Upcoming data base management systems offer prime examples: Building on OS/2, they're moving upscale to become full multi-user relational systems, supporting various degrees of transaction processing with robust recovery schemes. Similarly, word processing packages are incorporating multiuser annotation and merge functions, along with capabilities for tracking and cataloging revisions, thus moving into what vendors of traditional office automation call document processing (see "The Work-Group Ethic," *PC World*, October 1987).

Electronic mail, an addictive office automation staple that makes telephone tag obsolete, is appearing in mainstream applications like Ashton-Tate's *Framework* and Tandy's *Professional DeskMate*. And everyone from tiny start-ups to major players like WordPerfect are selling packages that supplement E-mail with scheduling, calendaring, and other goodies.

Slowly and painfully, the industry is creating relatively compatible and very powerful OS/2 network system platforms that will gracefully handle jobs in situations where DOS would flame out. As those platforms arrive and network hardware costs drop, the distributed power, flexibility, and graphics strengths of PC nets will recast office automation for the nineties.

We're already seeing the first pioneers: innovative applications with new weapons to attack business problems. According to Eric Sall, product director for Lotus's upcoming *Notes*,

some of these packages will give users "more dynamic, subjective, and opinionated ways for information to be brought into the process." Other software will help users cooperate on many tasks now mired in manual mode. None of these products have hit store shelves yet, but they're coming.

### RESTRUCTURING E-MAIL

Electronic mail is as popular this year as jokes about presidential candidates. Customers are most anxious to find ways to link multiple E-mail systems. Vendors, though, are also quietly producing net applications that combine E-mail with other functions built atop data bases.

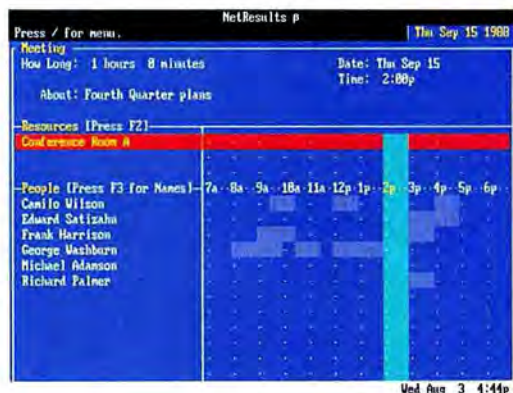
*Higgins*, a veteran package from Conetic Systems in San Leandro, California, includes scheduling, to-do list, phone messaging, and expense reporting modules. Miami-based Data Access's *Office Works* pushes calendaring, filing, phone messaging, and document control features. *WordPerfect Office for PC Networks* from WordPerfect in Orem, Utah, offers an application shell along with notebook, scheduling, and desktop accessory features. Likewise, Chronos Software of San Francisco has created a multi-user version of its *Who/What/When Office* package that performs project, time, and personnel management.

Electronic sharing of the familiar pocket personal organizer is a common theme. "People understand that concept," says Camilo Wilson, chairman of Lifetree Software in Monterey, California. Lifetree's *Net Results* is a memory-resident net package that tightly integrates E-mail, scheduling/calendaring, and work-flow management functions. Unlike plain vanilla E-mail, says Wilson, *Net Results* "lets you build as much structure as you want." Like its competitors, *Net Results* gives you a choice of responses with certain messages; the scheduler, for example, lets you accept or decline a meeting.

Voice annotation, another service that can tag along with E-mail, comes with Forum Systems' *PC/Forum*. The Santa Barbara, California, firm has been working on offbeat office

group—that's ten people who are always at their desks, don't travel, work the same hours, act as an autonomous isolated group, have no matrix structure with other groups in the larger

tion). The commercial product, due next year, will require OS/2 with the Presentation Manager. Lotus is also expected to crank up a *Windows* front end for DOS users.



Left: Lifetree's Net Results aids scheduling. Right: Coordination Technology's DOS prototype exploits "work centers."

software throughout the decade—first, with executive information systems; now, with a network package that runs under Hewlett-Packard's *NewWave* and delivers an integrated portfolio of basic office facilities.

## CONFERENCE CALLS

With a few added hooks for swapping messages among multiple users, E-mail can be incorporated into bulletin boards for informal electronic publishing. Computer conferencing goes two steps further. "You need to support chains of discussion, with facilities to navigate through the chains," says Gil Kirkpatrick, vice president for product development at Trellis Group in Hopkinton, Massachusetts. "You also want to be able to do global searching."

Like many of its peers, Trellis's *TimeTalk* calendaring and scheduling application is evolving in that direction. *Cross/Point* from Cross Information in Boulder, Colorado, has already arrived. But Lotus's *Notes* is the package most people will watch.

*Notes* is designed for sharing information flexibly among work groups—running ongoing discussion/action groups and letting users tune in at convenient times. Lotus chairman Jim Manzi says the package targets those who *don't* enjoy "a perfect work

enterprise, and have a manager whose door is always open. Relax any of these constraints, and you need something like *Notes*."

Already used by hundreds of employees at Lotus Development Corporation, the software often makes meetings unnecessary. Promising applications include project tracking, for keeping an eye on complex marketing programs and conferences, and broadcasting of information such as a company handbook. Other functions can include holding group discussions, such as when brainstorming product ideas, and following the history of events, as in tracking meeting agendas and minutes.

"*Notes* is limited only by the creativity of the people who buy it," Manzi maintains. Likely clients range from executive/secretary teams to sizable intercontinental discussion groups—for which *Notes* does fancy footwork, connecting multiple nets and tackling potentially nasty security problems.

Lotus has shown a *Windows*-based prototype of *Notes*, with snazzy graphics and some *Agenda*-like characteristics (including forms for input and "views" for organizing informa-

## CONNECTION MACHINES

Whereas *Notes* encourages relatively informal jottings, *Staffware* from FCMC in Berkeley, California, exudes grim corporate purpose. Built to automate paper flow, *Staffware* follows a task flowchart and prods users to fill out forms. "Reminders are issued when allocated deadlines are missed," says President Tony Kobine. FCMC is polishing *Calypso*, an OS/2-based successor to *Staffware* that integrates other applications and tools. "We think of the computer as a utility that's there to remind people," Kobine comments.

*The Coordinator* from Action Technologies in Emeryville, California, coordinates work efforts via a set of management tools built on top of sophisticated E-mail. The package follows work commitments to prevent items from falling through the cracks; although its nagging may rub many people the wrong way, the program can produce tangible rewards.

Coordination Technology, a well-heeled start-up in Trumbull, Connecticut, is busy on an even more ambitious project. This package, as yet unnamed, will support and then orchestrate many of the dozens or even hundreds of tasks that individuals and work groups face at any given moment—rather than focusing on individual tasks (as do most work-group

packages) or emphasizing explicit commitments made about given tasks (à la *The Coordinator*).

Chief Technical Officer Anatol Holt explains that Coordination Technology's package springs from his work in "connection mechanics," which, he says, deals with "people working together in physically organized work environments." One key to the package's development is a structured view of fundamental types of human interactions.

The package lets users organize work into a number of electronic centers, one per major job function. A sales vice president, for example, might have one center for tracking sales, one for personnel, and so on. Within each center you'll find role assignments (such as *acceptor* for budget review), links to the appropriate work group, and software tools (including standard applications such as 1-2-3). Coordination Technology aims for maximum flexibility. "The goal is letting you, the user, build the environment," says Holt, with the network providing the connections. The prototype runs in DOS. A commercial edition requiring OS/2 with the Presentation Manager will appear next year.

#### REAL-TIMELY MEETINGS

Data General strives for another lofty goal: supporting "live" electronic meetings. Chris Stone, manager of the company's Office Systems Group in Westboro, Massachusetts, says a likely use for its prototype *Windows*-based application would be several people reviewing a budget at once. "The same document appears on everyone's PC at the same time, and simultaneously you can talk over the phone." The meeting leader controls participants' degree of access; each person can manipulate the screen by mouse and annotate voice comments.

What will make or break the software, Stone says, is its speed of response and its flexibility—including

#### Building Blocks of Work-Group Productivity

- Scheduling (maintaining appointment and meeting lists, and allocating resources)
- Document processing (creating, editing, tracking, distributing, and archiving memos, reports, and other materials)
- Bulletin boards (facilities for holding ad hoc group discussions and for broadcasting information to the entire work group)
- Time/Project management (maintaining individual and group to-do lists, and tracking work in progress)
- Computer conferencing (controlling and tracking formal group discussions)
- Work flow coordination (coordinating and tracking tasks that require more than one work-group member)
- Electronic mail (sending messages and formatted files to individuals or groups)
- Data base management (storing, categorizing, and retrieving information, including electronic mail messages)

its ability to accommodate arguments, when those crop up. Still, early testing of the package, which currently has no release schedule, shows that many users prefer to meet in the flesh. Another constraint: "From a performance perspective, you really should have a net," Stone says. That point of view, obviously, excludes remote sites where the computer connection would be most valuable.

Jeff Raikes, Microsoft's director of applications marketing, also sees potential for electronic meetings that reach out to remote sites. "Ideally, your presentation software would be very interactive," he says; each user could look at other pieces of supporting data (like the actual numbers that generated a chart). Moreover, you could record the meeting for absentees, he suggests.

*Diamond*, a UNIX document-exchange application from BBN Systems and Technologies in Cambridge, Massachusetts, already offers just that. The package, which runs on Sun Microsystems' 386i, handles remote multimedia conferencing with integrated text, graphics, spreadsheets,

charts, and voice annotation. Users can record meetings, and the program runs acceptably fast at 9600 bps, BBN claims.

#### SLOW-BURNING BARRIERS

Group productivity applications represent a real marketing challenge, according to Lotus's Manzi. The need for long customer courtships leads to early product announcements. And a suitable distribution channel doesn't exist; today's net resellers focus much more on communications expertise than on customer application needs.

Christopher Greendale, president of Network Technologies International in Ann Arbor, Michigan, acknowledges that his firm has encountered a rocky road with its UNIX-based *docuFORUM* document collaboration software. Greendale identifies three stumbling blocks: selling the concept, finding the right fit in the computing environment, and shaping software to fit specific jobs.

How will customers measure productivity gains, and how will they get employees to sign on? "The products that do best will be those that can be grasped quickly," predicts Lifetree's Wilson. "That's far more important than anything else."

Work-group productivity software builds on a foundation that combines electronic mail and data base management services. Most packages branch out to include one or more of the functions described.

According to Jeffrey Tarter, publisher of the *Soft-letter* newsletter in Cambridge, Massachusetts, it's just as important to come up with complete solutions. Tarter points to *ForComment* from Brøderbund Software in San Rafael, California, as an example of a product that supplies only a partial solution. "*ForComment* automated one-tenth of the [document processing] problem, when you have to automate the whole thing."

As Microsoft's Raikes remarks, "Vendors have to think through the scenarios for people who will be using their work-group tools, and then enhance their spreadsheets, word processors, and so on." At the same time, the software needs more than a nodding acquaintance with nonelectronic matters, including documents.

Pricing hasn't yet settled for all categories; listings for DOS products generally range between \$100 and \$200 per user. The industrial-strength OS/2 contenders haven't arrived, but clearly the overall environment will not be cheap. 3Com's OS/2 network system software, for instance, starts at \$3000 and demands powerful 80286 and 80386 machines. Even more

alarming, a few vendors are already talking wistfully about Intel's forthcoming 80486 chip.

### THE ORGANIZATIONAL MANDATE

Mundane functions like scheduling can offer appreciable assistance in handling resources like conference rooms and audiovisual equipment. Payoffs can increase with large networks. For example, on a Banyan Systems wide area net, Trellis's *TimeTalk* can schedule fleets of cars at various sites and describe each car.

But add personal schedules to the equation, and it may no longer balance. Do you want all your co-workers to know your exact schedule? wonders Carol Woolfe, applications manager at Banyan in Westboro, Massachusetts.

Thriving on open information exchange, on-line conferences may yield some ancillary benefits, such as doing away with the powers of oratory and putting the focus on substance. New York group-productivity evangelist Esther Dyson claims that such systems "expose the hand wavers—everybody's argument looks plausible or implausible depending on the argument, not who said it."

"[Electronically linked] work groups are going to take a lot of personnel management," predicts Woolfe. "This is a new way of doing business—you're not just replacing a calculator with 1-2-3—and it's scary stuff."

Achieving user friendliness "gets more intricate as the application gets more intricate," Woolfe adds, and clearly many offerings are confronting that dilemma. (Coordination Technology's prototype labels 1-2-3 an "encapsulated foreign object.") And with what conflicting interfaces should the software comply?

But despite all the hype, delays, and risks, users should watch for these packages. "A *VisiCalc* of networking is inevitable," declares Dave Williams, Banyan's director of product planning. And he stresses that such offerings will fortify not just work groups but entire companies. "As the network snakes through the organization, it becomes a nervous system that ties the organization together." ●

*Eric Bender is PC World's East Coast editor.*

### FOR MORE INFORMATION

#### Cross/Point

Cross Information  
1881 Ninth St., Canyon  
Center, #311  
Boulder, CO 80302  
303/444-7799  
Reader service number  
720

#### Diamond

BBN Systems and  
Technologies  
10 Moulton St.  
Cambridge, MA 02238  
617/873-3000  
Reader service number  
721

#### docuFORUM

Network Technologies  
Int'l  
315 West Huron

Ann Arbor, MI 48103  
313/994-4030  
Reader service number  
722

#### ForComment

Brøderbund Software  
17 Paul Dr.  
San Rafael, CA 94903  
415/479-1700  
Reader service number  
723

#### Higgins

Conetic Systems  
1470 Doolittle Dr.  
San Leandro, CA 94577  
415/430-8875  
Reader service number  
724

#### Net Results

Lifetree Software  
411 Pacific St.  
Monterey, CA 93940

408/373-4718  
Reader service number  
725

#### Notes

Lotus Development  
Corp.  
55 Cambridge Pkwy.  
Cambridge, MA 02142  
617/577-8500  
Reader service number  
726

#### Office Works

Data Access  
14000 S.W. 119th Ave.  
Miami, FL 33186  
305/238-0012  
Reader service number  
727

#### PC/Forum

Forum Systems  
5540 Ekwill St.  
Santa Barbara, CA  
93111  
805/683-5661  
Reader service number  
728

#### The Coordinator

Action Technologies  
2200 Powell St., 11th  
Floor  
Emeryville, CA 94608  
415/654-4444  
Reader service number  
729

#### TimeTalk

Trellis Group  
85 Main St., P.O. Box  
338  
Hopkinton, MA 01748  
508/435-3066  
Reader service number  
730

#### Who/What/When Office

Chronos Software  
1500 16th St.  
San Francisco, CA  
94103  
800/777-7907,  
415/626-4244  
Reader service number  
731

#### WordPerfect Office for PC Networks

WordPerfect  
1555 N. Technology Way  
Orem, UT 84057  
801/225-5000  
Reader service number  
732

# OS/2 EXTENDS ITS REACH

To stay in business in the 1990s, PCs will need to make connections. OS/2 Extended Edition will help them become upwardly mobile.

*Eric Bender*

If you upgrade from IBM's OS/2 Standard Edition to the new Extended Edition, does the operating system look different? No, because it's identical—"Extended" refers to added communications and data base management applications that IBM believes essential to any well-connected workstation.

IBM projects that by 1992, around 95 percent of all business PCs will be connected to their peers or larger systems. That scenario seems to call for a broad suite of connectivity choices, with corresponding data base underpinnings. "The disciplines of communications and data base management are becoming heavily dependent on each other," explains Tony Dvorak, manager of Extended Edition product operations at IBM's Entry Systems Division programming center in Austin, Texas.

With Extended Edition, IBM aims "to make a very advanced application platform that's very simple for application programmers," Dvorak says. The software

also has to fit within IBM's imposing Systems Application Architecture (SAA) scheme, which calls for common application programming interfaces, user access methods, and communications options across IBM's major mainframes, minis, and micros.

The project called for massive in-house development, so IBM wrote Extended without the help of Microsoft. Does that make it a closed architecture? Not really. IBM is releasing specifications and tools much the way it has done with DOS. Communications vendors will compete no more directly with IBM than before. Data base suppliers can choose among platforms from IBM, Microsoft/Ashton-Tate, and others.

Customers saw IBM's first tangible results when Extended 1.0, which is character-based like Standard 1.0, arrived in August. Extended 1.1 will be available

in November and will add Standard 1.1's Presentation Manager interface, although that won't be incorporated into the communications and data base management programs. Each version of Extended costs \$795, with a free upgrade from 1.0 to 1.1.

Machine requirements are hefty. IBM says that you can get by with 3MB of memory and a 20MB hard disk, but if you take advantage of Extended's communications and data base functions, you will probably need at least 5MB of memory and a hard disk several times larger.

## COMMUNICATIONS: THE VEGEMATIC MODEL

Corporate customers search for simple but effective ways to blend together applications and data files stored in their various types of machines. Extended's communications manager aims to support the PC end of that process.

Extended offers optional terminal emulation and file transfer for IBM 3101 and DEC VT 100 asynchronous terminals, and local (Dis-

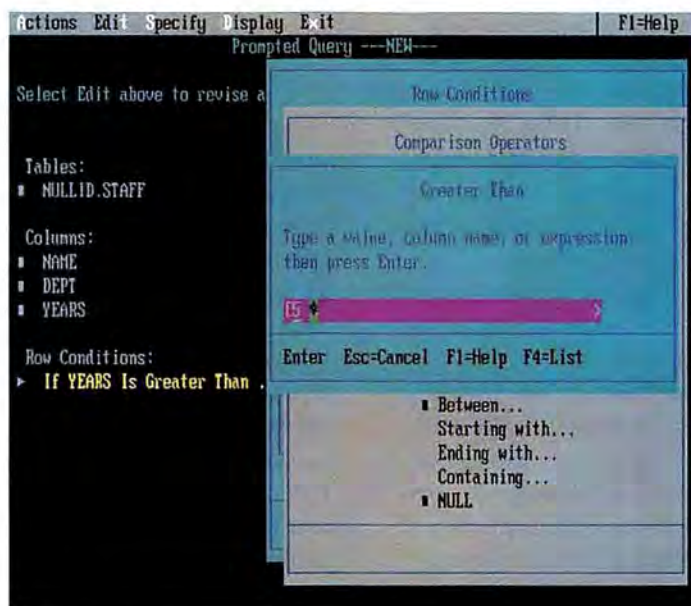
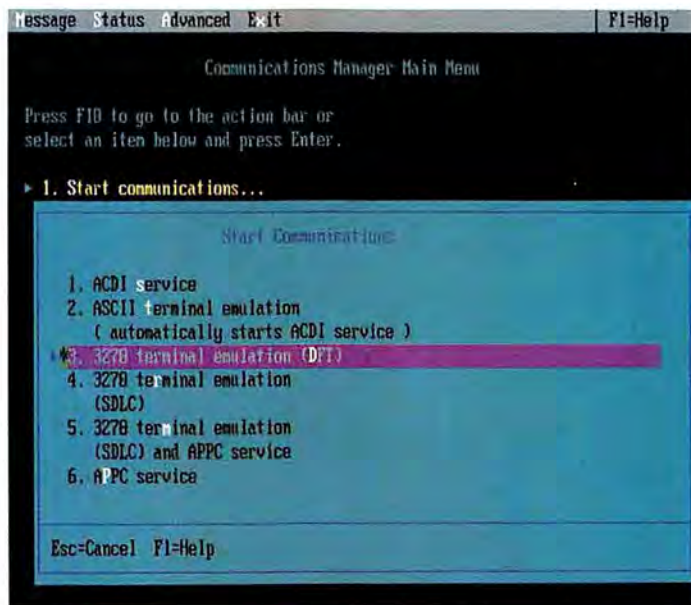


tributed Functions Terminal) and remote (Synchronous Data Link Control) 3270 synchronous devices. But Extended provides only bare-bones functionality—less than that found in DOS equivalents. The software does raise the ceiling on mixed and multiple communications sessions, though, including up to five DFT and five SDLC sessions. Every Extended PC also gets communications management tools for nets of all sizes—including hooks for managing large computer networks.

For the moment, users with most third-party peripherals (including Digital Communications' popular IRMA boards) are out of luck. Extended can't reach them, and IBM hasn't revealed any plans to change that.

This fall Extended 1.1 will hook up with Token-Ring and PC Network nets via IBM's OS/2 LAN Server software. At a future date, IBM will support the high-level 3270 programming interface, X.25 data networks, a systems network architecture local area network gateway, and emulation of the 5250 terminals that connect to System 3x and AS/400 minicomputers.

In general, IBM's rivals say they'll be the first to move most of the communications functions away from the PC and into a local area net server.



### ONE STORY, ONE SQL

Little brother to IBM's DB2 relational system, Extended's data base manager is a single-user package. It divides into two components: A Structured Query Language (SQL) engine offers low-level data management functions, and a query manager provides both developer and end-user tools. Users can work from a com-

mand line or rely on menu-driven prompts that facilitate data entry, edits, queries, and report generation and even help you build custom interfaces. As with most relational data bases, the standard prompts are not overwhelmingly intuitive.

Single-user applications that respect SQL calls need

Extended Edition's communications manager is designed to let PCs juggle several different types of connections at once.

Users can access the data base manager's SQL engine through a bare-bones query manager; here a prompted query is underway.

## Upgrade Plans for OS/2 Extended Edition

	Extended Edition 1.0	Extended Edition 1.1	Extended Edition planned
<b>Includes</b>	OS/2 Standard Edition 1.0	OS/2 Standard Edition 1.1	OS/2 Standard Edition 1.1 or later version
<b>Communications</b>			
Multiple asynchronous	Y	Y	Y
3270 DFT, SDLC	Y	Y	Y
Token-Ring network	N	Y	Y
PC Network	N	Y	Y
SNA network gateway	N	N	Y
X.25 support	N	N	Y
5250 emulation	N	N	Y
<b>Data base</b>			
Single-user relational	Y	Y	Y
Network multiuser	N	N	Y
<b>Minimum memory</b>	3MB	3MB	n/a
<b>Minimum storage requirement</b>	20MB	20MB	n/a

OS/2 Extended Edition 1.0 offers relatively limited communications and data base modules. Version 1.1 will incorporate the Presentation Manager and support for files exceeding 32MB, plus connections for IBM local area networks.

not be rewritten for future multiuser offerings. Those offerings will include a data server for OS/2 networks, although Big Blue has not specified when such a product would appear.

Years from now, users will reach the higher altitudes of SAA where they won't have to worry whether data is on a PC in the office, a mainframe in Chicago, or a mini in Minneapolis. "Distributing SQL requests from a given task to multiple systems—PS/2s, System/370s, or AS/400s—is our goal," Dvorak says. "That's a difficult problem."

For more basic data base chores, Extended already offers the building blocks. The leading PC data managers are being recast to handle SQL, and those should sit comfortably on top of Extended's data base engine.

## CHECKING THE COMPETITION

How does Extended stack up against its adversaries?

On the hardware side, Extended does not demand a PS/2. It runs—slowly—on an AT. It also works on Compaq Deskpros and other highly compatible PCs, minimizing any threat to those vendors. But IBM calls the Extended Edition one of the first packages that tunes into the PS/2's Micro Channel Architecture.

The Micro Channel supplies a broader bandwidth than the normal 10-MHz AT bus and more rugged performance for multiple communications links. While an AT can handle several 3270 sessions, for example, such hardware was not intended to play referee while concurrent sessions wrestle for the communications ports. Designed to share such interrupts, the Micro Channel lets PS/2 owners juggle

more—and more varied—sessions. During the next decade, that may prove important to significant numbers of buyers.

In the software market, confusion reigns, partly because so many interlocking pieces will go into complete installations.

At the LAN level, the emerging Extended family primarily faces off against Microsoft, Novell, and their respective allies. But it's too early to handicap the race. Nobody's close to shipping complete kits. Look at data bases, now splitting into front ends and servers: The Microsoft/Ashton-Tate SQL/Server will butt heads with an unannounced Extended server, while an upgrade of Extended's query manager will duel with an unannounced Microsoft front-end package, among others.

Even though competitors may often surpass Extended's features, the software will become a de facto standard among the large corporate customers where IBM rules. And in that environment, it will extend our definition of a minimum workstation. ●

*Eric Bender is PC World's East Coast editor.*

## FOR MORE INFORMATION

### OS/2 Extended Edition 1.0, 1.1

IBM  
U.S. Marketing and Services Group  
900 King St.  
Rye Brook, NY 10573  
Reader service number 770

# No matter which of these modes you use,

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40-column VGA Text  
80-column CGA Text  
80-column EGA Text  
80-column VGA Text  
Lo-res CGA Graphics  
Hi-res CGA Graphics  
MDA Monochrome Text  
80-column VGA Monochrome Text  
Lo-res MCGA Graphics  
Lo-res VGA Graphics  
Med-res VGA Graphics  
EGA Monochrome Graphics  
Hi-res EGA Graphics  
Hi-res MCGA Graphics  
Hi-res VGA Graphics

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**Our Low Sale Price**  
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List \$1995

## 12" TTL Monochrome Monitor



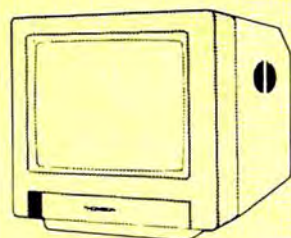
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- 1/2 Height - Takes 1/2 the Room of Full Size Drives

**Sale Price \$249<sup>95</sup>**

List \$499

## Seagate

### Super Fast ST 251 40 MEG Harddrive

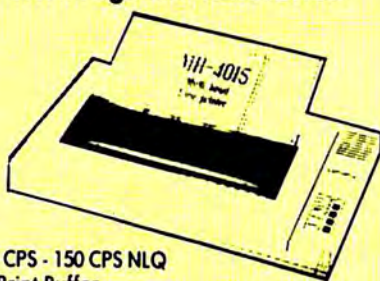
- 38 ms Access
- Supports MS DOS
- 40 Mega Byte Storage
- Auto Boots When Powered Up
- 1/2 Height - Takes 1/2 the Room of Full Size Drives

**Sale Price \$389<sup>95</sup>**

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Multi-Head Wide Carriage Printer  
With High Dot Resolution



- 720 CPS - 150 CPS NLQ
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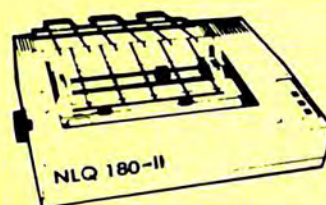
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**\$99<sup>95</sup>**

### TEAC 720K - 3 1/2" Drive

- Double Sided/Double Density
- Fits IBM PC, XT & Compatibles
- Half Height
- List Price \$199

**\$99<sup>95</sup>**

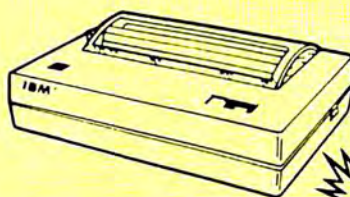
### TEAC 1.44 M - 3 1/2" Drive

- 1.44 Mega Byte Memory
- Fits IBM AT & Compatibles
- Double Sided/Double Density
- List Price \$299

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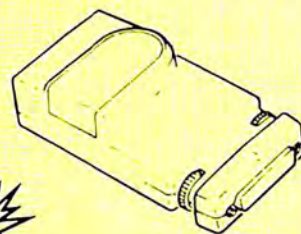
**Our Low Sale Price**

**\$49<sup>95</sup>**

List \$199

## 300/1200 BPS Migent Pocket Modem

Free Terminal Software



- Hayes compatible
- Runs on AC or battery
- Turns on/off automatically
- Small enough to put in your pocket
- Plugs directly into your serial port on many computers
- Easy to use; no switches to set
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**Our Low Sale Price**

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# ACCOUNTING TOOLS OF THE TRADES

RALPH SOUCIE

**Industry-specific accounting systems can be the best solution for businesses with special needs. PC World surveys top products in three domains: point-of-sale, construction, and medical practice.**

Off-the-shelf accounting packages aren't for everybody, but few companies can afford to code their own accounting systems from scratch. Fortunately, there is a middle ground: industry-specific or "vertical market"

accounting packages tailored to your type of business. Of course, such systems aren't cheap. One thousand dollars typically buys a specialized module and perhaps some general accounting functions such as inventory or accounts receivable; a complete multiuser turnkey hardware/software system with a lot of on-site hand-holding can easily top \$30,000.

Still, vertical market developers offer some things most *DacEasy* or *Solomon III* dealers can't—namely, familiarity with your industry's accounting cycles and vocabulary, plus comprehensive training and support. And there's another bonus: Since a vertical accounting package speaks your language, it's often easier to learn and use than all-purpose general accounting programs.

Careful shopping is still the watchword, because what you get depends on the source. Value-added resellers (VARs) often bundle the software with hardware—from PCs to bar-code readers to sales-slip printers. Other VARs (and vendors) include general ledger, accounts receivable, and accounts payable functions with the specialty modules, while still others offer packages that merely work with popular off-the-shelf accounting programs.

Dazzled by all this diversity? Trade organizations and industry-specific groups can be a valuable resource for prospective buyers; some publish reviews of accounting software or keep lists of recommended products. *PC World's* survey of 18 vendors offering specialized retail, construction, and medical market accounting systems should get you off to a good start. Peruse the product descriptions, contact likely vendors for details and demos, and you'll be well on your way to making a sound business decision.



## POINT-OF-SALE RETAIL

Point-of-sale (POS) software captures transactions; stores pricing data; and works with inventory, general ledger, and other "back office" accounting programs. A PC/cash-drawer combination typically records transactions at the front counter; dedicated digital cash registers (including those with programmable keypads) are the exception.

Naturally, you should look for a POS package that works with your registers and can reprogram them. If a PC is at the front counter, the program should allow on-line access to inventory and credit information. The POS package should also handle all standard retail functions from "no sale" to split-tendered (part cash, part credit) transactions; accept input from bar-code readers; and provide a simple tickler-file interface to inventory data. Look, too, for security features that protect against employees tapping the till.

Larger retailers should consider how POS data feeds into a sales-reporting module, as well as the system's ability to address multiple cash drawers and track inventory stored in a number of locations.

### Mainstreet Merchandiser

*Armor Systems*

*Mainstreet Merchandiser* consists of POS, inventory control, accounts receivable, and customer data base modules. It supports input devices such as bar-code readers and programmable keypads. Support for wholesale operations—such as picking tickets—is included, and it can handle serialized inventory. One nicety: The program allows you to print a price quote for requested or out-of-stock items, then retrieve it later for an invoice. The package produces reports on lost sales and customer buying histories. Limited custom report formatting is available.

### ARCS, Advantage

*DataSym*

DataSym offers a generic, single-store POS system called *ARCS* and a five-store system called *Advantage*, plus a variety of customized products that address special niches like theaters, restaurants, liquor stores, and apparel stores. *ARCS* utilizes cash registers (not PCs) as POS devices, and supplies PC interface boards for Sharp registers and PROM chips that reprogram keypads. The program produces reports on profit margin by item and fast, slow, and zero inventory movement. Separate modules handle general accounting functions such as inventory and invoicing.

### Key Retailer

*SoftKey Software Products*

SoftKey's *Key Retailer* is unusual in that POS, inventory, general ledger, accounts receivable, accounts payable, and purchase order modules are bundled into a complete accounting system. Though originally designed for small-to-medium operations, the product today is used by some chains. It supports bar-code readers, up to 200 registers on a network, split tendering, multiple price levels, and serialized inventory. It does not, however, store and retrieve price quotes or support programmable keypads. The system time-stamps transactions and generates reports analyzing peak sales periods and serialized goods broken down by location or by customer.

### Retail Management System

*Westech Corp.*

The *Retail Management System* concentrates on POS operating, inventory control, and customer data base management for individual stores; for general accounting functions, you must turn to the Star, Boss, or Certiflex product lines. A separately priced \$244 mailing-list program allows a cashier to pull customer addresses from a data base and patch them into invoices. The inventory value report includes some rudimentary graphics that can highlight undesirable inventory builds.

### PC Register, Store Front Retailing, Branch Store Retailing

Trac Line Software

Trac Line has a system for almost any size retail operation, and all work with the vendor's full-function *Integrated Accounting* program. *PC Register*, an entry-level package, requires extra software and a modem to link to the accounting program. The more capable *Store Front Retailing* supports two registers and adds some inventory, purchasing, and accounts receivable functions. Aimed at small chains, *Branch Store Retailing* handles several registers within an individual store and can track and maintain inventory at multiple locations. An on-line querying feature allows the salesperson to pull up historical detail to help sell add-on products and respond to customer questions.

### StoreMinder, InStore

Xtrasoft

*StoreMinder* is not a product itself but an umbrella trade name for a series of stand-alone modules: *SalesMinder* (POS), *StockMinder* (inventory), and *MailMinder* (customer data base). *InStore*, the flagship of a separate product line, combines POS and inventory functions for large chains, supports file and record locking, and can handle up to 26 registers on a network. Both *StoreMinder* and *InStore* support bar-code readers and programmable keypads, print full invoices or sales slips, and handle split tendering. A reorder report and multilevel pricing on the inventory status report are included. Xtrasoft products work with DASI's full-function accounting software.



## CONSTRUCTION

The construction industry embraces everything from small companies putting up eight houses a year, to general contractors building apartment complexes, to large firms fulfilling major government contracts. Yet all construction accounting software is built around a job-cost module. Some vendors provide estimating and bid-analysis modules; if you win the bid, you use the bid data to set up the job-cost file. Most estimating modules allow you to "take off" quantities for pricing. Unless otherwise noted, you can assume the following packages include fixed-contract and time-and-materials billing; the estimating modules (if offered) are integrated with the job-cost module. Payroll support varies; the high-end systems handle numerous pay rates and multiple job sites across several states within a pay period, and produce certified reports for the Department of Labor. In general, systems designed for larger construction firms include more reporting because of government regulations.

### Construction Management, Construction Accounting

Small Systems Design

Approved by the National Association of Home Builders (NAHB), this series includes complete job-cost and accounting functions for

general contractors who work on a variety of projects. The *Construction Management* package maintains a complete bid history and features point-and-shoot selection of menu items as well as automatic job-file updating. Job reporting is very flexible—you can select items individually, in ranges, or all at once by date, vendor, job, and many other parameters. Templates automate job setup, and you can query the system via pop-up windows.

There's even a project scheduler that features bar-graph and critical-path reports. The company's *Construction Accounting* package includes job-cost, general ledger, accounts receivable, accounts payable, and payroll modules, plus some estimating capability, but it lacks many of *Construction Management's* advanced features. The company sells inventory and job-cost estimating modules, a special edition of its construction software for electrical contractors, and a service-bureau version which maintains data for several companies.

### Series 2000

Concord Management Systems

*Series 2000* is a multimodule package that offers large-scale builders a comprehensive and powerful accounting and construction management system. The job-cost data base is flexible, the payroll module well equipped for governmental reporting, and the query tools geared for decision support. Other high-end features include the ability to handle retainages, digitized takeoffs, and service orders. The program generates an executive summary highlighting gross and net profit by job, and it can print AIA-format draw requests on standard G703 forms.

## Libra Construction Software

### Libra Corporation

Libra is popular with some Big Eight accounting firms because it combines strong general accounting and construction functions. Designed for companies managing several projects at once, *Libra's* job-file data base allows you to define data fields and track jobs by estimator, project manager, or foreman. The program also tracks equipment use. Libra markets an estimating module that integrates with the job-cost module and supports digitized takeoffs. The system can also create custom reports. Libra also offers specialized submodules from laser check printing (\$995) to sales analysis and billing (\$200).

### Medallion, Precision

#### Timberline Software

Timberline offers three different selections from its line of modules: *Medallion/Builder* for home-builders; *Medallion/General* for general contractors; and *Medallion/Specialty* for plumbing, heating, or electrical contract work. All three modules can track multiple companies, and all three come in multi-user versions. You can produce detailed per-unit cost reports, bonding reports, and phase graphs to aid in scheduling subcontractors. The company also offers a separate estimating module. Timberline's *Precision* series provides estimating and bid analysis functions that work with the job-cost module; the package supports digitized takeoffs and uses pop-up windows.

### Basic Builder, Profit Builder

#### Construction Data Control

*Basic Builder* is a simple, single-user, single-company system that bundles job-cost, general ledger, accounts receivable, and accounts payable modules into a \$1695 package.

## WARRANTY AND SUPPORT

Vendor	Money-back guarantee (days)	Network version available	Free phone support (days)	Extended support cost/module	On-site install/training	Import/export data type <sup>1</sup>
<b>POINT-OF-SALE RETAIL</b>						
Armor Systems		yes	30	\$200/yr.	no	2,3,4
DataSym	30	yes	30	5	yes	4
SoftKey Software		yes	5	5	yes	4
Trac Line Software	5	yes	6	\$875/yr. <sup>7</sup>	yes	4
Westech	90	yes	90	\$200/yr.	no	2
Xtrasoft		yes	5	\$100-\$350/yr.	yes	2,3,4
<b>CONSTRUCTION</b>						
Concord Management Systems		no	90	\$125-\$350/yr.	yes	2
Construction Data Control		yes	90	\$75-\$150/yr.	yes	2,4
Enterprise Computer Systems	90	yes	365	\$100-\$600/yr.	no	2
LIBRA		yes	60	\$125/hr.	yes	3,4
Small Systems Design		yes	365	\$795/yr. <sup>7</sup>	yes	4
Timberline Software	90	yes	90	\$50-\$100/yr.	yes	2,4
<b>MEDICAL</b>						
American Medical Software		yes	90	\$150-\$250/yr.	yes	4
Artificial Intelligence		yes	45	\$500/yr.	yes	4
Data Strategies		yes	365	\$480/yr.	yes	4
Elcomp Systems		yes	90	<sup>8</sup>	yes	4
Physician's Practice Management	30	yes	30	\$1000/yr.	yes	<sup>9</sup>
PSM	90	yes	90	\$130/hr.	yes	2,3,4

<sup>1</sup> May be offered via extra module.

<sup>2</sup> Exports files in 1-2-3, WKS and WK1 formats.

<sup>3</sup> Exports files in dBASE, DBF format.

<sup>4</sup> Exports files in ASCII format.

<sup>5</sup> Supplied by VARs; arrangements vary.

<sup>6</sup> Trac Line offers 30 minutes of free support during the first 30 days of purchase.

<sup>7</sup> Price for all modules.

<sup>8</sup> Support costs based on a percentage of module's purchase price.

<sup>9</sup> Only with PC\*Claim.

(Estimating and payroll modules are extra.) The job status report shows projected cost variances and can detail costs by category or summarize them by class. *Profit Builder* is a multicompany, networkable series that you buy module by module. A *Basic Builder* user can re-

ceive credit toward a *Profit Builder* upgrade and obtain a conversion utility that moves data from one system into the other. Both product lines feature point-and-shoot operations, macros, and queries via pop-up windows. The estimating modules support digitized takeoffs, but neither system handles time-and-materials billing.

### **Business Management System, Professional Estimating**

#### *Enterprise Computer Systems*

Highly rated by the NAHB for ease of use and overall customer satisfaction, Enterprise's products are aimed at small and medium-size home builders. Along with its general accounting functions, the *Business Management System* includes documentation aimed at newcomers to PC-based accounting, an on-disk tutorial, and extensive sample data. The job-cost module produces up to 96 distinct reports and offers formats for different types of building. *Professional Estimating* comes with a 10,000-part data base and applies a systematic approach to pricing jobs.



#### **MEDICAL**

Since many patients pay for medical services via third-party insurance carriers, billing is the most pressing accounting problem facing doctors, medical corporations, and clinics. More than other specialized programs, medical market software attempts to provide "total solutions," offering the basic accounting modules and necessary hardware for one (usually expensive) package price. In addition to billing and accounting, some packages offer modules for scheduling appointments and making follow-up phone calls to

patients; some even maintain clinical information on patients. Reporting can also be rather sophisticated, detailing contact lenses sold by month or comparing each doctor's financial performance over time.

### **Flexible Package**

#### *Elcomp Systems*

Highly adaptable to individual needs, this package comprises a "medical core" module that handles patient registration, accounts receivable, and budgeting. Optional modules take care of general accounting, electronic claims, insurance forms design, patient recalls, appointment scheduling, and medical records. Most modules offer both family-practice and specialty-practice billing. The system can report on overdue insurance claims and produce 14-month financial trend reports.

### **CompuMedic**

#### *Data Strategies*

*CompuMedic* consists of accounts receivable, insurance processing, patient records, recalls, general ledger, word processing, a powerful report writer, and a tie-in to General Electric's on-line medical claims clearinghouse. Additional options include accounts payable, patient scheduling, inventory, and electronic medicare claims submission. You can also design custom reports with the system.

### **Medical Office Billing System, Medical Office Management System**

#### *American Medical Software*

The *Office Billing System* takes care of billing, accounts receivable, and insurance claims processing. The *Office Management System* handles appointment scheduling; generates revenue analysis reports by practice (according to diagnosis, location, physician, or procedure),

plus other diagnosis and procedure history reports; and offers a word processing interface. An electronic claims module is also available.

### **TIPS Healthcare Management System**

#### *PSM*

PSM's package comes in basic and advanced versions. At a minimum you get accounts receivable, insurance processing, patient recalls (with batch printing of postcards), and general accounting. The advanced package adds electronic claims, clinical and lab test reports, surgical scheduling, hospital census, and more sophisticated revenue reports. *TIPS'* statistical reports can select patient records by age, sex, procedure, and many other criteria.

### **PAS-3 Plus Medical**

#### *Artificial Intelligence*

The basic *PAS-3* package includes patient registration, accounts receivable and billing, mailing lists, and a custom insurance-forms generator. The program offers eight billing modes, pop-up windows, continuous background data-integrity checking, a pause key that temporarily suspends operations, and a relational query feature for generating custom reports from the transaction data base. The company also sells a medical records module, general ledger (payroll included) and appointment scheduling modules from another vendor, and various specialized modules for dentists, anesthesiologists, and chiropractors.

### **Threshold, PC\* Claim**

#### *Physician's Practice Management*

*Threshold* is a basic insurance processing package aimed at smaller practices. The system includes accounts receivable, patient regis-

tration, billing, and paper-claims processing, but only limited reporting. Option packs priced from \$305 to \$615 let you schedule appointments and generate clinical and fi-

nancial reports. *PC\*Claim* focuses on electronic insurance claims processing. The company does not offer general ledger, accounts payable, or payroll modules. ●

*Ralph Soucie is a CPA in Portland, Oregon, and a contributing editor for PC World.*

## WHERE TO BUY

### POINT-OF-SALE RETAIL

#### Armor Systems, Inc.

324 N. Orlando Ave.  
Maitland, FL 32751  
407/629-0753

**List price:** Mainstreet Merchandiser \$2480, General Ledger \$695, Accounts Payable \$695, Purchase Order \$695, Payroll \$695

**Reader service no. 610**

#### DataSym

435 Elgin St.  
Brantford, Ontario  
N3T 5Y6 Canada  
519/758-5800

**List price:** ARCS \$2495; Advantage \$5995; Inventory Control \$1495; Accounts Receivable, Payable, General Ledger, and Invoicing \$1495

**Reader service no. 611**

#### SoftKey Software Products, Inc.

260 Richmond St. #300  
Toronto, Ontario  
M5V 1W5 Canada  
800/263-5800

**List price:** Key Retailer \$2295

**Reader service no. 612**

#### Trac Line Software

51 Alpha Plaza  
Hicksville, NY 11801  
516/935-7500

**List price:** PC Register \$279, Store Front Retailing \$795, Branch Store Retailing \$1095, Integrated Accounting \$2495, Purchase Order \$495

**Reader service no. 613**

#### Westech Corp.

P.O. Box 432  
Sparta, NJ 07871  
201/729-4378

**List price:** Retail Management System \$649, Mountain Mail \$244

**Reader service no. 614**

#### Xtrasoft, Inc.

4701 Patrick Henry Dr.  
#2101  
Santa Clara, CA  
408/986-9872

**List price:** StoreMinder series: SalesMinder \$995, StockMinder \$995, MailMinder \$395. InStore series: InStore \$2995 for one to three workstations (extra for additional workstations); Customer Link (data base and list manager) \$595

**Reader service no. 615**

### CONSTRUCTION

#### Concord Management Systems, Inc.

5301 W. Cypress  
P.O. Box 25617  
Tampa, FL 33622  
813/875-4492

**List price:** Series 2000 run-time module \$200, Job Cost \$2500, Subcontractor Control \$900, General Ledger \$1500, Payroll \$1500, Purchase Order \$900, Accounts Receivable and Billing \$1500, Accounts Payable \$1500, Scheduling \$2995

**Reader service no. 616**

#### Construction Data Control

3675 Crestwood Pkwy.  
Atlanta, GA 30136  
800/221-3929

**List price:** Basic Builder \$1695, Payroll \$600, Estimating \$695. Profit Builder: Job Cost \$1500, General Ledger \$1500, Standard Payroll \$1500, Variable Rate Payroll \$2500, Purchase Order \$1500, Accounts Receivable \$1500, Accounts Payable \$1500, Subcontract Control \$795, Profit Bid Estimating \$3495

**Reader service no. 617**

#### Enterprise Computer Systems, Inc.

One Independence  
Pointe  
Greenville, SC 29602  
803/234-7676

**List price:** Business Management System \$4995, Professional Estimating \$3995, Accounts Receivable \$1595, Payroll \$1595

**Reader service no. 618**

#### Libra Corp.

1954 East 7000 S  
Salt Lake City, UT 84121  
800/453-3827

**List price:** Libra Construction Software: Job Cost \$1295, General Ledger \$795, Payroll \$795, Order Entry \$1295, Accounts Receivable \$795, Accounts Payable \$795, Inventory Control \$795, Espri Advanced Estimating \$2995; required Libra Environment \$195

**Reader service no. 619**

#### Small Systems Design

4894 Sterling Dr.  
Boulder, CO 80301  
800/272-0053

**List price:** Construction Management \$6995, Construction Accounting \$2995, Job-Cost Estimating \$1995, Inventory \$995

**Reader service no. 620**

#### Timberline Software

P.O. Box 728  
Beaverton, OR 97075  
503/644-8155

**List price:** Medallion series: Medallion/Builder (single user) \$5530, (multiuser) \$7670; Medallion/General (single user) \$7455, (multiuser) \$10,400; Medallion/Specialty (single user) \$7250, (multiuser) \$10,060; Job Cost \$3160; General Ledger

\$1155; Payroll \$1185; Accounts Receivable \$1155; Inventory \$1155; Accounts Payable \$1155. Precision series: Estimating (single user) \$840, (multiuser) \$1195; Estimating Plus (single user) \$2840, (multiuser) \$3990; Digitizer (single user) \$1990, (multiuser) \$2850; Bid Analysis (single user) \$990, (multiuser) \$1395; Cut and Fill (single-user version only) \$1495; Pricer (single user) \$490, (multiuser) \$690; Advanced Data Bases \$1490

**Reader service no. 621**

### MEDICAL

#### American Medical Software

20 Edwardsville Professional Park  
Edwardsville, IL 62025  
800/423-8836

**List price:** Medical Office Billing System \$1495, Medical Office Management System \$2495, Electronic Claims Submission \$495

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#### Artificial Intelligence, Inc.

P.O. Box 569  
Renton, WA 98057  
206/271-8633

**List price:** PAS-3 Plus Medical \$2995, Medical Records \$500, Digital Software Gold General Ledger \$595, Digital Software Sum:Time (appointment scheduling) \$150

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#### Data Strategies, Inc.

17150 Via Del Campo  
#203  
San Diego, CA 92127  
619/451-0480

**List price:** Compu-

Medic \$5600, Accounts Payable \$400, Appointment Scheduling \$1200, Inventory \$400

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#### Elcomp Systems, Inc.

Foster Plaza VII  
661 Andersen Dr.  
Pittsburgh, PA 15220  
800/441-8386

**List price:** Flexible Package core module \$500; Billing \$1000; General Ledger, Accounts Payable, and Payroll \$2400; Electronic Claims Submission \$1875; Insurance Forms Designer \$1000; Patient Scheduling \$750; Patient Recalls \$750; Medical Records \$3125

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#### Physician's Practice Management, Inc.

350 E. New York St.  
#300  
Indianapolis, IN 46204  
317/634-8080

**List price:** Threshold \$1995; Financial Pack (practice analysis) \$615, Listing Pack (various reports) \$595, Appointment Registration Pack \$305, Manager Pack (more reports) \$605, all four packs \$1000. Prices slightly lower if extended support is purchased. PC\*Claim modules vary from \$89.95 to \$549, depending on features desired.

**Reader service no. 626**

#### PSM, Inc.

P.O. Box 1877  
Kettering, OH 45429  
513/293-0692

**List price:** TIPS Healthcare Management System: basic version \$3495, advanced version \$5495, Appointment Scheduling \$695

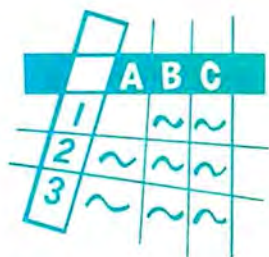
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For more information about any product, contact the manufacturer or circle the number on the reader service card.

# How Hard Is Your Money Working?

Once you've put your money  
to work, how do you judge its  
performance?

**The Du Pont Return-On-Investment chart gauges your venture's efficiency and shows you the arithmetic.**



Spreadsheets

Charles  
Kyd

Contemplating an investment? Whether it's a single share of stock, a piece of production machinery, or an entire company, one of the most important questions you can ask is, What's the ROI? Though many other factors also bear consideration, the likely return on your investment marks the threshold between thumbs up and wait and see.

But the need for ROI calculations doesn't end once the investment is made. Just as the interest rate of a savings account reflects its ongoing performance, the ROI is a vital sign of business profitability.

Since the early 1920s, the Du Pont company has used an ROI formula chart similar to the one in **FIGURE 1** to measure its internal performance. Du Pont's formula is recognized worldwide as an ef-

fective financial management tool. This article describes how to create a Du Pont ROI chart in *Excel*; however, you can use any character-based spreadsheet and approximate the look of the *Excel* chart by using the underline and vertical bar characters.

The ROI chart in **FIGURE 1** illustrates how income and assets are combined to calculate a Return-On-Investment ratio. Notice that the Du Pont formula uses gross investment (assets before deduction of accumulated depreciation) to calculate this ratio, while many other companies use net investment. Either method will work as long as you use it consistently.

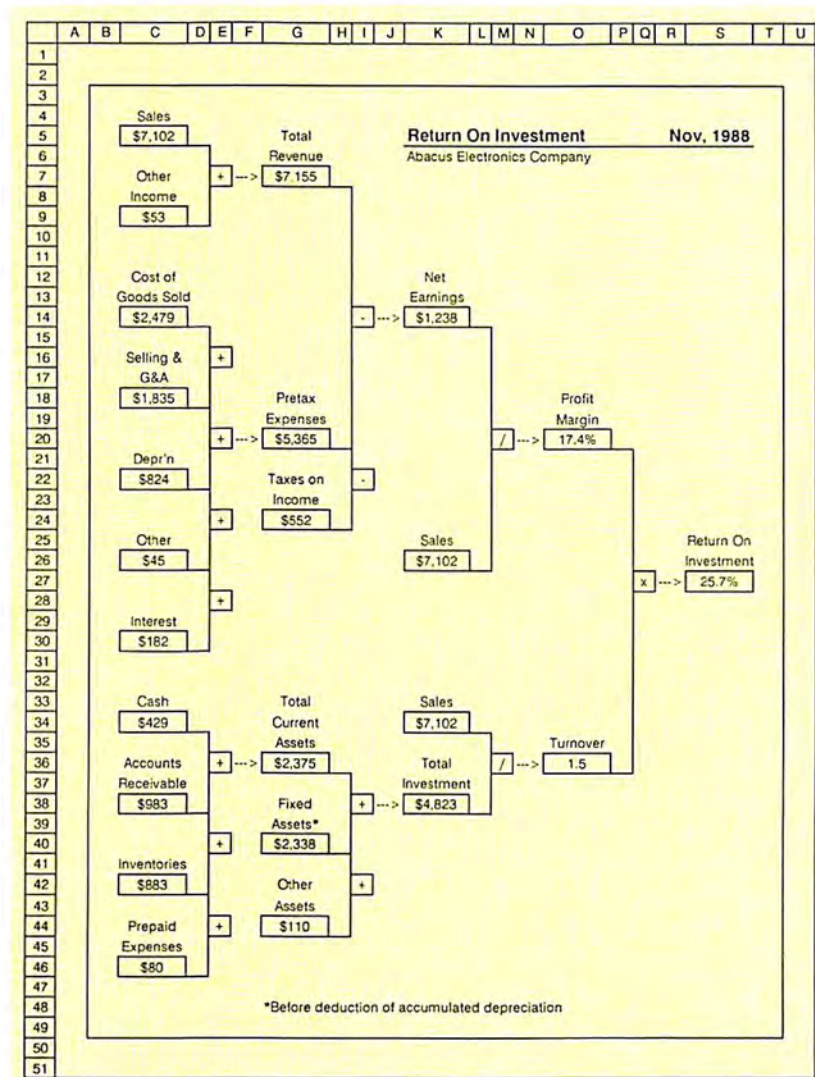
**FIGURE 2**, which contains a standard business income and assets statement, provides the numeric data for the ROI chart in **FIGURE 1**. The Income section shows a breakdown of income for the previous 12 months, often called a

rolling 12-month income statement. The Assets section comes from the balance sheet at the end of the period. Designing the ROI chart to reference standard financial worksheets like these streamlines maintenance and makes it easier to vary the formulas, if desired.

### Creating the ROI Chart

To create **FIGURE 1**, first open a new worksheet and deselect *Gridlines* in the *Options Display* dialog box. Next, in the *Format* menu, assign the 8-point *Helv* font to the worksheet, then set the width of columns A and U to 3.33; columns B, F, J, N, R, and T to 3; columns C, G, K, O, and S to 8; and columns D, E, H, I, L, M, P, and Q to 2. There's also a quick way to format several non-adjacent columns (or cells): Go to the first column and press < Shift > - < F8 > , go to the next column and press < Shift > - < F8 > twice, go to the next column, and so on. Then set the desired format.

Enter the labels shown for cells K5 and K6 and assign the 10-point *Helv Bold* font to the range K5:S5. Enter the formula =TEXT(DATE(88,11,1),"mm, yyyy") into cell S5 to display the date as text; this allows the date to extend beyond the limits of column S without returning an overflow error as a value-format date would. To complete the date format, select *Format Alignment* and choose *Right*, which forces excess text to extend beyond the left border of cell S5.



**FIGURE 1:** Standard income-statement and balance-sheet numbers plug into this Excel worksheet to calculate the Return On Investment.

The range C5:E9 contains a pattern of borders and symbols that you can copy to create the remainder of the chart quickly. To format cells C5, C9, and E7, select the *Format Border* menu and select *Outline*. Center-align the range using the *Format Alignment Center* command, and assign the numeric format to cells C5 and C9 from the *Format Number* menu. To draw connect-

ing lines between cells, create top and right borders in the necessary cells in column D using *Format Border*.

Next, copy all or part of the range you've just created to the necessary locations (C14, C18, C22, and so on). Then enter the remaining labels and addition,

subtraction, multiplication, and division symbols. To create the arrow in cell F7, enter a space, four dashes, and a greater-than symbol.

Format cells O20 and S27 as percentages and cell O36 using one decimal place. Finally, to frame the entire chart, select the range B3:T49 and choose *Outline* from the *Format Border* menu.

**FIGURE 2** is created within the same worksheet as **FIGURE 1** to make cell referencing easier. Starting in cell B55, type in all labels as shown and assign the numeric format to the ranges K58:K74 and W58:W74. Then, in cell K60 enter  $=\$K\$58 + \$K\$59$ ; in cell K63 enter  $=\$K\$60 - \$K\$62$ ; in cell K69 enter  $=\text{SUM}(\$K\$65:\$K\$68)$ ; in cell K74 enter  $=\$K\$63 - \$K\$69 - \$K\$71 - \$K\$72$ ; in cell W62 enter  $=\text{SUM}(\$W\$58:\$W\$61)$ ; in cell W66 enter  $=\$W\$64 - \$W\$65$ ; and in cell W71 enter  $=\$W\$62 + \$W\$66 + \$W\$69$ .

To reference the data in your chart, open a new window with *Window New Window* and turn off its gridlines. Then, arrange the windows side by side with *Windows Arrange All*. In one window, display the cells in the ROI chart that you want to fill; in the other window, display **FIGURE 2**, containing the data. You now have two views of the same worksheet. To fill the chart's first cell, Sales, select cell C5 in one window, enter  $=$ , select cell K58 in the other window, press the  $\langle F4 \rangle$  (Absolute/Relative) key to assign an absolute reference to the formula, and then press  $\langle \text{Enter} \rangle$ .

Repeat this technique for cells C9 and K59, C14 and K62, and so on. In the case of cell C18 (Selling & G&A), you'll have to finish the reference formula by

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
53																								
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Data for Du Pont Return-On-Investment Chart															FY 1988									
Income										Nov-88					Assets									
Sales										7,102					Cash									
Other Income										53					Accounts Receivable									
Total Revenue										7,155					Inventories									
Cost of Goods Sold										2,479					Prepaid Expenses									
Gross Profit										4,676					Total Current Assets									
General & Admin										798					Fixed Assets									
Marketing & Sales										1,037					Less Accumulated Depreciation									
Depreciation Expense										824					Net Fixed Assets									
Other Operating Expenses										45														
Total Operating Expenses										2,704					Other Assets									
Interest Expense										182														
Taxes on Income										552					Total Assets									
Net Earnings										1,238														

**FIGURE 2:** The ROI chart in **FIGURE 1** gets its information from this table. The same calculations are performed in both figures to catch errors.

typing in  $\$K\$65 + \$K\$66$ , since those two cells are combined on the ROI chart. After you're done, press  $\langle \text{Ctrl} \rangle - \langle F4 \rangle$  to close either window.

The last step is to enter formulas into the eight cells in **FIGURE 1** that do not directly reference data in **FIGURE 2**. In cell G7 (Total Revenue) enter  $=\$C\$5 + \$C\$9$ ; in cell G20 (Pretax Expenses) enter  $=\text{SUM}(\$C\$14:\$C\$30)$ ; in cell G36 (Total Current Assets) enter  $=\text{SUM}(\$C\$34:\$C\$46)$ ; in cell K14 (Net Earnings) enter  $=\$G\$7 - \$G\$20 - \$G\$24$ ; in cell K38 (Total Investment) enter  $=\text{SUM}(\$G\$36:\$G\$44)$ ; in cell O20 (Profit Margin) enter  $=\$K\$14/\$K\$26$ ; in cell O36 (Turnover) enter  $=\$K\$34/\$K\$38$ ; and in cell S27 (Return On Investment) enter  $=\$O\$20 * \$O\$36$ .

The formulas in cells G7, G36, and K14 perform calculations duplicated in cells K60, W62, and K74, respectively. However, repeating the calculations will help pinpoint any mistakes that might creep into a frequently edited income-and-assets statement; errors could slip by unnoticed if **FIGURE 2**'s subtotals were blindly linked to **FIGURE 1**'s.

### Modifying the Du Pont Chart

Many financial analysts use variations of the Du Pont chart that you might want to create as well.

To generate the Return On Assets (rather than ROI) ratio, for example, link cell W66 (Net Fixed Assets) rather than cell W64 (Fixed Assets) to cell G40. Another variation calculates Return On Equity by adding a third ratio, consisting of net assets divided by stockholders' equity, to column O. Multiplying this new ratio by Turnover and Profit Margin returns the ROE. Another variation excludes interest expense and taxes from the calculation of expenses. This separates the effects of the business's internal operations from external tax and financing costs. Whichever variation you choose, the Du Pont formula is an invaluable tool for calculating profitability. ●

*Charles Kyd, a writer and consultant in Seattle, spent ten years as a CFO. This article is adapted from his new book, The Microsoft Excel Business Sourcebook (Microsoft Press, Redmond, Washington, 1988).*



## Toshiba's 6.4 Pound T1000 Is the Lightest Laptop Yet

PC HANDS ON

BY HOWARD MARKS

Big advances have been made in DOS-compatible laptop computers in the last year. Back lighting and supertwist LCDs have made screens sharper than ever. Miniaturized hard disks from JVC have expanded stor-

with the programs on your desktop computer.

Toshiba America, which had a lot to do with this laptop revolution, is bucking the trend. Its new T1000 sacrifices a few of the amenities we've come to expect from new laptops but delivers the essentials in a sturdy 6.4 pound package.

There's no

But the T1000 is a case of less being more. The design is brilliant. DOS is stowed on a ROM chip for instant booting. The 12 1/4 by 2 by 11 inch package fits in an ordinary briefcase. It runs on a charge for 5 hours and can keep 100,000 bytes of data.

light, portable computer.

A couple of pounds heavier than Tandy's Model 100, it's far more powerful.

Of course, Toshiba was under pressure to come up with something. A tariff imposed by the government

LAN Magazine

## A Major Technological Feat. There Is Nothing That Comes Close To The T1000.

By Harry Newton

This is another one of my biased test drives. I like this product. I use it. I am writing this test drive on it, sitting in bed. It is one gorgeous luxury. The T1000 is the lightest PC-compatible laptop I've ever fully loaded.

BYTE

JANUARY 1988

## THE MOST PORTABLE IBM PC-COMPATIBLE COMPUTER I'VE EVER USED.

The T1000 (see photo A) is a full IBM PC-compatible computer in a compact 6 1/2-pound package. In its standard configuration, the T1000 comes with an 80C88 running at 477 MHz, 512K bytes of 100-ns RAM, MS-DOS version 2.11 in ROM, a single 720K 3 1/2 inch floppy disk drive.

PC WEEK

## T-1000 Lap-Top: Light, but No Featherweight in Performance

By Stephen Sagman

To fashion the extraordinarily small T-1000 lap-top computer, Toshiba engineers took their best-selling T-1100+ lap-top, miniaturized everything they could and scrapped the frills.

What they came up with is a featherweight. It's a little bigger than a briefcase, but it weighs less than a

That Toshiba engineers gave overriding emphasis to keeping the T-1000's size and weight down is evident in every aspect of its design.

The T-1000 display is the same supertwist LCD panel used in the Toshiba T-1100+. It has the advantage of providing high-contrast text and graphics, drawing very little power, and saving the battery.

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All of which helps explain why the experts' reactions were so flattering.

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## CONSUMER WATCH

### Advice and information for the computer consumer

"Pushed" PCs deliver fast  
performance at a low cost—  
but buying one could be risky.

Anita  
Amirrezvani

If you're looking for a fast PC, shop with caution. Advertised speed ratings can be misleading—and a PC's microprocessor could be less than it's cracked up to be.

A system advertised as a 25-MHz 386 may not actually contain an 80386-25 chip. This 25-MHz microprocessor—the fastest Intel makes—is not expected to be widely available until early 1989. In the meantime, smaller vendors who can't get the fastest chips are buying 20-MHz 80386s and "pushing" them beyond specification, to 24 MHz and sometimes further.

This speeding-up process unfolds in several stages. First, the manufacturer buys thousands of Intel chips and screens them, searching for chips that will run faster than specification. In the next stage, each screened chip is paired with a faster crystal, the part that regulates a microprocessor's speed. A crystal operating at a higher frequency makes the microprocessor perform faster—for example, at 25 MHz instead of 20 MHz. Other parts, such as memory chips, must also run faster for the system to work.

#### Intel Takes a Stand

According to Intel, it's risky to run a chip beyond its specification. "We test our parts to work right at the specified frequency under a series of conditions that include different voltages and operating temperatures," says Intel marketing director Claude

Leglise. "When parts are used out of specification, the system could freeze, math results could be erroneous, and the parts could become overstressed and break. It doesn't always happen, but it's hard to predict when it will and when it won't."

"There are many ways to speed up your system that are easy and safe," adds Intel's Bill Rash, product marketing manager for 32-bit chips. "You can go out and buy an accelerator board, for example. With a speeded-up system you're crossing your fingers that you won't run into problems."

Even some manufacturers believe pushed PCs are risky. "Insidious problems can occur, like a wrong number appearing in a spreadsheet," says Ken Aupperle, president of motherboard maker Hauppauge Computer Works (which does not use pushed chips). "If I were buying one of those systems, I would make sure the vendor knew how to properly screen the parts. But outside of IBM or DEC, there aren't too many vendors whose word I would take."

#### The Other Side of the Coin

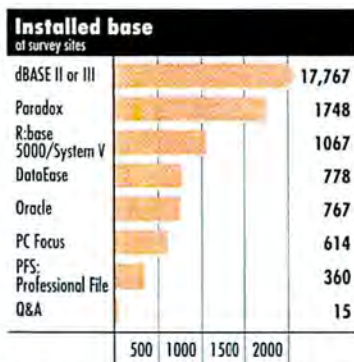
Manufacturers of speeded-up systems beg to differ. "There's a lot of politics in this. Intel doesn't want people to believe that its 16-MHz chips will run at 20 MHz because it wants to sell the 20s for a higher price," says *(continues)*

## RATE YOUR SATISFACTION: Data Bases

Market giant *dBASE* boasts a decent user satisfaction rating—but it's not as high as *Paradox*'s. Even so, more of the survey sites plan to buy *dBASE* than *Paradox* this year.

Although its installed base is large for a *dBASE* competitor, *R:base* received only an average user-satisfaction rating among survey participants and ranked at the bottom of the plan-to-buy list.

Flat-file upstart *Q&A* isn't widely distributed among survey sites, but it rated as highly as *dBASE* in user satisfaction. Not surprisingly, a healthy percentage of the companies say they plan to buy *Q&A*.



Source: International Data Corporation. From a survey conducted in February 1988 of 183 sites, each with at least 50 PCs.

Guy Duff, national sales manager for Dyna Computers in San Jose, California.

Dyna Computers currently sells a 24-MHz 386 system and motherboard and has been selling pushed 80286 systems for years. "Based on our previous experience, Intel chips are built well beyond specification," says Duff. After the chips have been screened, he says, every Dyna motherboard is burned in and tested in a "hot box" for 72 hours. According to Duff, "After six years of business, we haven't gotten a single dead CPU back from our customers."

Computer Classifieds, a vendor in Miami, also sells pushed 24-MHz systems—but doesn't drive the chip up to 25 MHz. "It takes much more testing to screen reliably beyond 24 MHz," says Marketing Vice President Charles Papir. "There's a happy medium between the amount of testing required and the final price."

For consumers, the advantage to buying a pushed PC is cost. Major manufacturers sell 25-MHz 80386s for top dollar—IBM's least expensive complete system, for example, retails for \$8600. "You can get one of our 24-MHz systems for half that price," says Dyna Computers' Duff. Moreover, a speeded-up system may deliver a lot of performance without costing much more than a slower PC. Computer Classifieds' 24-MHz system sells for roughly \$4300 with a monitor and hard disk—only about \$400 more than its 20-MHz machine.

Even when 25-MHz chips are available to any manufacturer that wants them, systems will continue to be pushed—so long

as there's a demand for better performance. Vendors estimate that the 80386-25, for example, can be speeded up to 32 MHz.

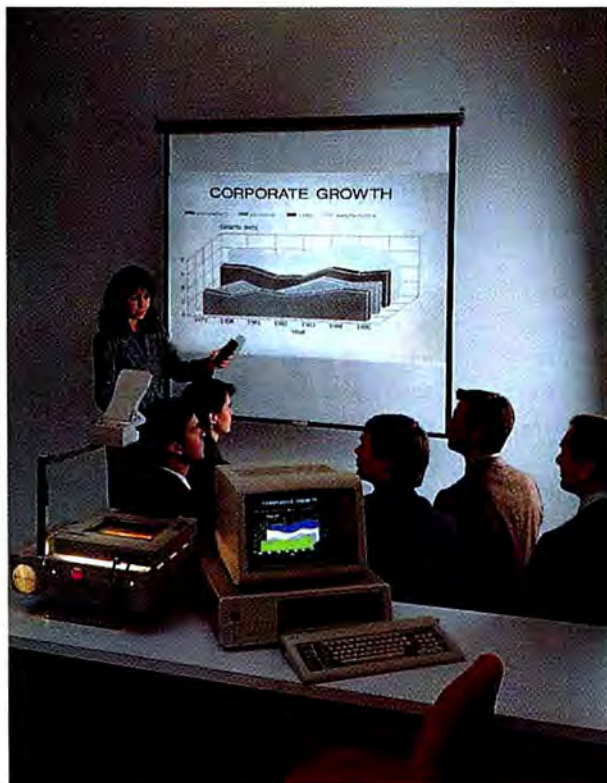
### Zippy Coprocessors

Coprocessors can also be pushed to achieve faster speeds—and that's exactly what Ariel Computer in Flemington, New Jersey, is doing. "We test thousands of coprocessors every month," says Ariel vice president of engineering Jeff Lackman. "Most 10-MHz chips can qualify for 12, others make it to 14 or 16 and some even get up to 20 MHz. Originally our customers were mostly technical; now the mainstream is picking up because graphics and *Microsoft Windows* programs require a lot of processing power."

The fastest 80287 available from Intel is officially rated at 10 MHz. These chips can be purchased through mail order for about \$319; chips pushed by Ariel to 12 MHz are \$499, 14s are \$599, and 16s are \$699. "Large corporations say our product allows them to use PCs instead of minicomputers for big calculations," says Lackman.

Ariel also sells an \$89.95 product called XCELX Speed-injector, a crystal you can install in your PC to speed up an existing 80287 to 16 MHz. A similar concept applies to turbocharging microprocessors: Vector Development sells a \$125 product called AT TurboSwitch II that you can use to run a 6-MHz IBM AT (but not compatibles) at speeds of up to 12.5 MHz. But in both cases, the crystal is speeding up a chip that hasn't been screened or a system that hasn't been tested at higher levels of heat and stress. So you may get unpredictable results.

(continues)



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### Buying Tips for Systems

Before buying a PC, you have the right to know whether the system has been pushed or actually contains a microprocessor rated at the advertised speed. If there's any doubt, open it up and check the microprocessor yourself. Every Intel chip's spec is etched right on its outside cover.

Note, too, that faster machines generate more heat and may have more difficulty getting Class B approval from the Federal Communications Commission. Class B PCs are shielded more thoroughly than Class A machines and are cleared for residential use. The issue is possible interference: radio reception problems or "snow" on your TV while the PC is on.

According to FCC engineer Liliane Volcy, "The compliance rate with Class B regulations is very low. Many companies don't have the capital to invest in system design and testing, or they simply want to keep the computer's cost down." If the computer is going to be used at home, you should make sure it's rated Class B by the FCC.

If you want to buy a pushed system, find out first how rigorous the manufacturer's tests are. "If a company just puts in the chip, boots the computer, and then sends it off, that's not good," says Computer Classifieds' Papir.

Get any speed guarantees in writing, advises Ariel's Lackman. "I've seen this loophole: A system is supposed to run at 8, 10, 12, and 16 MHz, but when the user runs it at 16 MHz, it dies.

The manufacturer says, 'Sorry, but to run it at 16 MHz you need a new chip.'"

Finally, find out about replacement policies. Companies that stand behind their products will be generous about fixing problems. "If your CPU dies, we'll send you a new one by overnight mail," says Dyna Computers' Duff. A guarantee like that inspires confidence.

### FOR MORE INFORMATION

#### Ariel Computer Corp.

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**Reader service number**  
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(continues)

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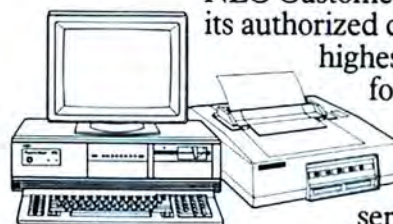


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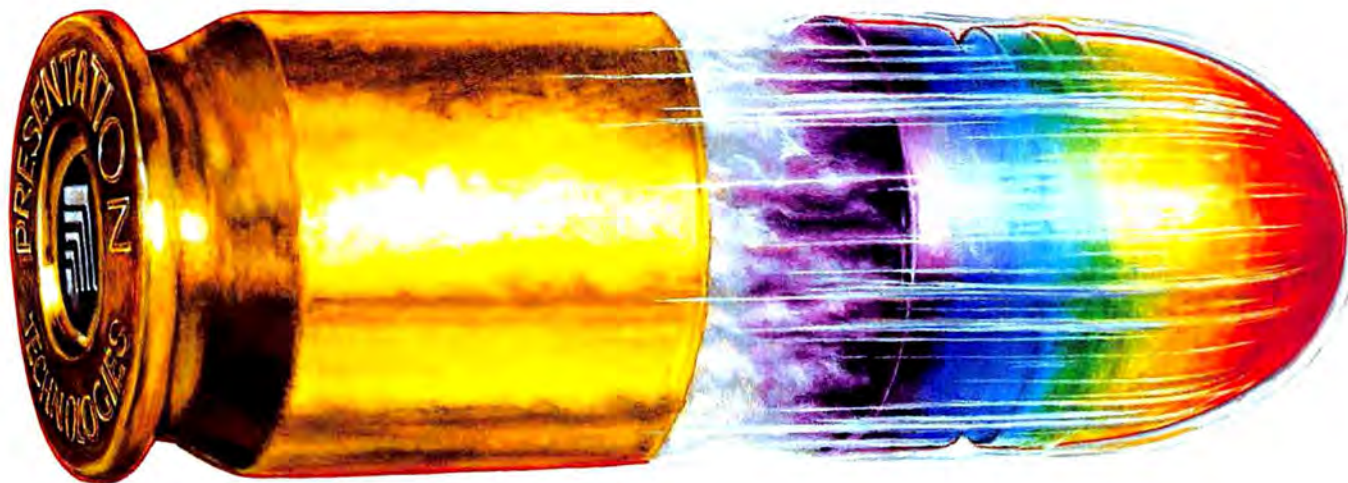
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## SHOP TALK

### Multiplication by Division

In early 1987 I bought a Samsung monitor for my computer. Less than three months later it stopped working. It was still under warranty, so I called the company and was told to take the monitor to the local authorized service dealer. The dealer hasn't been able to fix the monitor because it has never received the necessary part from Samsung.

I've spent a great deal of time and money calling Samsung's customer service office, but to no avail.

Uday Desai  
Carbondale, Illinois

*Editor's note: When Consumer Watch contacted Samsung Electronics America (SEA) in Saddlebrook, New Jersey, a spokesperson said Mr. Desai's monitor was not made by her division of Samsung Electronics, the Korean parent company.*

Consumer Watch spoke with Mr. Desai and asked him to send in a copy of his warranty card, which did indeed bear the name Samsung Electronics America. After several follow-up calls to SEA went unreturned, the same spokesperson said there had

been a lot of confusion because "many monitors got SEA registration numbers accidentally." Although she promised to follow up on the problem, nothing happened.

Finally, after more calls, SEA service engineer Jeff Reeves contacted Consumer Watch and explained that several independent divisions make Samsung monitors, including SEA in Saddlebrook and Samsung Electronics Corp. (or Ltd.) in Rancho Dominguez, California. Micro Five, a joint venture between SEA and a group of investors in Costa Mesa, California, sells computers and SEA monitors directly to end users.

According to Reeves, the full name of the Samsung division responsible for the warranty (continues)

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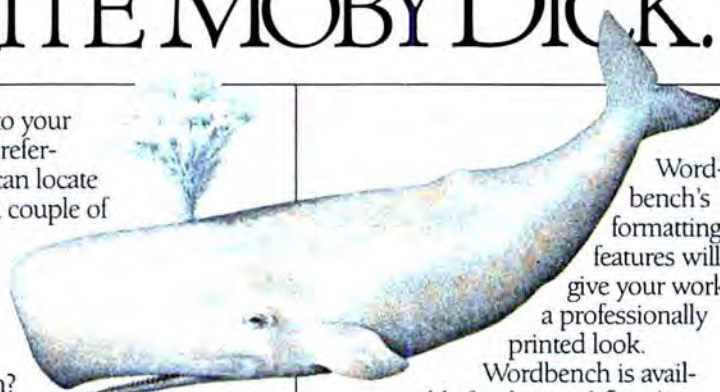


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should be written on the monitor. Consumers can call 800/524-1302 to obtain the name of the nearest authorized service center. Alternatively, consumers can request service from the factory service centers in Saddlebrook or Rancho Dominguez, but they must call for a return merchandise authorization number before sending in the merchandise for repair. Reeves adds that consumers must keep the original sales receipt to obtain warranty service; the warranty card alone is not enough.

But that's not the end of the story. Monitors are also sold by Samsung Electron Devices, another independent division in La Mirada, California. These monitors bear the Samtron la-

bel. The number for warranty information is 714/522-1282.

It's no wonder Mr. Desai had problems. Five months after writing to Consumer Watch, he finally received a refund for his monitor from SEA, as well as compensation for his telephone expenses.

#### No-Frills Mail Order

On February 3 I placed an order by mail with Telemart, expecting a three-week delay while my check cleared. On February 23 I called to check the status of my order and was told there was no record of it. I assumed that the order had been lost, so I placed a second order, prepaid by cashier's check to eliminate further delay.

Then I received my canceled check from the bank for the

"lost" order. I called Telemart and was told that my original order had actually been processed on February 10. When I asked that my second order be stopped, I was told that my original order wouldn't ship until March 7. By March 2, my cashier's check still hadn't been returned.

On March 4, thoroughly disgusted by the entire affair, I decided to cancel the order. I was told I would be charged a 15 percent restocking fee, even though this fee isn't listed anywhere in Telemart's ads or on its invoices.

Brian Clark  
Evanston, Illinois

*Editor's note: In a telephone interview, Telemart spokesperson (continues)*

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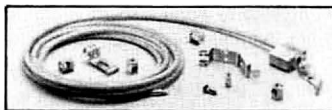
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Paul Farnell said that Clark's original order had been made under a business name, Clark Audio Design. However, according to Farnell, when Clark called to check on the order, the clerk was given the name Brian Clark and found no listing.

Farnell confirmed that the restocking fee is not listed in Telemart ads. "The reason we choose not to put that policy in our ads is that it implies we take items back," he says. "There are cases where if someone makes an error we'll take the item back. But if the order has already been processed or shipped, we charge a restocking fee to meet our costs." Farnell says that Clark's order had already been processed when he called to cancel.

### Logicsoft Goes Under

MSC International and five subsidiaries, including mail-order companies Logicsoft, Micro to Go, and Moneysworth, filed for Chapter 11 bankruptcy reorganization on June 6, 1988.

The company names and case numbers are as follows: MSC International Inc., d/b/a MSC Federal Micro Services, formerly MSC Measurement Sciences Corp., case no. 888-80516-21; Print 360 Inc., case no. 888-80517-21; Logiclabs Inc., d/b/a Fast Computer Co., case no. 888-80518-21; Micro to Go Inc., case no. 888-80519-21; Moneysworth Computer Products Inc., case no. 888-80520-21; and Logicsoft Inc., case no. 888-80521-21.

Consumers with claims against any of these companies should file a proof-of-claim form

with the U.S. Bankruptcy Court, Eastern District of New York, 601 Veterans Memorial Hwy., Hauppauge, NY 11788; 516/361-8601. At press time, the filing deadline had not been set.

### What's My Line?

In August, *Consumer Watch* reported that mail-order company SupplyLine in Lombard, Illinois, showed no signs of being in business. That company should not be confused with Supply Line in Claremont, California, which is very much alive. Writes company vice president Mike Bivens: "Many people who tried to reach SupplyLine in Illinois obtained our 800 number and have become our customers. But please let your readers know that we're a (continues)

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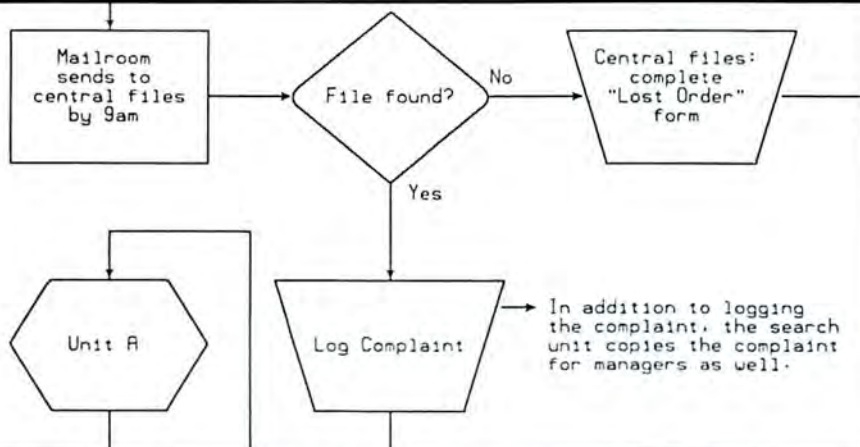
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going concern and not affiliated with the other company."

Bivens says Supply Line sells "everything that goes under, around, and through a computer —diskettes, software, peripherals, and so on." The company's phone number is 800/648-7376 in California, or 800/422-3392 outside California.

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

## POWER TIP NO. 19

### Help for 1-2-3 Password Users

Forgetting the password assigned to a 1-2-3 release 2.x file can be cause for alarm. But if you get an "incorrect password" error message, remember that 1-2-3 password checking is case sensitive. In a pinch, try entering the password in both upper-case and lowercase letters before you hit the panic button. (Use /File Save <F1> for help on using passwords.)

Thomas Oniguchi  
 Santa Clara, California

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# Where does PC WORLD

Answer: to NSTL — America's leading computer

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Last year, *PC World* designated National Software Testing Laboratories as its official research facility. And for good reason.

NSTL is the leading independent research organization exclusively devoted to testing PC hardware and software. Our knowledge, experience and skilled technical staff enable us to generate analytical data so accurate, comprehensive and meaningful that no one else can match it.

*PC Digest* is our comparative ratings report on IBM-compatible PCs and peripherals. It's the authoritative source for objective, scientific hardware evaluations.

Granted, this unusual publication is not for everyone. But if you need to go beyond the ads and the reviews...if you require a deeper level of analysis...if your work calls for complete and systematic data to guide your buying decisions...then *PC Digest* is the only place to turn.

## The ultimate hardware reference tool.

Today, the PC marketplace is more crowded and confused than ever before.



*PC Digest evaluates a wide range of PCs and peripherals.*

How can you be certain a piece of equipment will prove reliable? That it will do all it claims? That it will be compatible with your existing system? How can you make truly informed buying decisions?

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New equipment is a major investment. And, for most organizations, buying PCs and peripherals is a continuous process — not a one-time event.



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*PC Digest* can help you make the right decisions — and avoid expensive mistakes. Arriving each month, it's an ongoing reference source for a wide range of products. For example:

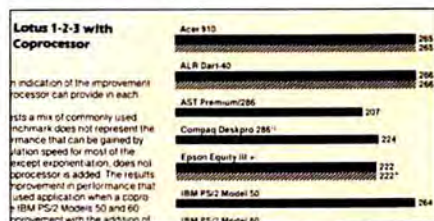
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- ✓ Laptops
- ✓ Modems
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- ✓ Backup systems
- ✓ VGA boards
- ✓ Monitors
- ✓ Network adapters
- ✓ Memory expansion cards
- ✓ Disk drives
- ✓ Hard disk cards
- ✓ Other mass storage devices
- ✓ Accelerator boards
- ✓ Dot-matrix printers
- ✓ Co-processors
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- ✓ And more

For each product, we determine: How easy is it to set up? What are its features and capabilities? What special system requirements are necessary? How well does it work with major business software? How fast does it perform typical tasks? How good is the documentation? How does it function under DOS and OS/2?

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— David Bunnell, Chairman

We've recognized the increasing need for performance testing that measures products from a real-world perspective....That's why we have selected National Software Testing Laboratories of Philadelphia, Pa. as the exclusive test facility for all products reviewed in *PC World*.

— Richard Landry, Editor

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— Eric Knorr, Senior Associate Editor

# go to test equipment?

## testing lab.

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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	Passport 240	Inward 240	Match 10	Probus 240-10	Probus 240-10	Probus 240-10	Probus 240-10	Probus 240-10	Probus 240-10	Probus 240-10
Speeds up IBM PC-1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N	N	N	N
Microprocessor	80286	80286	80386	8086	80286	80286	80286	80286	80286	80286
Memory Cache	128K	8K	64K	8K	N	8K	8K	8K	8K	128K
On-board memory	N	N	GP1	N	1024K	N	N	N	N	N
Computer processor retained	N	Y	N	N	Y	N	N	N	N	N
Change Speed	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5
Change speed without rebooting	Y5	N	Y5	Y5	Y5	N	N	N	N	N
Change speed within application	N	YK	YK	N	N	N	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N	N	N	N
RAM disk included	N	Y	N	N	Y	N	N	N	N	N
Print spooler included	N	Y	N	N	Y	N	N	N	N	N
Lowest cost	64	54	1	1	54	54	54	54	54	54

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Product version: 47.0

Shipping method: Direct primitive exposure

Recommended toner cartridge: Canon 5,000 sheets

Paper Requirements: Score Letter, legal, A4, B5, envelopes, labels, film, weights: 104 maximum

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\*\*\* Compaq 286

\*\*\* IBM PS/2 Model 80

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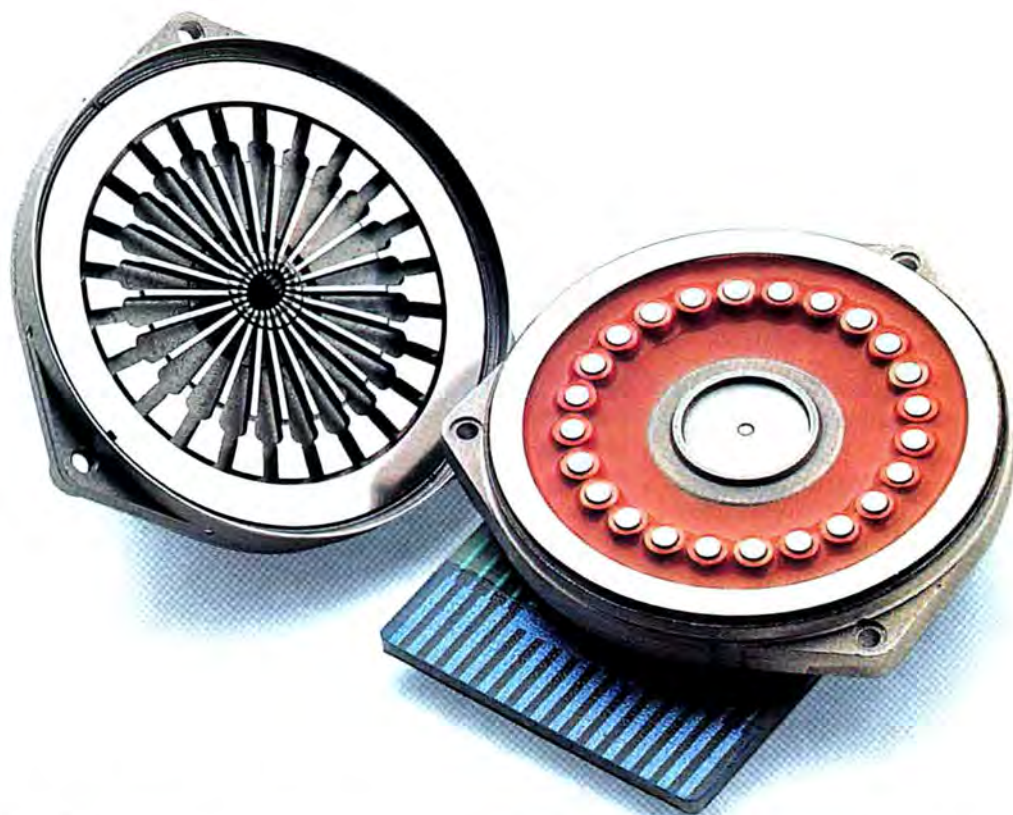
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## THE UPGRADE PATH

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### Magical Memory Management for the 80286

Hyperbole is hardly new in the PC marketplace, especially when it comes to upgrade products. Companies are always claiming that their upgrades "triple your processing speed" or "turn the XT into a multiuser system," so naturally I approached the All Chargecard with some skepticism. After all, All Computer Inc. claims its little memory-management board allows the 80286 to directly access up to 16MB of EMS 4.0-compatible expanded memory.

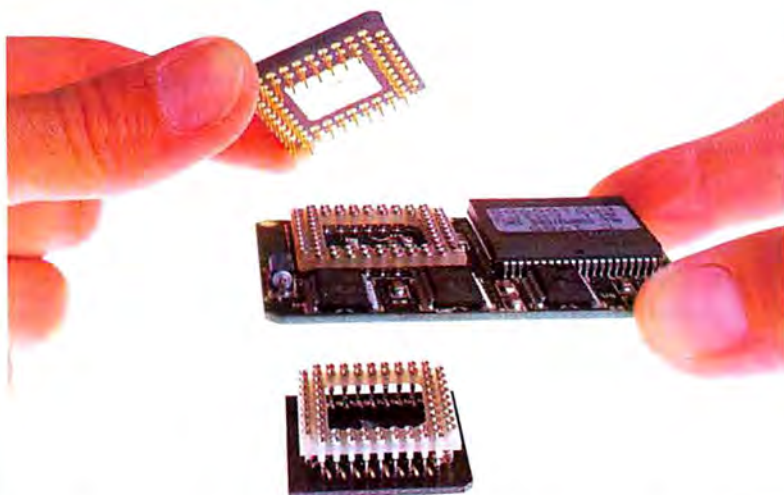
A simple trick, you might think, until you consider the implications. Ease this tiny board between an 80286 chip and its motherboard socket, and your

system can use any combination (up to 16MB) of expanded and extended memory as expanded memory. You also won't have to disable motherboard RAM to get the full benefits of multitasking programs such as *Desqview*. Better still, the Chargecard can access the memory addresses between 640K and 1MB, effectively boosting user RAM to 960K. The Chargecard even lets you run *PC-MOS/386*.

The company also throws in a RAM disk program designed to retain its data when the system is rebooted, plus a passel of memory-mapping and -management utilities. All this and a 5-year warranty for only \$399.

The biggest shock of all? The Chargecard actually works as claimed. What other product es-  
*(continues)*

**Robert  
Luhn**



Installing a Chargecard can take three steps. Plug the 80286 into the Chargecard, slip the duo into the socket extender, and then push the assembly into the waiting motherboard socket.

entially doubles your system's conventional work space for those mega-worksheets, data bases, and documents or those crucial but RAM-hungry memory-resident programs? What other board lets *Desqview* use *all* installed memory for multitasking applications? If you own an 80286-based system (including the PS/2 Models 50 and 60), the Chargecard is a must buy.

Just keep in mind that the Chargecard can be difficult to install. The process basically involves removing the system's 80286 chip, plugging it into the Chargecard, and then plugging the assembly back into the 80286 socket. Unfortunately, the microprocessor socket in many systems—including the IBM PC AT Model 339 upgraded here—is surrounded by capacitors. Try to push the Chargecard flush into the socket, as directed, and you'll mash the capacitors and possibly disable the motherboard. Another complication: One of the plastic feet that secure the motherboard to the system chassis prevents the Chargecard from snapping into place.

There are two solutions to these knotty problems. Upgraders on a budget can remove the motherboard, pull out the obstreperous plastic foot, *gently* bend the capacitors away from the 2½-by-1½-inch Chargecard, force the Chargecard into the 80286's socket, and reinstall the motherboard. (For tips on removing a motherboard, see "The Ultimate Turbo Board," *The Upgrade Path*, PCW, November 1987.) A simpler, albeit more expensive, remedy is to buy the company's \$100 socket extender. (You may need this adapter anyway if your system's 80286 is

planted on the motherboard in a leadless chip mount.) However, since this raises the Chargecard another quarter-inch off the motherboard, you'll probably have to relocate the system's disk controller to another 16-bit slot. Tools of the upgrade: small flat-blade and Phillips screwdrivers, an 80286 chip puller (supplied by the company), and a pair of needle-nose pliers (for removing the plastic foot).

Before you wrangle with the Chargecard, reconfigure all expanded memory boards as extended memory, and run the computer's setup program to record the change. Then park the AT's hard disk, turn off the system, unplug all external cables, remove the system cover, and ground yourself before touching the system or any component.

Locate the 80286 chip (just behind and to the left of the hard disk drive in an IBM AT), swivel the computer so the disk drives are to your right, and remove any boards that obstruct your view. Slide the chip puller's prongs between the 80286 and its socket, and lift up gently. Repeat the procedure on at least one other side of the chip (it may be impossible to get at all four sides) and the chip should ease out. Note: Remember what direction the notch on the 80286 is facing—you'll need this information later. Take the Chargecard out of its antistatic bag and plug the 80286 into the socket on the card. The chip should be firmly socketed but not necessarily flush to the board.

Install the Chargecard as if you were reinstalling the 80286—as you lower the Chargecard's pins into the empty 80286 socket, make sure the 80286's notch is pointing in the proper direction.

If you have trouble lining up the pins, shine a lamp on the motherboard and peek through the computer's backplane. Now survey the situation. Will pressing the Chargecard into the socket crush capacitors and other components in the immediate vicinity? Is one of the motherboard's feet getting in the way? If not, plug in the Chargecard. It needn't be perfectly flush in the socket, but pretty darn close. If there are obstructions, either use All Computer's socket extender or remove the motherboard and follow the procedure outlined previously.

Once the Chargecard is in place, reassemble the system and turn it on. You'll discover that the Chargecard's considerable powers aren't available until you install device drivers that specifically tap each talent. Thankfully, the company supplies a prompt-driven installation program that copies over the necessary drivers (for expanded memory, the RAM disk, and accessing 960K of user RAM) and modifies or creates AUTOEXEC.BAT and CONFIG.SYS files. The process is straightforward, and if you dig around the Chargecard's somewhat muddled user manual you'll discover hundreds of tips for tweaking the system.

The Chargecard isn't perfect. It can be a pain to install and its drivers can soak up 64K of RAM. Note, too, that the company's RAM disk program has a bug that prevents it from retaining its contents when the system is rebooted. The manufacturer also notes that the Chargecard won't work in the AT&T 6300 Plus, Zenith Z-248/12, and 80286 (*continues*)

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## By James Lewis

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systems from Sanyo and Indtech Systems.

But the Chargecard's talents far outweigh its quirks. If you want to unlock the memory hiding in your system for *1-2-3*, *Desqview*, and a thousand other programs, get the Chargecard. It's definitely the Upgrade Product of the Year.

#### WHERE TO BUY

##### All Chargecard

All Computers Inc.  
21 St. Clair Ave. #203  
Toronto, Ontario  
M4T 1L9 Canada  
416/960-0111

**List price:** \$399; socket extender \$100

**Requirements:** 80286 chip

**Warranty:** five years

**Extended warranty:** none

**Technical support:** unlimited, no toll-free number, M-F 9-5

**Other support services:** BBS

For more information, circle 660 on reader service card.

## One PC, Two Buses

Back in the early 1980s when the PC was new, expansion boards generally boasted a single option, such as a serial port, RAM, or video circuitry. As you might imagine (or remember), it didn't take long to fill up the PC's five slots. Today, with the availability of cheap internal modems, expanded memory boards, graphics boards, and the like, slot cram hasn't abated. The solution—now, as then—is to connect an expansion box with extra slots to your PC.

This may strike some as a fuddy-duddy upgrade, but it's incredibly easy to accomplish. If you're one of the many millions who rely on a faithful PC, XT, or compatible system that's out of

slots, consider the merits of the PC-Xtra from PC Horizons. The company has crafted a 6-slot box about half the size of the PC that closely resembles its inspiration—from its beige paint job to its noisy fan and impossible-to-remove cover. You can put any board in the PC-Xtra except a color graphics board; the unit's 50-watt power supply will keep things humming. Connecting the PC-Xtra to your PC takes about 5 minutes and requires small flat-head and Phillips screwdrivers.

As always, park the PC's hard disk if it has one, turn off the system, unplug all external cables, remove the system cover, and ground yourself before touching the system or any component. Place the PC-Xtra to the left of the PC and remove its cover. Don't yank the cover off or you could snag cables or damage the unit's power supply. The gray data cable that connects the PC-Xtra to the PC is inside the unit, plugged into a slot; pull the white connector out of the slot and poke it through the PC-Xtra's backplane. (*Don't* remove the other end of the cable that's attached to the PC-Xtra's motherboard.) Install any expansion boards in the PC-Xtra, put the hood back on, and screw it down.

Now find a free slot in the PC (or remove an existing board), remove its slot cover, fold the connector end of the data cable over into a triangular shape, and slip it through the backplane. When you plug the PC-Xtra connector into the slot, make sure the black stripe on the edge of the data cable is nearest the PC's backplane. At this point the manual directs you to put the slot cover back in place, but the PC-Xtra's data cable clearly

makes that impossible. No matter—the opening is effectively closed off.

Before you reassemble the PC, reset its DIP switches to reflect any new devices added to the PC-Xtra. If you're merely moving boards from PC to PC-Xtra, you can leave the DIP switches alone.

You won't need to hunt down a wall socket to power the PC-Xtra, thanks to its unique double-headed plug. One head plugs into the monitor's power outlet on the back of the PC; the other head connects to the monitor's power cable. Turn on the PC, and both units are up and running.

Simple, direct, and quick—the best kind of upgrade. If PC Horizons cut the PC-Xtra's price in half—a reasonable request, given the simplicity of the product—it would be the perfect upgrade. But the PC-Xtra does the job and that may well be worth the price of admission.

#### WHERE TO BUY

##### PC-Xtra

PC Horizons, Inc.  
1710-M Newport Circle  
Santa Ana, CA 92705  
714/953-5396

**List price:** \$549

**Requirements:** 8-bit slot

**Warranty:** one year, two years on the power supply

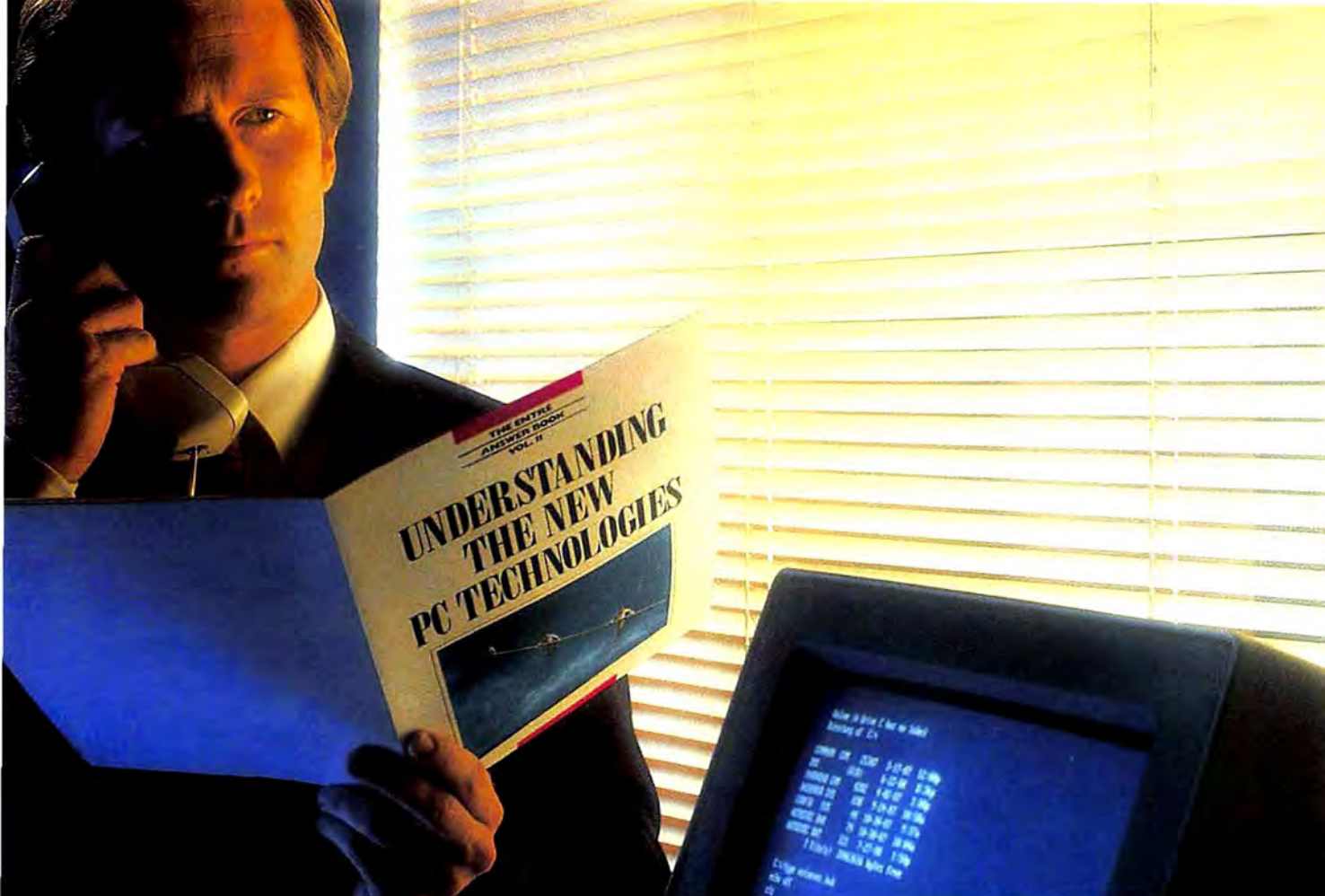
**Extended warranty:** none

**Technical support:** unlimited, no toll-free number, M-F 8-5

**Other support services:** none

For more information, circle 661 on the reader service card.

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



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| <input type="checkbox"/> 4.77/10MHz Motherboard             | <input type="checkbox"/> Hardware reset switch                                  |
| <input type="checkbox"/> Enamel beige case                  | <input type="checkbox"/> 8087 co-processor ready                                |
| <input type="checkbox"/> 150 watt power supply              | <input type="checkbox"/> Hardware turbo switch                                  |
| <input type="checkbox"/> One 360K 5.25 floppy drive         | <input type="checkbox"/> Audio speaker  |
| <input type="checkbox"/> Mono graphics adapter              | <input type="checkbox"/> 8 expansion slots                                      |
| <input type="checkbox"/> CGA adapter                        | <input type="checkbox"/> 48 hour hardware burn-in and diagnostic testing period |
| <input type="checkbox"/> 1 floppy controller for two drives | <input type="checkbox"/> Comprehensive 1 year parts and labor warranty          |
| <input type="checkbox"/> 1 game port                        |   |
| <input type="checkbox"/> 1 serial port                      |   |
| <input type="checkbox"/> 1 parallel port                    |   |

### OPTIONS

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## 12 MHz WITH ZERO WAIT STATE. 286 BASED SYSTEM

### STANDARD FEATURES:

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|---|--|
| <input type="checkbox"/> Intel 80286 Processor  | <input type="checkbox"/> Hercules compatible monochrome adapter card   |
| <input type="checkbox"/> 512K RAM   | <input type="checkbox"/> 1 parallel port                               |
| <input type="checkbox"/> 12 MHz with zero/one wait state motherboard. Motherboard accommodates up to 4MB onboard RAM using 80NS 1 MB dram's | <input type="checkbox"/> 1 serial port                                 |
| <input type="checkbox"/> Hard drive and floppy drive controller   | <input type="checkbox"/> Clock calendar with battery back-up           |
| <input type="checkbox"/> Samsung amber monochrome monitor   | <input type="checkbox"/> Enhanced 101 key keyboard                     |
| <input type="checkbox"/> 200 watt power supply  | <input type="checkbox"/> Full size or desk-saver case                  |
| <input type="checkbox"/> 1.2MB high density floppy drive  | <input type="checkbox"/> 80287 co-processor ready                      |
|   | <input type="checkbox"/> 48 hour burn-in and diagnostic testing period |
|   | <input type="checkbox"/> Comprehensive 1 year parts and labor warranty |

### EGA SYSTEMS:

NEC Multisync II monitor & Paradise EGA Card Add:	\$684
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## 20 MHz WITH ZERO WAIT STATE. 386/20 SYSTEM

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- |  |  |
|--|--|
| <input type="checkbox"/> 1 MB RAM  | <input type="checkbox"/> Samsung amber monochrome monitor              |
| <input type="checkbox"/> 16/20 MHz W/ zero wait state.                                     | <input type="checkbox"/> 1 Parallel port                               |
| Motherboard accommodates up to 4MB onboard RAM   | <input type="checkbox"/> 1 Serial port                                 |
| <input type="checkbox"/> 200 watt power supply   | <input type="checkbox"/> 1 Game port                                   |
| <input type="checkbox"/> Enhanced 101 key keyboard   | <input type="checkbox"/> Hercules compatible monochrome adapter card   |
| <input type="checkbox"/> AT style case with LED's for hard drive, power, and turbo setting | <input type="checkbox"/> HD/FD controller                              |
| <input type="checkbox"/> 1.2MB high density floppy drive                                   | <input type="checkbox"/> OS/2 compatible                               |
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NEC Multisync II Monitor and Paradise EGA card Add: \$684  
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	TOTAL
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## THE HELP SCREEN

### PC World offers answers and advice at every level

Back off to back up, untangle a twisted definition, make cents of an IBM keyboard, fight .BAK fragmentation, find the disk with DEBUG, locate a rack-mounted PC, and recognize when to clean your floppy drive's heads.

Karl  
Koessel

### At the End of My Tape

**Q.** *I'm the office manager for a small private dental practice. I've been using an AT for four years to track appointments and billings. The AT is equipped with an Alloy tape unit, which we use every night to perform a full backup of the hard disk files.*

*When the hard disk died three weeks ago, having the backup tape was a blessing; I simply re-stored the files from the tape to the replacement drive and was immediately up and running. Now, however, the tape drive isn't working. No matter what I choose from the backup menu, the tape drive's backup program tells me that no files were found on the hard disk and so none were backed up. But I know the hard disk has lots of files. What's wrong? Do I need a new tape backup unit?*

*By the way, the guy who maintains our system just added something that makes the time of day tick away in the upper right corner of the screen. I find it terribly annoying. Can you tell me how to get rid of it?*

Kathy May  
San Francisco, California

**A.** I'll bet your tape backup quit working the day your maintenance person added that clock. The technical explanation is that the clock and tape programs are trying to use the same DMA (direct memory access) channel. In lay terms, your system is try-

ing—and failing—to do two chores at a time.

Since you don't need the clock while you're backing up, you could make a bootable disk for drive A: and use it to boot the AT when you want to back up. Booting off the floppy disk will prevent the memory-resident clock program from installing and conflicting with the tape backup program. However, since you don't want the clock anyway, let's take out the command that installs it.

Use your word processor's nondocument (also called ASCII text) mode to edit the AUTOEXEC.BAT file found in the root directory of the hard disk. Look for the line that refers to the clock program (if it's not obvious which line it is, call your maintenance person) and delete it. Then save AUTOEXEC.BAT as an unformatted ASCII text file and reboot the AT. The clock should no longer appear on your screen, and the tape backup program should work as it always has.

### Twisted Pair

**Q.** *I want to install a small network at the office. It calls for twisted wire to connect the computers. Why is twisted wire needed? Would speaker cable or doorbell wire work as well? (Doorbell wire is often solid, with two wires running parallel inside a sheath.)*

Henry Hilliard, Jr.  
Houston, Texas  
(continues)

**A.** Your network calls for twist-pair wiring, not twisted wires. Twisted-pair wiring is two wires that twist around each other inside their common sheath. Twisted-pair connections are less susceptible to electromagnetic interference, which can damage the data packets that are sent around the network, than parallel-wired links. Fewer damaged packets means fewer packets that must be retransmitted, and therefore better performance from the network.

However, the length of the wire and the transmission speed of the network also affect the frequency of damaged packets. Many small networks have nodes fairly close together and transmit slowly enough that parallel wiring, like speaker or doorbell wire, works just fine. In fact, many small-network cards use standard (parallel) phone line to connect nodes.

### Cents, You've Been Gone

**Q.** *I've been using IBM and Compaq PCs since they were first marketed, but I can't find any manual, magazine, book, or person who can tell me why the cent symbol (¢) was omitted from the PC's keyboard. Any clues?*

Rodney Wren  
Summerfield, Florida

**A.** When the IBM PC was introduced, ANSI's ASCII (the American National Standards Institute's American Standard Code for Information Interchange) had already been adopted by most microcomputer hardware and software companies. IBM followed suit with its PC. Unfortunately, ¢ was not part of

ASCII code	Character	ASCII code	Character	ASCII code	Character	ASCII code	Character
128	Ç	160	á	192	Ł	224	α
129	ü	161	í	193	±	225	β
130	é	162	ó	194	⌈	226	Γ
131	â	163	ú	195	⌋	227	π
132	ã	164	ñ	196	—	228	Σ
133	ä	165	ñ	197	†	229	σ
134	å	166	•	198	‡	230	μ
135	ç	167	°	199	‡	231	τ
136	ê	168	¿	200	£	232	φ
137	ë	169	¬	201	¤	233	θ
138	è	170	¬	202	£	234	η
139	ï	171	½	203	¥	235	δ
140	î	172	¾	204	¥	236	∞
141	ì	173	¡	205	=	237	φ
142	Ä	174	«	206	¥	238	ε
143	Å	175	»	207	±	239	η
144	É	176		208	£	240	≡
145	æ	177	☼	209	¥	241	±
146	Æ	178	☼	210	π	242	≥
147	ó	179		211	£	243	≤
148	ö	180	†	212	£	244	∫
149	ò	181	‡	213	¥	245	∫
150	û	182	‡	214	π	246	÷
151	ù	183	π	215	‡	247	≈
152	ÿ	184	¶	216	‡	248	°
153	ö	185	‡	217	∫	249	•
154	ü	186		218	∫	250	•
155	ç	187	¶	219	■	251	✓
156	£	188	¶	220	■	252	η
157	¥	189	¶	221	■	253	˙
158	¥	190	¶	222	■	254	•
159	f	191	∫	223	■	255	

TABLE 1: The IBM PC's extended ASCII characters

the ASCII definition, and printers either could not print that character or required a special code to produce the cent sign.

Since ASCII is a 7-bit standard, only 128 (2<sup>7</sup>) characters and control codes (tabs, carriage returns, and codes for clearing the screen, moving the printer carriage one line, and so forth) can be specified. Because the IBM PC is a full 8-bit machine, IBM decided to extend the ASCII character set with 128 additional special characters or codes, one of which is ¢ (see TABLE 1). These days, most IBM PC-

compatible programs and printers accept, display, and print the IBM PC's extended ASCII character set.

To enter ¢, hold down the <Alt> key, enter 155 on the numeric keypad, and then release <Alt>. (You can use the same technique to enter any of the characters in TABLE 1.) Then try printing it. If you don't get a ¢, don't give up immediately. It may be that your printer has more than one character set and that the IBM set is not the de-  
(continues)

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Circle 266 on reader service card

fault. Check your printer's manual for available character sets and the instructions for invoking them. For example, the IBM PC's character set can be made the default on all current Epson printers by setting a DIP switch (or by pushing front panel buttons for the switchless models) or by sending the printer an Escape t1 Escape 6 (the ASCII sequence, in decimal, 27, 116, 49, 27, 54).

### Unwanted .BAK Files

**Q.** *I have a problem with Webster's New World Writer. For a professional word burner like me, with dozens of novels, short stories, and articles in various stages of completion, this word processor is great, mostly because of its excellent thesaurus and spelling checker.*

*Unfortunately, whenever a file is edited, Webster's insists on making a .BAK file out of the original. This action rapidly fragments my hard disk. I use FastTrax regularly to clean things up, but there is the ever-present dread of risking a chapter or more if something goes wrong.*

*Simon & Schuster insists that I can't eliminate this unwanted feature and suggests that I use a batch file to automatically delete the unwanted .BAK files. I didn't need this simplistic solution, and it doesn't solve the fragmentation problem anyway.*

*I could change word processors. Borland's Sprint sounds like it might be the one I'd be most comfortable with, but I'd still need to use Webster's to check spelling. I shudder every*

*time I think of having to use two word processors. Can you help me?*

*John A. Nelson  
Guerneville, California*

**A.** Two things first: *Sprint* has a spelling checker (see *The Software Shelf* in this issue), so if you opt for *Sprint*, you won't have to use *Webster's* too. Furthermore, because disk file allocation is a function of DOS, your files would get fragmented even if your word processor didn't make .BAK files.

That said, there are a few things you can do to reduce the amount of disk fragmentation. You can implement a RAM disk that's a little bigger than three times the size of the largest document you'll save (see VDISK.SYS in the DOS manual's chapter called "Configuring Your System"). (*Webster's*, like most word processors, creates a temporary copy of the file while you're editing, removing it only after the original has been renamed with the .BAK extension and the new edit has been saved. Therefore, you need space for all three files.) If your system has extended memory, producing a large enough RAM disk should not be a problem. (If you have an expanded memory board, you'll have to use the RAM disk program that came with it—if one did. Better yet, if you can configure some of that expanded memory as extended memory, do so and use VDISK.SYS for the RAM disk.) Otherwise, VDISK will use conventional RAM; hopefully your system has a full 640K worth. Once you've installed a RAM disk, you'll want to tell your word processing program that your document files are on that drive.

Before editing a file, you'll need to copy it to the RAM disk. Then you can start editing as you normally do, by typing WWP followed by the file name. When done editing, save the document, exit the word processor, copy the newly saved file from the RAM disk to the hard drive, and delete the files in the RAM disk. (You may want to create a batch file that performs all four steps for you.) Because the .BAK file and the temporary file are not saved on your hard disk, fragmentation is reduced, though not eliminated.

If you don't have enough RAM to implement the RAM disk strategy, or you worry that a power failure or kicked power cord will cause the RAM disk to lose all of your last edit session, you can use FDISK from DOS 3.30 or a later version to create a small partition on your hard disk as drive D:. Then use the method just described, substituting the hard drive D: partition for the RAM disk.

### Tracking Down DEBUG

**Q.** *I'm a newcomer to computers and could use some help. A recent utility in PC World was created using a program called DEBUG. I have MS-DOS 3.20 and want to purchase a compatible version of DEBUG. The article mentions that DEBUG can be found on the DOS Supplemental Programs disk of DOS versions prior to 3.30 but fails to mention where to buy that disk. Would you please tell me where I can obtain it?*

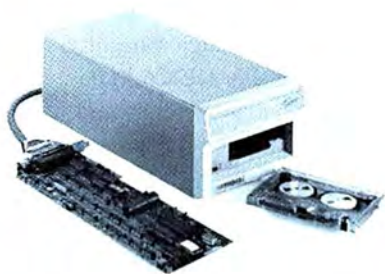
*Silas W. Downs  
Columbus, Kansas  
(continues)*

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Circle 185 on reader service card

**A.** You already have it. The DOS Supplemental Programs disk is the second disk included in your package of MS-DOS.

### Racking My Brain

**Q.** *I work for a broadband local area communications network. We provide a lot of state-of-the-art electronic communications and video equipment mounted in racks (standard 19-inch width) to various clients. Many require rack-mounted PCs for system monitoring, and so I'm looking for the right one. However, I can't seem to find a rack-mountable PC anywhere. Can you help?*

*Sharon Giudice  
Lyons, Colorado*

**A.** Texas Microsystems offers a nickel-plated-steel 19-inch-wide rack-mount unit, 7 inches high by 22 inches deep. The Model 3014 is equipped with two 8-bit and twelve 8/16-bit slots, five half-height drive bays, two fans to ensure proper cooling, and a 225-watt power supply. The company offers various hard disks that in combination can give you more than 1 gigabyte of storage within the 3014. High reliability, industrial-grade (NEMA Type 12) rack-mounted monitors and portable disk and tape drives are also available.

The 3014 is a passive back-plane unit, meaning that there is no motherboard. Instead, you plug in a CPU card to run the system. Four CPU boards, which are based on Chips and Technologies chipsets and the Phoenix BIOS, are available. The B880, a 4.77-MHz 8088-based system board with 256K or 640K of on-

board memory, costs \$495 or \$595, respectively. The \$1295 B286-1 is a dual-speed (6/8-MHz or 6/10-MHz) 80286-based board with 1MB of on-board memory. The N286S/16-1 is a 16-MHz, near-one-wait-state 80286-based CPU board with 512K (expandable to 4MB on board) of RAM for \$1595. It includes a socket for a 10-MHz 80287 coprocessor. The 80386-based B386 is available in 16-MHz and 20-MHz versions and can be configured with up to 16MB of on-board 32-bit memory, with prices starting at \$1645 for a B386 with no memory installed.

The 3014 is inappropriate for general office use; it was designed for laboratory and clean-room environments. Generally sold to system integrators, the rack-mountable unit complements other Texas Microsystems products meant for the factory floor and ruggedized military applications. For example, the company recently introduced a solid-state "hard disk," the SSD, for environments where a hard drive can't be used. The SSD holds up to 20MB of battery-backed static RAM with an average access time of approximately .025ms.

Should repair ever be needed for any component of these solidly built systems, the company guarantees 48-hour turnaround time and will ship a replacement part if the device cannot be repaired within that time period.

### WHERE TO BUY

#### Model 3014

Texas Microsystems, Inc.  
10618 Rockley Rd.  
Houston, TX 77099  
800/627-8700, 713/933-8050

**List price:** \$1595

**Warranty:** one year parts and labor

**Extended warranty:** one additional year for 50 percent of the current list price of the repaired item

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

**Other support services:** none  
For more information, circle 780 on reader service card.

### Keep a Clean Head

Reading "Back on Track" from August's *Help Screen* reminded a few readers of their disk-reading problems. Dirty read/write heads are not the problem when a floppy drive can read its own disks but can't read a disk written by another drive; however, these readers felt I should mention that when a single drive has trouble reading disks, especially ones it wrote, the heads probably need cleaning. So done. Another reader noted that read problems also occur when the back of the monitor is too close to the disk drive of some systems.

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

### POWER TIP NO. 20

#### Copy Two Files Into One

With the DOS COPY command, you can easily combine two ASCII files to create a third. For two files called List1 and List2, for example, just type COPY List1 + List2 List3. List3 will consist of List2 appended to the bottom of List1.

*Joseph Irwin  
St. Paul, Minnesota*

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Circle 113 on reader service card

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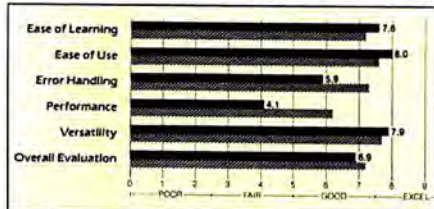
— Richard Landry, Editor, PC World

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Right now, a new generation of software is evolving. New programs — and changes to existing programs — will appear at an accelerating pace. OS/2 will soon be baseline technology — and generate a host of new applications. The 386 machines will accelerate the proliferation of software choices.

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	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Criteria 6	Criteria 7	Criteria 8	Criteria 9	Criteria 10	Criteria 11	Criteria 12	Criteria 13	Criteria 14	Criteria 15	Criteria 16	Criteria 17	Criteria 18	Criteria 19	Criteria 20
<b>DATA ENTRY FORMS</b>																				
Maximum forms per form	U	1	A06	U	U	U	A06	U	U	12	U	U	U	U	U	U	U	U	U	U
Maximum screens per form	2	15	15	1	A02	15	15	1	1	15	15	1	1	15	15	1	1	15	15	1
User specified field placement	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Text placed anywhere on screen	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
<b>VALIDATION</b>																				
Lookup validation	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Lookup in another table	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Range checking	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Validate by mathematical expression	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Data checking	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Summary checks	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

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*** 7.7	RTS Professional File	1.01	U	U	U	U	U	\$26K, \$149	U	U
*** 7.2	Phaser Basic	2.3	U	U	U	U	U	\$54K, \$149	U	U
*** 6.4	RapidFire	1.0	U	U	U	U	U	\$25K, \$149	U	U
A 5.3	Support File	1.0	U	U	U	U	U	\$54K, \$149	U	U

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Stephen L. Woolstenhulme,  
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Circle 170 on reader service card



## STAR-DOT-STAR

\* \*

### A global exchange of personal computer discoveries

Go wild with a Turbo C replacement for DEL, increase your AutoCAD comfort, simplify BASIC PRINTing, and check out three source-code analyzers.

Edited  
by  
Tom Swan

### Oh, Those Wild Deletes

When using wild-card characters with the DOS commands DEL and ERASE to delete multiple files, you can easily erase more than you intend. For example, with the command DEL \*.BAK, there's no way to delete only some files ending in .BAK. To DOS, wild-card file names like \*.BAT or \*.\* are all-or-nothing affairs.

So I couldn't delete specific files without giving up wild cards. I wrote a Turbo C program, DELVER.C (see LISTING 1), for DELETE with VERIFY. Once you become familiar with DELVER, you may never use DEL/ERASE again.

As with DEL/ERASE, you can use DELVER to delete a single file (DELVER filename.ext) or to delete several files with similar names using a wild card specification, such as DELVER TEST???.\*. But DELVER prompts you to answer Y before removing a file from disk. Press any other key, N or <Enter> for example, if you want to keep the file. DELVER will move on to the next file name.

Vincent D. O'Connor  
Babbitt, Minnesota

*Editor's note: To compile DELVER.C, start Turbo C and press <Alt>-E to place the cursor in the Turbo editor window. After entering the program text shown in LISTING 1, press <Alt>-C to open the Compile menu. Then, select Make to create*

*DELVER.EXE on disk. Quit Turbo C with <Alt>-X and copy DELVER.EXE to your disk's root directory or to any directory listed in your system's PATH command.*

### AutoCAD in Comfort

AutoCAD's numerous commands make the program difficult to use, especially if you don't have a mouse. For more comfortable CAD sessions, I use ANSI.SYS to assign my most frequently used commands to <Alt>-key combinations. For example, <Alt>-P issues Plot; <Alt>-S, Save; and so on.

A batch file, ACAD.BAT [LISTING 2], makes the key assignments and then runs AutoCAD. Each of the ANSI.SYS key definitions begins with PROMPT \$ef. Then come two numbers, each followed by a semicolon. The zero indicates an extended ASCII key such as a Function key, an <Alt>-key combination, <Insert>, <Cursor Up>, and so forth. The second number identifies the key [see TABLE 1]. For example, 0;37; is the code for <Alt>-K. [When defining a normal key, only one number, the key's ASCII code, is used.] Following the key code is the key's new definition, enclosed in double quotes. A single p ends the definition.

T. Sengupta  
Bihar, India  
(continues)

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```
/* delver.c, written by Vincent D. O'Connor */

#include <dos.h>
#include <dir.h>
#include <conio.h>
#include <stdio.h>
#include <ctype.h>
#include <process.h>

struct fblk block;
char dir [MAXDIR], path [MAXPATH], drive [MAXDRIVE];
char ext [MAXEXT], file [MAXFILE];

void main (argc, argv)
    unsigned argc;
    char *argv [];

{
    if (argc != 2) {
        printf ("\aInvalid number of parameters\n");
        exit (1);
    }

    fnsplit (argv [1], drive, dir, 0, 0);

    if (findfirst (argv [1], &block, 0)) {
        printf ("\aInvalid path or no matching files");
        exit (1);
    }

    do {
        fnsplit (block.ff_name, 0, 0, file, ext);
        fnmerge (path, drive, dir, file, ext);
        printf ("\nDelete %s? ", path);
        if (toupper (getche ()) == 'Y')
            if (unlink (path))
                printf ("\aError while attempting deletion");
    } while (!findnext (&block));

    exit (0);
}
```

LISTING 1: This Turbo C program, DELVER.C, prompts you for verification before deleting files from a disk.

*Editor's note: Before running ACAD.BAT, check that ANSI.SYS (from your DOS disk) is in the hard disk's \DOS directory and that CONFIG.SYS contains the line DEVICE=C:\DOS\ANSI.SYS. Whether or not you use AutoCAD, you can employ this same technique to add keyboard macros to other programs, but only if the software uses standard methods for reading the keyboard. Programs that access the keyboard directly may not recognize the ANSI.SYS key assignments.*

*You can also use this technique to create limited DOS macros. For example, I include the line PROMPT \$e[0;66; "Exit";13p in my AUTOEXEC.BAT file, assigning Exit plus <Enter> (ASCII 13) to <F8>. This lets me temporarily exit to DOS, as many current programs allow, and then press <F8> to quickly return to my work. Note that key definitions can contain a mix of quoted text and ASCII codes.*  
(continues)

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```
prompt $e[0;25;"plot"p
prompt $e[0;19;"redraw"p
prompt $e[0;31;"save"p
prompt $e[0;20;"text"p
prompt $e[0;22;"undo"p
prompt $e[0;44;"zoom"p
prompt $e[0;30;"arc"p
prompt $e[0;46;"copy"p
prompt $e[0;32;"dim"p
prompt $e[0;18;"erase"p
prompt $e[0;48;"block"p
prompt $e[0;33;"fill"p
prompt $e[0;34;"grid"p
prompt $e[0;35;"hatch"p
prompt $e[0;23;"insert"p
prompt $e[0;38;"line"p
prompt $e[0;50;"move"p
prompt $e[0;16;"quit"p
prompt $p$g
c:
cd c:\acad
acad
```

LISTING 2: ACAD.BAT assigns frequently used commands to <Alt>-key combinations before running AutoCAD.

### What You See

#### Is What You Print

In BASIC, it isn't always convenient to use PRINT and LPRINT to output text to the screen and the printer. For instance, while debugging, I often need to test printer output by temporarily changing LPRINT statements to PRINT, a tedious and time-consuming job when you have hundreds of such statements to edit.

Recently, I found a more convenient way to accomplish the

identical task: Use OPEN and PRINT # (instead of PRINT and LPRINT) for all output. With this method, the statement OPEN "LPT1:" FOR OUTPUT AS #FN directs PRINT # statements such as PRINT #FN, "ABCDEFGH" to the printer, in exactly the same way LPRINT does. Similarly, OPEN "SCRN:" FOR OUTPUT AS #FN directs output to the screen. The variable FN can be any number from 1 to 255.

REDIRECT.BAS [LISTING 3] demonstrates the technique and shows how to redirect PRINT output with simple assignment statements to variables BUFPR, BUFSCR, and BUFOUT, which also help make the code easy to read. Best of all, I can now print anything I can display without editing a single PRINT or LPRINT statement.

Richard C. Baxter

Wilton, Connecticut

## DEVELOPER'S TOOLBOX

### The Electric Source-Code Acid Tests

Lately, I've been getting a helping hand from three source-code analyzers: PC-Metric, Turbo An- (continues)

ASCII Code	Extended Key
16-25	<Alt>- Q, W, E, R, T, Y, U, I, O, P
30-38	<Alt>- A, S, D, F, G, H, J, K, L
44-50	<Alt>- Z, X, C, V, B, N, M
59-68	<F1> through <F10>
84-93	<Shift>-<F1> through <Shift>-<F10>
94-103	<Ctrl>-<F1> through <Ctrl>-<F10>
104-113	<Alt>-<F1> through <Alt>-<F10>

TABLE 1: Extended ASCII codes for ANSI.SYS reassignments of function key and <Alt>-key combinations

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Export Import (Partial or All)	Yes <sup>1</sup>	Yes	Yes
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Built-In Graphics Output		Yes	Yes
Networking		Yes	Yes <sup>2</sup>
Plotter Support		Yes	Yes
Multitasking			Yes

<sup>1</sup>Exporting only <sup>2</sup>When LAN Mgr. is available

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**PC WORLD**

```

100 BUFPR=1
110 BUFSCR=2
120 BUFOUT=3
130 OPEN "LPT1:" FOR OUTPUT AS #BUFPR
140 OPEN "SCRN:" FOR OUTPUT AS #BUFSCR
150 CLS
160 LOCATE 10,10
170 INPUT "SELECT PRINTER (P) OR SCREEN (S) FOR OUTPUT ", ANS$
180 IF ANS$="P" OR ANS$="p" THEN BUFOUT = BUFPR
190 IF ANS$="S" OR ANS$="s" THEN BUFOUT = BUFSCR
200 IF ANS$<>"P" AND ANS$<>"S" THEN GOTO 150
210 PRINT #BUFOUT, "These two lines can go either to the printer or
220 PRINT #BUFOUT, " to the screen by defining BUFOUT at run time."
230 PRINT #BUFPR, "This line is always printed."
240 PRINT #BUFSCR, "This line is always displayed on screen."
250 BUFOUT=BUFPR
260 PRINT #BUFOUT, "These lines are redirected to the printer"
270 PRINT #BUFOUT, " by making BUFOUT equal to BUFPR."
280 BUFOUT=BUFSCR
290 PRINT #BUFOUT, "These lines are redirected to the screen"
300 PRINT #BUFOUT, " by making BUFOUT equal to BUFSCR."
999 END

```

**LISTING 3: REDIRECT.BAS** demonstrates how to use PRINT statements to direct output to either the printer or the display.

*alist*, and *AsmFlow*. These programming tools provide a battery of acid tests to analyze, profile, and document my source code in ways I've never been able to accomplish before.

If programming is an art, *PC-Metric* is a state-of-the-art critic. I use the Pascal and C versions, but COBOL, Modula 2, and FORTRAN packages are also available. Working with most modern compilers, *PC-Metric* reads a source-code text file and applies scientific formulas to a program's logic.

As a test, I fed *PC-Metric* a 1700-line module from my Turbo Pascal data base system. About 30 seconds later, on a 16-MHz ALR 386/2, I received two reports: a chart of statistics and a text file advising me whether each procedure and function falls within recognized standards of excellence.

The statistics include: total and unique operators and operands, length versus predicted length, purity ratio, volume, effort, cyclomatic complexity, esti-

mated errors, and others. Obtaining these values is the easy part. Understanding how to apply the evaluations requires a careful reading of the tutorial, which explains the theory behind each variable. A bibliography lists related books and articles. If I can ever find the time, I'd love to read them all.

For immediate help in using *PC-Metric* statistics, a supplied utility converts report files to comma-delimited ASCII text for loading into *dBASE*, *1-2-3*, or *Quattro*. After loading my test data, I ran an included macro to graph the results in pie and bar charts. Immediately I spotted a procedure that was doing more than its fair share of the work and made a note to divide the code into several smaller modules. Perhaps I could have drawn this conclusion directly from the program text, but the graph grabbed my attention and gave me a new way to evaluate my work.

(continues)

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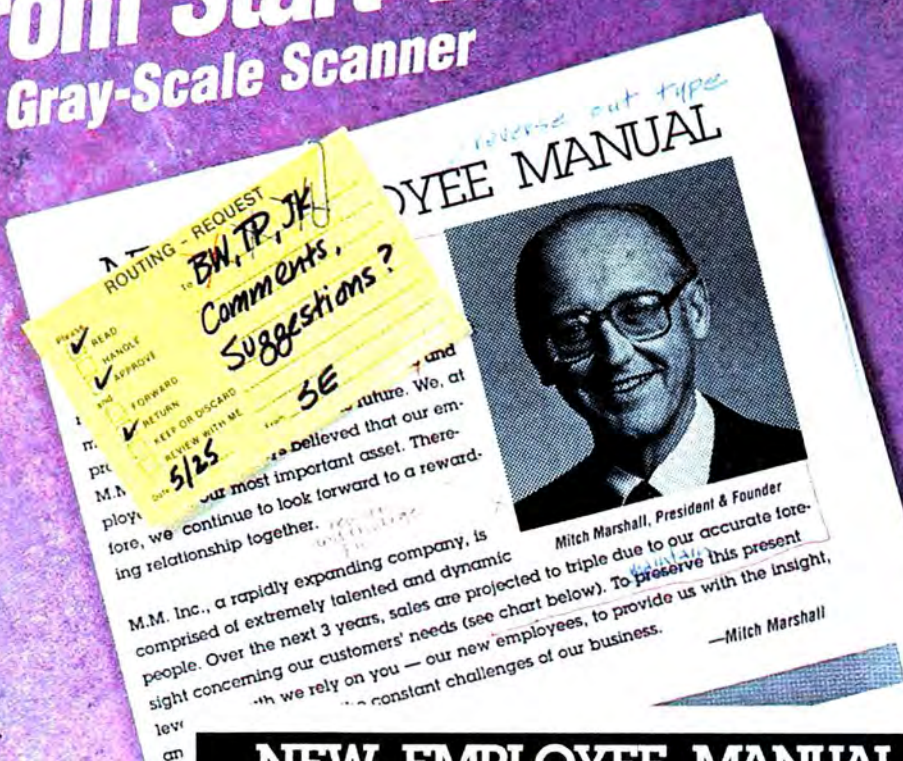
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*—Mitch Marshall*



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*PC-Metric* statistics offer other practical applications that may not be obvious. For example, instead of bidding a source-code maintenance job by the line, as many consultants do, you could run a 10,000-line C program through *PC-Metric* and calculate your fee based on the program's complexity.

*PC-Metric* is also useful in allocating testing time. I can quickly identify the more complex and error-prone modules in a program and concentrate my testing there, on the theory that bugs are more likely to show up in the trickier sections.

Another analytical tool, *Turbo Analyst 4.0*, is strictly for Turbo Pascal programmers. Kim Kokkonen of TurboPower Software isn't charging enough for this wonderful set of source-code tools. On four disks are two execution profilers, a program structure analyzer, a program lister, and a Pascal formatter, which can stylize even the messiest source-code jumble. In addition to a few other goodies, most of the source code is included. (The missing text is available in other products from the same company.)

Of all the tools in the *Turbo Analyst*, the most useful in my work are the two execution profilers. In fact, after trying them I abandoned a similar profiler I was planning to write. I know when I've been beaten.

A profiler can help inject extra speed into a program. The profiling software sits in memory while your program runs. After you quit the program, the profiler reports how much time was spent executing various sections

of code, identifying the most heavily traveled paths. Because most programs spend about 90 percent of the time in only 10 percent of the code, optimizing the time-critical sections in superfast assembly language often generates nearly as much speed as you could expect from rewriting the entire program. A good profiler can pay for itself on first use.

In addition to the profilers, the *Turbo Analyst's* Pascal structure analyzer locates duplicate identifiers, prints a procedure hierarchy chart and index, warns about unused symbols, and reports on possible side effects. (Side effects can occur when functions change global variables, a poor practice and a prime source of bugs.)

For assembly language programming, I came across another analytical tool, *AsmFlow*, a program that deserves better exposure. *AsmFlow* reads Assembler source code, calculates CPU timings (invaluable for optimizing code), displays and prints flow charts, and summarizes stack usage, registers, and unused external symbols.

A unique feature marks the closest instruction affecting a conditional jump. If you've ever used the wrong jump instruction, accidentally testing the overflow instead of the carry flag, for example, you'll appreciate this feature.

At the touch of a few keys, *AsmFlow* can also generate a list of procedures called by other procedures. Revising such "called-by" lists at the top of each module is one of those necessary assembly language documentation chores that I loathe doing by hand.

After years of testing, analyzing, and documenting my source

code the hard way, I now have the software tools I need to put my programs to the test. *PC-Metric*, *Turbo Analyst*, and *AsmFlow* are on my hard disk to stay. —Tom Swan

## WHERE TO BUY

### AsmFlow

Quantum Software  
19855 Stevens Creek Blvd. #154  
Cupertino, CA 95014  
408/244-6826

**List price:** \$99.95

**Requirements:** 384K, DOS 2.10 or later version

Not copy protected

**Technical support:** no toll-free number, M-F 8-5

**Other support services:**

MCI, CompuServe

**For more information, circle 650 on reader service card.**

### PC-Metric 2.0

SET Laboratories, Inc.

P.O. Box 03627

Portland, OR 97203

503/289-4758

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**Requirements:** 256K, DOS 2.10 or later version

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**Technical support:** available to registered users; no toll-free number, M-F 8-4:30

**Other support services:**

CompuServe, update newsletter

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### Turbo Analyst 4.0

TurboPower Software

P.O. Box 66747

Scotts Valley, CA 95066-0747

800/538-8157 ext. 830,

800/672-3470 ext. 830 California,

408/438-8608

**List price:** \$75

**Requirements:** 256K, DOS 2.00 or later version, Turbo Pascal 4.0 or later version

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

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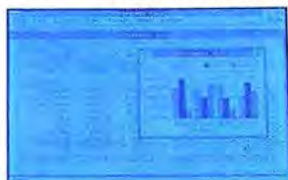
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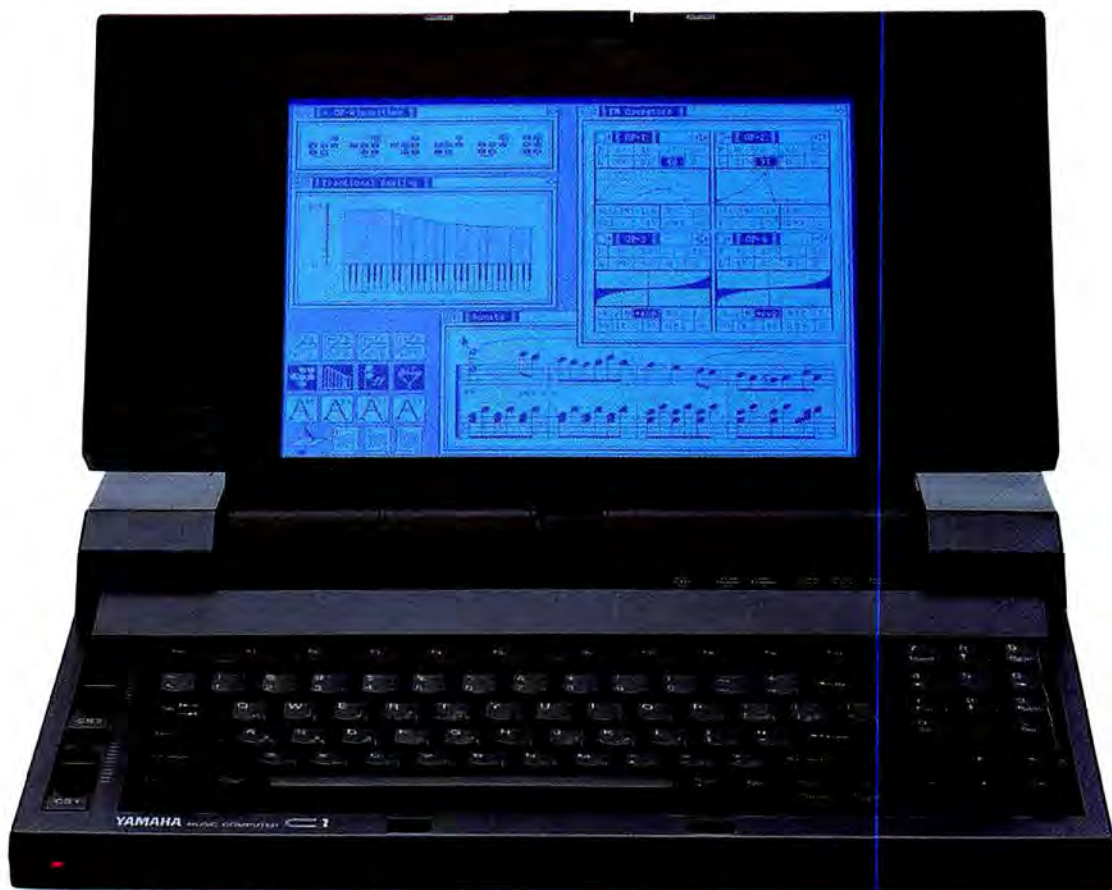
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# The Catacombs of OS/2

OS/2 achieves its multitasking might through a grid of back routes and pathways.

Here's a short course on the rules of the road.



Robert  
M. Carr

**W**hen all is said and done, OS/2 is about one thing: multitasking. Its heralded attributes—a vast 16MB of memory-address space and the ability to tap 286 hardware-protected memory—are simply means to that end.

In good time OS/2 will transform the PC into a host for a suite of full-fledged applications, from heavyweight spreadsheets and data managers to lighter-weight utility software, such as to-do lists and time managers.

But OS/2 is hardly the first product capable of running more than one program at a time. DOS-based operating environments like *Windows 2.0*, *Windows/386*, Quarterdeck's *Desqview*, and Tandy's *DeskMate* can legitimately juggle several applications at once.

The OS/2 advantage is true preemptive multitasking. That is, OS/2 permits numerous properly written applications to reside (and operate) safely within the machine while each appears to be living solo.

Don't be fooled by OS/2's "single user" status; as befits a minicomputer-style operating system, OS/2 is a master at communication—it's simply negotiating tasks rather than users.

OS/2's internal tricks and techniques may be invisible to you, but they won't be to your

OS/2 application. Under OS/2, that application will intrinsically be more capable, more communicative, and more respectful of coresident applications than its DOS predecessor.

## Raising the Flag

OS/2's sophisticated internal techniques, collectively called interprocess communications (IPC), make the multitasking wheels spin while they ensure data integrity. The IPC storehouse includes shared memory, semaphores, pipes, queues, and a *Windows* technique called dynamic data exchange (DDE).

Whenever multiple programs or tasks within one program share the same information, they must coordinate data access. Under OS/2 the fundamental apparatus for sharing access to data is the semaphore. Semaphores provide a fast means of data locking, typically for in-memory data. They operate as flags or streetlights governing each application's access to shared data and limiting write access to files. Semaphores are necessary simply because altering shared data in a random way is ruinous; my edits to a file could well wipe out your edits.

By convention, each application must check the semaphore (*continues*)

before proceeding. In the event of a conflict, the application must wait before rechecking. Even with a green light, an application must be well behaved, notifying OS/2 when its work is completed. The semaphore can then change its value and grant access to another application.

Semaphores exist because data shared among multiple tasks is as prone to problems as data siphoned through multiple users. But data not shared in one location needn't be guarded, although it may need to be copied or sent from one process to another. That's where the other forms of interprocess communications come in.

### Sharing Pipe Dreams

OS/2 generally assumes that applications must be carefully insulated from each other, and it relies on the 286's protected-mode hardware to physically prevent one application from accessing memory reserved for another. But OS/2 does provide a trapdoor for cooperative applications, where "trust" has been established. That escape hatch is termed *shared memory*.

With shared memory, an application requests that OS/2 temporarily drop the memory barriers for specified programs. Sharing memory makes sense for separate processes within an application, or for applications written to work together—particularly if they need to exchange large amounts of data while conserving RAM and maximizing speed.

You might regard pipes, queues, and DDE as OS/2's answer to the Postal Service. These three vehicles deliver one application's packet of data to another application.

Pipes come in two flavors: anonymous and named. Anonymous pipes are commonly used within one application for internal multitasking. Named pipes are connections that enable applications on separate PCs to communicate directly and exchange information, wherever they reside.

Pipes can be used as speedy conduits to link background processes—a technique sometimes called *pipelining*, because several pieces of code can work on the data in parallel. Pipe data is stored only in RAM buffers, not on disk. Furthermore, pipe data can be accessed only in the order it is written in—on a first-in, first-out basis.

Named pipes follow the naming conventions of PC files: applications need only know a pipe's name to access it. When OS/2 does include named pipes, it will deliver messaging capabilities roughly equivalent to a post office that can address every letter itself. With such power, named pipes will most frequently be included in applications that provide a service to a number of clients simultaneously—mail and data base servers, for example.

Like named pipes, queues provide messaging communications between applications. Unlike named pipes, queues use shared memory within a single PC to communicate between applications. Message passing is quick because messages need not be copied, but queues operate only within one PC, implementing hot link relationships.

### One if by Land, Two if by DDE

These messaging techniques are included within OS/2 or will be in due course. But once a message is passed from one application to another, how does the

program decipher it? How does a program determine whether the corresponding application is requesting data or sending it? And in what format?

OS/2 itself doesn't provide the answers, but the Presentation Manager does, thanks to DDE. DDE is not a delivery technique but a formatting and writing convention that describes the layout and meaning of messages passed via pipes and queues.

DDE enables an application to inform coresident applications of data changes. The classic example of DDE in action involves the receipt and dissemination of stock quotes among a communications program like *Lotus Signal*, a spreadsheet, and a market analysis package.

It's clear that OS/2 and the Presentation Manager offer an array of technologies that enable applications to communicate well beyond the scope of DOS 3.x or any DOS-based environment. Although the software development community will need time to fully probe these capabilities, users will emerge the clear winners. We'll be able to follow building-block strategies, assembling software suites in which the whole far exceeds the sum of the parts.

OS/2's rich IPC techniques alone endow OS/2 applications with functionality you can be sure that canny developers will exploit. Such promise suggests that the transition to OS/2 may be surprisingly painless—perhaps even pleasant. ●

*Robert M. Carr is the creator of Framework II and cofounder of Go Corporation, a software start-up.*

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# III

# Call for Nominations



## PURPOSE

The Andrew Fluegelman Award is given annually to encourage personal computer software excellence and to recognize a software programmer or team of programmers. We are looking for people who have made a substantial, innovative contribution to the personal computer community in commercial, shareware, or public-domain software.

The award was established in 1986 by PCW Communications to commemorate Fluegelman's contributions to the software field. Fluegelman developed PC-Talk, the first easy-to-use and powerful communications program for the IBM PC. His concept of freeware remains one of the most innovative means of sharing and marketing software. Fluegelman died in July 1985, and a fund was established in his name. The annual award, sponsored by PCW Communications and the Software Publishers Association, is made possible through the Andrew Fluegelman Fund.

## ELIGIBILITY

Any commercial, shareware, or public-domain personal computer software—including utilities, applications, and languages—developed by an individual or a team is eligible. The program must have been released between January 1, 1985, and December 31, 1988. Nominations can be submitted by anyone who did not participate in the software's development. Companies are encouraged to submit nominations for software that they market; but only individuals, not companies, are to be nominated.

## JUDGING

Each program will be evaluated according to the following criteria:

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The award recipient is selected in a two-step procedure. First, an independent screening committee will review nominations and select the finalists.

Second, a panel of judges will evaluate the work of the finalists. From these, an award recipient will be selected.

## PROGRAM COPIES

Finalists will be asked to submit six copies of their program for the judges' evaluation. These will be returned after judging. Please do not send programs until you are notified that you are a finalist.

## PRIZE

The award winner will receive \$5000 and a commemorative plaque. The award will be presented at the Software Publishers Association annual awards dinner in March 1989.

**1989 Andrew Fluegelman Award Nomination Form.** Please type your entries; no handwritten entries will be accepted. Attach additional pages with a brief description of program (100 words or less!) and the reason for your nomination.

## DEADLINE

Nomination entries must be postmarked no later than February 1, 1989. Mail six completed copies of this nomination form to:  
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San Francisco, CA 94107  
For further information,  
please call (415) 546-7722.

Name of program: \_\_\_\_\_ Creator (if more than one, designate team leader): \_\_\_\_\_

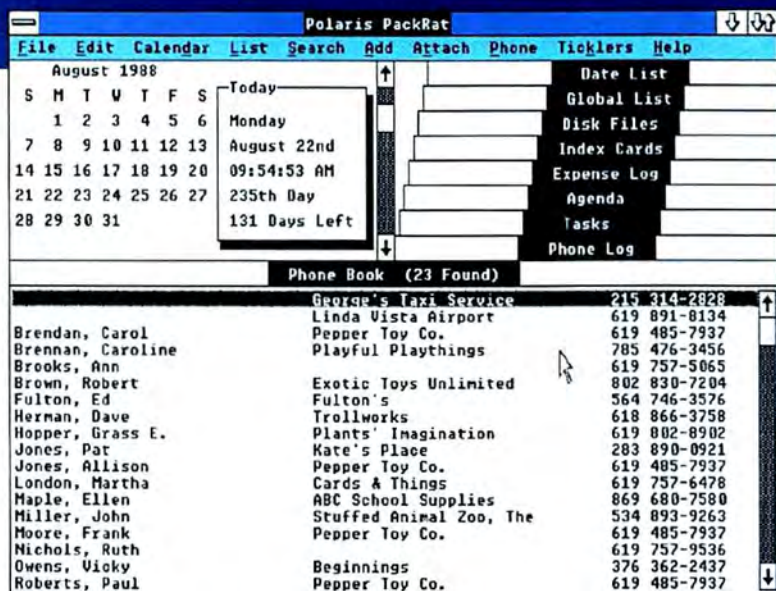
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**Michael Harper  
and  
Marlene Nesary**

### On-Line Savvy



**Alfred Glossbrenner's Master Guide to CompuServe**  
Alfred Glossbrenner  
Brady/Prentice Hall Press, New York,  
1987  
432 pages  
\$19.95 softcover

Alfred Glossbrenner is a walking encyclopedia of PC communications know-how. His 12th book, *Master Guide to CompuServe*, provides a comprehensive survey of this granddaddy of general-interest information and communications services. Whatever your primary concern—investment information, games, electronic conferencing, research—the *Master Guide* can help you hack a path through CompuServe menus and commands.

Fully one-third of the *Master Guide* is devoted to accessing and using the wealth of business and financial information available on CompuServe, which Glossbrenner claims is second only to Dow Jones News/Retrieval in this realm. "There's so much valuable material scattered through the system," he writes, "that it's easy to miss out if you don't have a plan of attack." Gloss-

brenner has one, and he gives a hands-on demonstration of strategies for exploiting CompuServe's business news, information, expert advice, and tips.

His densely packed pages reveal lots of consumer savvy, too. For example, getting the name and address of a company through one CompuServe data base, Disclosure II, will cost you \$2.30, but you can obtain it for a mere two bits using Standard & Poor's data base.

Retrieving information from this well-organized guide is often a delight. Glossbrenner's discussion of the on-line *Academic American Encyclopedia* notes that the service "is enormously popular among elementary and high school students....the AAE makes it easy to research a topic in the detail acceptable at the elementary and secondary level ...and to quote key passages without the need to retype anything."

Spend a little time reading Glossbrenner's book and you're likely to save big bucks on connect time. Browsing also has its rewards, since it points out services you may not be aware of. Whether you already subscribe to CompuServe or are just considering it, you'll appreciate Glossbrenner's inside tips.

*(continues)*

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## Bossing Brains



### Peopleware: Productive Projects and Teams

Tom DeMarco and Timothy Lister  
Dorset House, New York, 1987  
188 pages  
\$23 softcover

If you hire people for their brains, you can't treat them like modular components and expect an able, creative crew to emerge. That's the basic message in *Peopleware: Productive Projects and Teams*, a cogent little book written by Tom DeMarco and Timothy Lister, two consultants whose specialty is "knowledge worker" productivity.

Between them the two authors have over 30 years' experience with such companies as American Express and Hewlett-Packard. They use this experience to describe the "puzzle of keeping good people," and the intriguing, sometimes exasperating process of team building.

DeMarco and Lister tell a subtle story to illustrate the all-important jelling process: Workers assigned to a new project are invited to a preproject get-together at the manager's home, where they wind up pitching in with everything from shopping to dishwashing at an apparently impromptu spaghetti dinner.

"Nobody takes charge.... There is some talk of making a clam sauce, and when nobody's opposed, two of your new mates begin to talk out the details.... Your boss gives no direction, but she pitches in to chop onions when someone suggests that's

what's needed.... Gradually a dinner comes together."

What does this laid-back style have to do with the bottom line? Everything, say DeMarco and Lister. "You have to look twice to see the manager's hand in any of this...but you've just had your first success as a group. Success breeds success, and productive harmony breeds more productive harmony."

Though a spaghetti dinner might not cost the company anything, some of DeMarco and Lister's recommendations will. They've studied the correlations between productivity and environment for ten years, and make a strong case for large, quiet offices. "Police-mentality planners design workplaces the way they would design prisons: optimized for containment at minimal cost." This is false economy, argue the authors. "As long as workers are crowded into noisy, sterile, disruptive spaces, it's not worth improving anything *but* the workplace."

If your firm can't afford larger premises, at least it can ensure more worker privacy by providing "a quiet little cubbyhole with two large folding tables and a door that shuts," instead of an "EZ-Whammo Modular Cubicle with seventy-three plastic appurtenances." Quiet can be secured by deep-sixing the electronic paging system and doing something about the phones. (Their tip: stuff the bells with tissue.)

*Peopleware* is fun to read because the authors illustrate their analyses and solutions with war stories drawn from their consulting experience. But this well-researched book is also persuasive because its advice is backed up by firm scholarship. —M. H. (continues)



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## BOOKS IN BRIEF

There's only one LaserJet bible, and now it's been updated. Written by Ted Nace and Michael Gardner, *LaserJet Unlimited, Edition II*, covers everything from LaserJet origin myths to running the LaserJet with a Mac. Along the way you'll learn how to speak in tongues (the arcane printer control language); compress print time using memory cards and PostScript controllers; find, download, and use fonts; and run the LaserJet effectively with the latest word processing, spreadsheet, data base, and desktop publishing software. Make this bargain book your first LaserJet add-on. \$24.95, Peachpit Press, Berkeley, California, 1988; 512 pages, softcover.

Word guru Peter Rinearson has a new offering. A palm-size, action-oriented guide to version 4.0, *Microsoft Word for the IBM PC* is organized by task rather than by command or menu structure—a boon for those (not us, of course) who forget command names or the menu location of esoteric operations. Concise paragraphs explain tasks both simple and complex. You'll find useful directions for creating multiple columns, sorting paragraphs, merging master and data documents—even quitting Word. Especially handy are the appendix's short command summaries for entering and editing text and for moving around within a document. It's well worth the \$5.95. Microsoft Press, Redmond, Washington, 1988; 122 pages, softcover. —M. N. ●

Michael Harper teaches English at Scripps College in Claremont, California. Marlene Nesary is an assistant editor for PC World.

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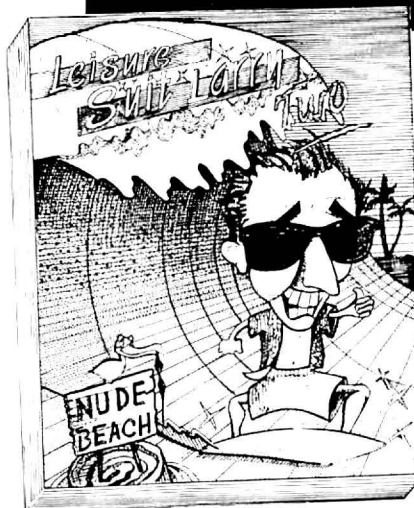
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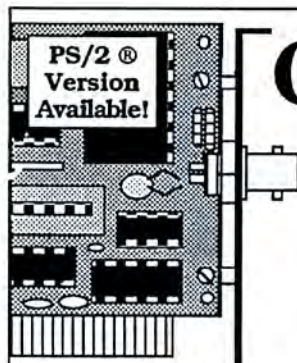
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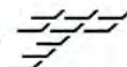
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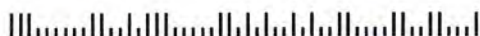
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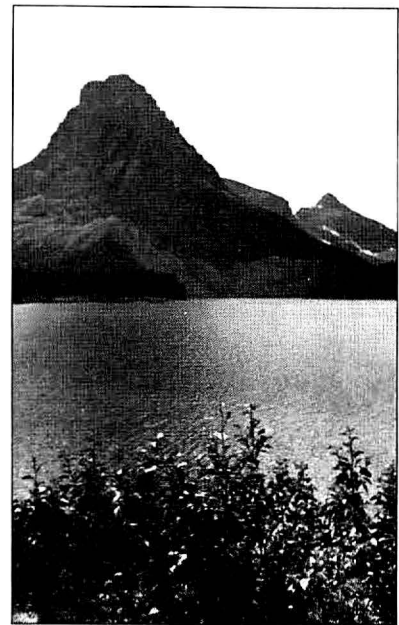
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# Management Reading List: Wall Street Journal, Fortune and PC World.



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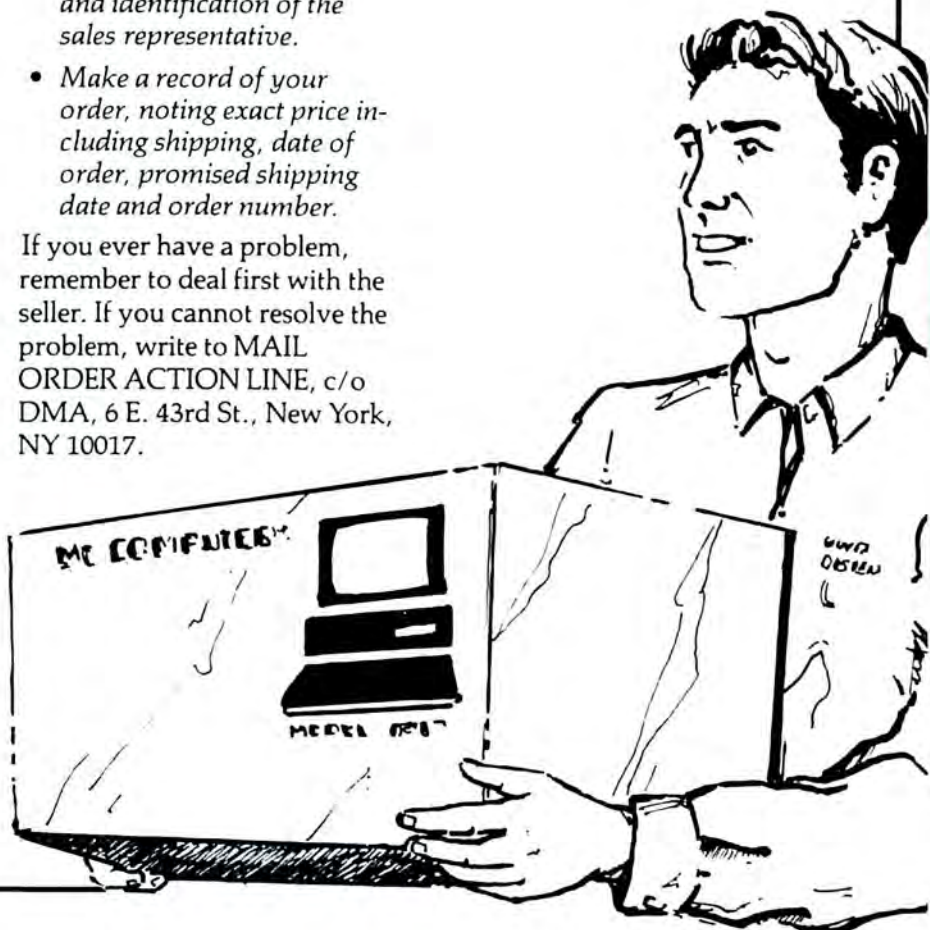
- State as completely and accurately as you can what merchandise you want including brand name, model number, catalog number.
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- Obtain an order number and identification of the sales representative.
- Make a record of your order, noting exact price including shipping, date of order, promised shipping date and order number.

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Model 50-30	\$2,949
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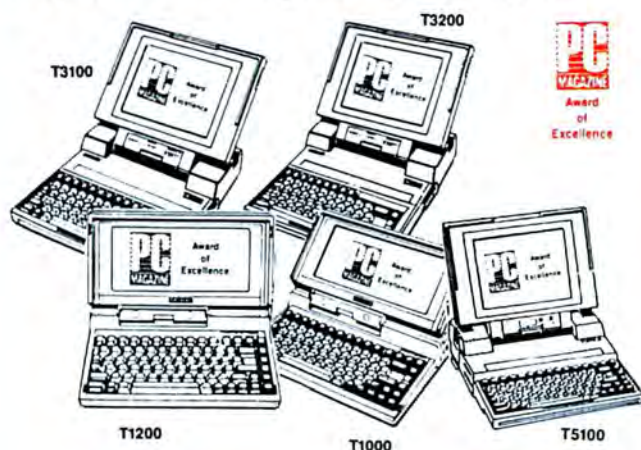
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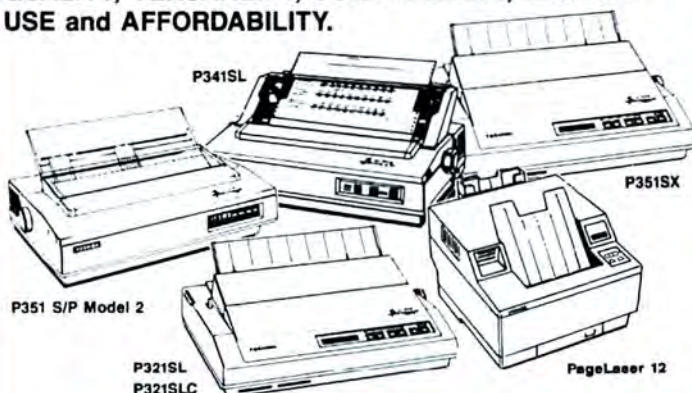
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Everex 1200/2400 Int.	\$79/\$147
Everex 2400 External	\$279
Hayes 1200	\$279
Hayes 1200B Alone	\$244
Hayes 1200B w/Software	\$279
Hayes 2400 ext	\$409
Hayes 2400B Int.	\$377
Hayes 2400B w/software	\$419
US Robotics 2400 Int	\$149
US Robotics 2400 ext	\$162
US Robotics 1200 Int	\$84
US Robotics 1200 ext	\$98
US Robotics Cour. 2400	\$279
US Robotics HST 9600	\$625
2400 Internal IBM PSII	\$199

### FAX MACHINES

Sharp FO-300	\$1219
Sharp FO-420	\$1339

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## TOSHIBA Printers



These 24 pin models are loaded with features and are priced right. You can select multiple fonts and pitches right from the menu-driven front control panel. With paper parking, you can insert a single sheet without removing the continuous form paper. All this and multiple emulations with no dip switches.

**P321SL Narrow \$459**  
**P341SL Wide \$629**

## HARDWARE

### PRINTERS

Citizen	LIST	FAST
120D	229	145
180D	259	165
MSP40-55		Call
Tribute 124	699	449
Tribute 224	949	599
Diconix		
150P	499	299
Epson		Call
Fujitsu		
DL3400	995	549
NEC		
P2200	569	339
P5200	799	509
P5300	1049	669
P5XL	1295	Call
LC890	4799	Call
Okidata		
182 Plus	319	219
292 (Req. Interface)	539	349
320	499	329
390	699	469
393 (Req. Interface)	1399	915
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	185
KXP1592	699	389
KXP1595	749	419
KXP1524	949	519
Star		
NX1000	289	169
NX2400	499	339
NB2410	699	449
Toshiba		
P321SL	749	459
P341SL	999	629
P351SX	1499	929

### BOARDS

AST	LIST	FAST
Hot Shot 286	645	339
Six Pak Plus 64K	210	119
Everex		
1200B Int Modem	149	73
2400B Int Modem	249	149
Genoa		
Super EGA Hi-Res+	399	175
Super VGA #5100	445	239
VGA Hi-Res #5200	645	359
Hercules		
Graphic Card +	299	169
Intel		
8087-2	250	149
80287-8	410	239
80287-10	480	269
Above Board 286	645	Call
Orchid		
VGA	399	229
Designer VGA	545	299
Tiny Turbo 286	445	269
Twin Turbo 12mhz	645	369
Paradise		
Basic EGA	199	Call
Autoswitch 480	349	169
VGA Plus	399	259
VGA Professional	599	369
5 Pack OK	129	59
Practical Peripherals		
1200B Int Modem	99	65
2400B Int Modem	199	149
Prometheus		
Promodem 2400B	199	129
Promodem 2400G	249	159

### The Complete PC

Answering Machine	349	219
Fax	499	319
Hand Scanner	249	159
USRobotics		
1200 Baud Internal	149	69
1200 Baud External	179	89
2400 Baud External	249	129
2400 Baud External	279	149
Video 7		
Fast Write VGA	549	335
Vega Deluxe	379	189
Vega VGA	499	259
V-RAM VGA	799	469

### LAPTOPS

Mitsubishi		
MP-286L Dual	3195	1879
MP-286L 20mb	4595	2449
NEC		
Multispeed EL II	2295	1449
Multispeed HD	3695	2249
Sharp		Call
Toshiba		
T1000	1249	749
T1200F	2099	1369
T1200FB Backlit	2399	1499
T1200H	3499	2199
T1200HB Backlit	3599	2399
T3200	5799	3695
T5100	7499	4595
Zenith		
SuperSport Dual	2399	1599
SuperSport 20mb	3599	2399
SuperSport 286	4999	Call

### MONITORS

Amdek	LIST	FAST
1280	999	669
210A	129	89
310A Limited Offer!	230	75
Magnavox		Call
Mitsubishi		
1409 RGB	399	259
1410 EGA	599	399
Diamond Scan 1381	799	489
NEC		
Multisync II	899	575
Multisync GS	279	189
Multisync Plus	1399	869
Princeton		
Max15	389	Call
Ulttrasync	849	479
Sony		
1302 Multiscan	995	659
1303 Multiscan	825	499
Zenith 1490	999	599

### DISK DRIVES

Miniscribe		
40MB AT #3650	499	319
Mitsubishi		
40MB AT MR535 22ms	825	399
Seagate		
20MB XT Kit #225	599	267
30MB XT Kit #238	699	287
30MB AT #138	599	299
40MB AT #251	899	349
80MB AT #4096	1199	599
Toshiba		
360K Floppy	119	77
720K 3.5" Floppy	149	87
1.2MB 5.25" Floppy	149	87

**Call On Non-Listed Items**

## SOFTWARE

### Database

Clipper	LIST	FAST
DataEase	600	379
dBase III+	699	359
dBXL Diamond	199	105
Foxbase Plus	395	185
Paradox	725	399
Quartz	795	449
RapidFile	295	179
Rbase for DOS	700	419
Reflex	150	84
Q & A	349	179
Desktop Publishing		
Byline	295	175
GEM Desktop Pub.	299	169
Pagemaker 3.0	795	Call
PFS:First Publisher	129	69
Publisher's Paintbrush	285	149
Ventura 2.0	895	459
Financial		
Bedford Integr. Acct.	249	149
BPI	Call	Call
Computer Associates		
DAC 3.0	99	59
DAC Payroll 3.0	99	59
Dollars & Sense	179	99
In-House Accountant	199	109
Managing Your Money	199	117
Peachtree Complete II	199	149

### Graphics

Boeing Graph	LIST	FAST
Deluxe Paint II	395	199
Draw Applause	105	67
Freelance Plus	495	269
GEM Draw Plus	495	Call
Generic CADD	299	165
Graph Plus	99	49
Harvard Graphics	495	299
PrintMaster Plus	60	Call
Integrated		
First Choice	159	85
Works	149	89
Windows 286	195	59
Windows 386	195	117
Mice		
Logitech C7 Serial/Bus	119	65
Logitech HiRes Bus	150	83
Microsoft Serial/Bus	150	95
Microsoft W/ Windows	200	129
PC Mouse II Serial/Bus	149	84
Power Protection		
Curtis Ruby Plus	115	59
Datashield 85	90	50
Datashield 100	99	57
Isobar 4-6	80	42

### Programming

Macro Assembler	LIST	FAST
Norton Guides (Specify)	150	89
Turbo Basic	100	58
Turbo C 2.0 New!	99	58
Turbo Pascal 5.0 New!	149	87
Quick Basic	149	87
Quick C	99	59
Quick C	99	59
Spreadsheets		
Excel	495	Call
Lotus	495	Call
Lucid 3-D	149	79
Plan Perfect	395	189
Quattro	248	139
Worksheet Utilities	100	55
Utilities		
CoreFast	149	87
Desklink	170	95
Desqview	130	73
Fastback Plus	189	87
Formtool	95	54
Laplink Plus	140	77
Norton Advanced	149	74
PC Tools Deluxe	80	36
Sidekick Plus	195	119
XTree	70	34

### Word Processors

Easy Extra	LIST	FAST
GEM First Word Plus	99	55
Grammatik III	199	117
Manuscript	89	49
Multimate Adv. II	495	Call
Professional Write	565	247
Rightwriter	199	105
Sprint	95	49
Q & A Write	195	119
Webster's Writer	199	119
Word	60	47
Word Perfect	450	Call
Word Perfect Library	495	Call
WordStar Prof. 5.0	129	59
XyWrite III Plus	495	219
XyWrite III Plus	445	299

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Stanford Diehl  
BYTE Magazine, Oct.  
1988, Review of 20 386 Machines

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## HARDWARE

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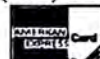
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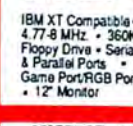
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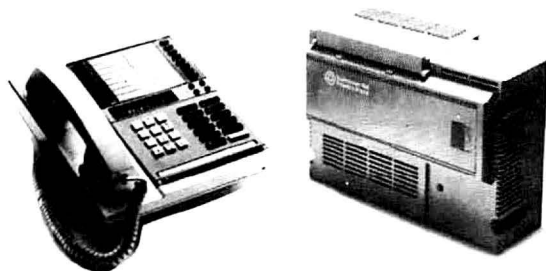
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AT 386 w/BIOS, 16MHz ..... 1499.

### HARDWARE

**AST Research**  
Xtormer/286, 512K, 10MHz ..... 699.  
Advantage 2/286, mod. 80, 1Mb ..... 725.  
Advantage 2/286, PS/2, OK ..... 389.  
Advantage Premium 286, 512K ..... 389.  
Rampage 2/286, PS/2, 512K ..... 489.  
Rampage 286, 512K ..... 489.  
AST Sasepak, OK ..... 119.

### ATI Technologies

EGA Wonder 800 ..... 199.  
VGA VIP ..... 319.  
2400cvt. int. Modem w/MNP-5 ..... 189.

### GENOA

Super EGA ..... 199.  
Super VGA ..... 299.

### GULFSTREAM

ET-FAX Board w/software ..... 1189.  
HERULES  
Color Card/ CGA ..... 149.  
Graphics Card Plus ..... 174.

### INTEL

Inboard 386/PC to 386 ..... 975.  
Inboard 386/AT to 386 ..... 1059.  
Above Board 2 PS/2 mod/5060 ..... 299.  
Above Board 286 AT 512K ..... 329.  
Above Board PS/286, model 30 ..... 349.

### 8087 (5MHz)

8087-1 (10MHz) PS/2 ..... 102.  
8087-2 (5MHz) ..... 158.  
8087-6 (5MHz) ..... 185.  
8087-8 (5MHz) ..... 309.  
8087-10 (10MHz) ..... 309.  
8087-16 (16MHz) ..... 549.  
8087-20 (20MHz) ..... 799.

### ORCHID Technology

Any Turbo 286 REDUCED! ..... 289.  
Designer VGA Board ..... 299.  
RAMQUEST 50/PS2, 2Mb ..... 699.

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Autoswitch 480 ..... 199.  
VGA Plus ..... 299.

### QUADRAM

Quad386XT ..... 747.  
Prosync/2400/752x410 ..... 269.  
Microtizer/1 buffer w/4K ..... 239.  
Quadsprint XT accelerator ..... 98.  
Liberty EMS XT card, OK ..... 98.  
Silver Quadboard, Sixpak comp. .... 98.

### VIDEON 7

VEGA Deluxe ..... 199.  
VEGA VGA ..... 299.

### INPUT DEVICES

**Advanced PC Keyboards**  
5160 84key XT/AT switchable ..... 59.  
5161 101key XT/AT switchable ..... 79.

### CH Products

Mail II Joystick/IBM ..... 39.  
Mail II Joystick/Apple ..... 39.

### Mach III Joystick/IBM

Mach III Joystick/Apple ..... 39.  
Gamecard III ..... 39.

### KEYTRONICS

KB101 101key/AT ..... 89.  
KB151 84key deluxe ..... 119.

### KRAFT

IBM PC/XT/AT Joystick ..... 33.  
Mouse PC/XT/AT serial ..... 89.

### LIGHTGATE

Felix for PC/XT/AT ..... 159.

### LOGITECH

Bus Mouse w/PC/XT/AT ..... 99.  
Serial Mouse PC/XT/AT ..... 99.  
Serial Mouse PS/2 ..... 99.

### MICROSOFT

Bus Mouse w/PC Paintbrush ..... 105.  
Serial Mouse w/PC Paintbrush ..... 105.  
Serial PS/2 w/PC Paintbrush ..... 118.

### MSX Technologies

PC Mouse serial PC/XT/AT ..... 98.  
PC Mouse serial PC/XT/AT ..... 98.  
PC Mouse serial PC/XT/AT ..... 98.

### SUMMAGRAPHICS

SummaSketch ..... 449.

### FLOPPY DISK DRIVES

**SONY**  
312MB Floppy 1.44Mb ..... 149.

### TEAC

555B 360K Floppy/PC/XT/AT ..... 89.

### TOSHIBA AMERICA

FD4403 31/2" Micro 760K ..... 129.  
31/2" Micro 1.44Mb w/kt ..... 139.  
ND04B 360K Floppy/PC/XT ..... 84.  
ND04E 360K Floppy AT gray ..... 84.  
ND04E 360K Floppy AT gray ..... 110.

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### MINISCRIBE

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685B 65Mb Full ht., 28ms ..... 849.  
8438 38Mb Half ht., 65ms RLL ..... 299.

### PLUS Development

Plus20 Hardcard, 20Mb, 49ms ..... 549.  
Plus40 Hardcard, 40Mb, 39ms ..... 719.

### SEAGATE

ST1225 25Mb, 65ms, w/WD RLL ..... 299.  
ST1338 38Mb New! 31/2" ..... call.  
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ST1551 51Mb 40ms ..... 449.  
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ST1096 96Mb 25ms w/WD RLL ..... 799.

### WESTERN DIGITAL

Filecard PS30 PS/2 mod 25/30 ..... 389.  
Filecard30 ..... 449.  
100GRAH Contr. 1:1 interface ..... 199.  
1003RAH Controller RLL/AT ..... 187.  
1003RAH Controller PS/2 ..... 149.  
1002-27X Controller RLL/XT ..... 98.  
1002-WX1 Controller XT ..... 89.

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### IOEGA

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Bernoulli dual20Mb 51/4" ext ..... 1699.  
Bernoulli dual20Mb 8" ext ..... 1895.  
Tri-pak 20Mb cartridge 51/4" ..... 189.  
Tri-pak 20Mb cartridge 5" ..... 255.  
PC38 Adapter card PC/XT/AT ..... 189.  
PS4 Adapter/PS/2 mod 50, 80 ..... 299.

### IRWIN

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1200 XT 20Mb backup(int) ..... 369.  
1400 XT 40Mb backup(int) ..... 499.  
2459 PS/2 40Mb backup ..... 479.

### TALLGRASS Technologies

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1040 AT 40Mb backup(int) ..... 599.  
1040 XT 40Mb backup(int) ..... 599.

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### Advanced 286 Clones w/OK

Advanced286/16base system ..... 849.  
Advanced286/16 w/20Mb ..... 1099.  
Advanced286/16 w/40Mb ..... 1099.

### Advanced XT Clones w/OK

AdvancedXT base system ..... 489.  
AdvancedMX/XT w/memo/20Mb ..... 999.  
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Premium Workstation ..... 2195.  
Premium386 Model340, 40Mb ..... 4699.

### COMPAG

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Desktop386 Model 40 ..... call.  
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### NEC

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### TOSHIBA

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11000 Laptop, dual floppy ..... 1499.  
11300 Laptop 286, 20Mb ..... 2995.  
13200 286 full keybd, 40Mb ..... 3995.  
T5100 386, EGA, 40Mb ..... 4995.

### NETWORKS

### 3COM

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Ethernet II card ..... 399.

### WESTERN DIGITAL

StarLAN/Novell starter kit (network for less than \$400) ..... 1077.  
Ethernet Plus adapter board ..... 239.  
VitalLink LAN software ..... 120.  
StarHub ..... 329.

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**Advanced MODEMS**  
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1200baud External ..... 89.  
1200baud Pocket MODEM ..... 99.  
2400baud w/software(int) ..... 120.  
2400baud External ..... 159.

### HAYES

Smartmodem 1200B w/sw(int) ..... 299.  
Smartmodem 1200 External ..... 449.  
Smartmodem 2400B w/sw(int) ..... 299.  
Smartmodem 2400 External ..... 449.

### MIGENT

Pocket Modem 1200 ..... 127.

### PROMETHEUS

2400C External ..... 199.  
2400B/2 w/software(int) ..... 149.  
2400PS PS/2 w/software(int) ..... 299.  
1200B/2 w/software(int) sale! ..... 79.

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**AMDEK**  
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140A 12" amber grn or white ..... 153.  
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LaserDrive CD ROM/MX/MS soft ..... 899.

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### NEC

MultiSync II 13" TTL/Analog ..... 595.  
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Monograph sys (1024x1024) ..... 1555.

### SAMSUNG/LTI

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Mono 14" color TTL ..... 88.  
EGA 14" RGB ..... 289.  
EGA 14" EGA/EGA Color ..... 395.

### SONY

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CPD1303 13" EGA ..... 569.

### WYSE

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WY501 14" terminal ..... 419.  
WY60 14" terminal ASCII ..... 519.

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Proprinter X24, 240cps 24pin ..... 635.  
Proprinter XL24, 240cps 24pin ..... 835.

### NEC

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P655XL Color, 100cps/24pin ..... 1095.  
P650 Pinwriter, 65cps/24pin ..... 599.  
LC890 Silentwriter/Laser ..... 3395.

### OKIDATA

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ML182, parallel ..... 245.  
ML182, parallel quality ..... 319.  
ML183, parallel ..... 469.  
Laserline 6 (req IBM int.) ..... 1399.

### PANASONIC

KX-P1080, 160cps draft/pr ..... 185.  
KX-P1081, 192cps draft/pr ..... 198.  
KX-P1082, 240cps draft, 132 ..... 339.  
KX-P1524, 24pin, 80cps/24pin ..... 595.

### SEIKOSHA

SL80A1 24pin ..... 366.  
SL130A1, 24pin ..... 749.  
SBP10A1, 16pin, 800cps ..... 3299.  
SK300A1, 9pin, 300cps/s.p ..... 399.  
SK300A1, 9pin, 300cps, 132 ..... 499.

### TOSHIBA

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P341SL, 24pin, 216cps ..... 699.  
P351SX (color add \$179) ..... 1099.  
PageLaser 12, High volume ..... call.

### PLOTTERS

**HOUSTON INSTRUMENTS**  
DMP41 31/2" ..... 2399.  
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SCA10A0 ..... 2499.  
DMP56A ..... 4399.

### ROLAND

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DXY980 ..... 1488.

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**COMPUTER ACCESSORIES**  
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P25 4 outlet stand alone ..... 62.  
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A200 PC Data Display Module ..... 888.

### KENSINGTON

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Masterpiece Plus ..... 108.  
System Saver II ..... 69.

### System Saver I/II

Printer Muffler, 80column ..... 119.  
Printer Muffler, 80column ..... 39.

### MICROCOM ACCESSORIES

51/4" Rolltop Diskette File ..... 29.  
31/2" Rolltop Diskette File ..... 22.  
PC Vacuum Cleaner ..... 39.  
GRT Valet (12x12) ..... 119.  
Underside Keyboard Drawer ..... 49.

### FLIP N' FILE

FNF MiniXT 500 51/4" smoke ..... 10.  
FNF MicroXT 100 31/2" smoke ..... 11.  
FNF Maxi 50 8", smoke ..... 15.  
FNF Micro 25 31/2" smoke ..... 8.  
Universal Printer Stand ..... 9.

### DISKETTES-lifetime warranty

5 1/4" DS/DD Diskettes PC/XT/386/680 ..... 11.  
Maxell MD2-D ..... 11.  
Verbatim Datafile DS/DD ..... 12.  
Fujii MD2D ..... 11.  
Advanced Color w/plastic box ..... 8.  
5 1/4" DS/DD High Density AT/1 2Mb ..... 23.  
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Verbatim DatafileHD ..... 23.  
Fujii MD2HD ..... 22.

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Maxell ..... 49.  
Verbatim Datafile ..... 49.  
Fujii ..... 49.  
Sony ..... 49.

### PRINTER BUFFERS

Advanced 64K buffer ..... 129.  
Advanced 64K buffer ..... 169.

### SWITCH BOARDS

Advanced 2-position AB, 3636 ..... 29.  
Advanced 2-position AB, 2525 ..... 29.  
Advanced parallel converter ..... 69.  
Advanced serial converter ..... 69.  
BuffaloSX (up to 7) ..... 499.  
Logical Connection 256K ..... 499.

### INTELLICOM

Longlink-Parallel ..... 199.  
Longlink-Serial ..... 199.  
QuickLink-Par to Ser-64K ..... 149.  
QuickLink-Par to Par-64K ..... 149.  
QuickLink-Par-Buf-Par to Ser ..... 299.

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DESKPRO 286 W/40MB	\$2,499.00
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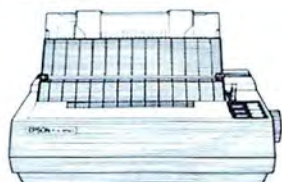
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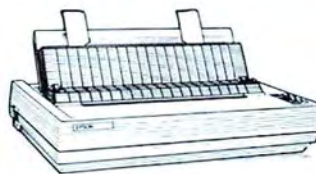
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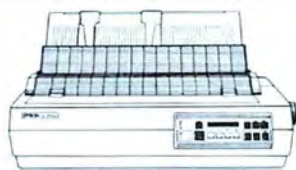
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- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
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FH	Seagate ST4096	28ms	80MB	<b>\$599</b>
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with MNP

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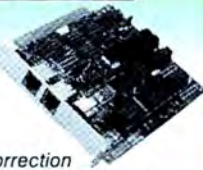
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### Scottsdale Systems 386

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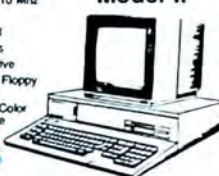
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## Panasonic

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## Monitors

## Monitors

## Modems

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### Magnavox:

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7BM-613	\$79.95
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CM8505	\$199.95
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CM8762	\$239.95
8CM-515	\$259.95
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8CM-873	\$499.95

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ND-356T 3 1/2" 1.44MB	\$129.95

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1200i PC Card	\$65.95
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2400	\$149.95
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Smartmodem 2400	\$419.95

### US ROBOTICS:

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## Plain English, Please



Joan Hope

I belong to no PC user group, subscribe to no computer publications, and can never remember how to pronounce "DOS." I know how to turn on my PC, run my word processing program, make copies of my files, and turn off the PC. In other words, I am a typical PC user.

As a college English teacher and graduate student, I use my PC almost exclusively for word processing. It has changed my whole approach to writing and drastically improved the final product. But it saves me neither paper nor time, because I make many more drafts than I would using a typewriter and still make revisions in longhand.

The other academics and writers I know are no different. PCs have become as indispensable to us as our dictionaries, but since we use them for only a few specific tasks, there's no reason to keep up with PC technology, much less the latest jargon. We have a tough time getting along in a world of computer jocks who flash the latest buzzword like a membership badge. Computer product instructions (when there are any) are written for insiders.

The PC I bought two years ago came without assembly instructions. After putting all the components where I thought they belonged, I discovered that

I didn't know how to plug the thing in (yes, this is a true story). A friend—a Ph.D. candidate in computer science—helped me figure out that the power cord was missing. A simple parts list and assembly diagram would have saved me an hour of frustration. Fortunately, that same friend installed DOS and configured the system for me, a favor for which I am still grateful.

Now that I am familiar with the most common commands, my DOS user's guide serves as a handy reference. But it's obviously written for people who already know the answers. I can never find the solutions to my problems and invariably end up calling friends for help. As for my GW BASIC programmer's guide, I haven't gotten past that part of the introduction that reads, "GW BASIC ... provides sophisticated string handling, structured programming features, and improved graphics." I know what "improved graphics" means—I think.

My *WordStar Professional* manual is better, but even that has left me stranded a few times. For example, it explains how to protect and unprotect files using the opening menu, but on several occasions I've hit the wrong key and accidentally protected files while editing them. The manual doesn't tell me how

to undo the mistake while in edit mode, so I have no recourse but to exit my file and lose any changes I've made.

I suggest that computer vendors find a different kind of writer to prepare their instruction manuals. MicroPro says it chooses skilled writers who are also technically competent, but I say technical competence is a handicap. The ideal candidate is a good writer who knows little about computers and nothing about the product in question. We need documentation written by people who understand the common user's problems. Companies could simply make a technician available to answer the writer's questions while he or she focuses on translating computer gibberish into plain English. Graduate humanities programs are full of qualified candidates who could use the work. ●

*Joan Hope is a doctoral candidate in English at Indiana University at Bloomington.*

*Have a different perspective? Write Dan Lavin, user ombudsman, PC World, 501 Second St., San Francisco, CA 94107.*



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