

SPECIAL SECTION: THE BEST IN BUSINESS GRAPHICS • dBASE IV

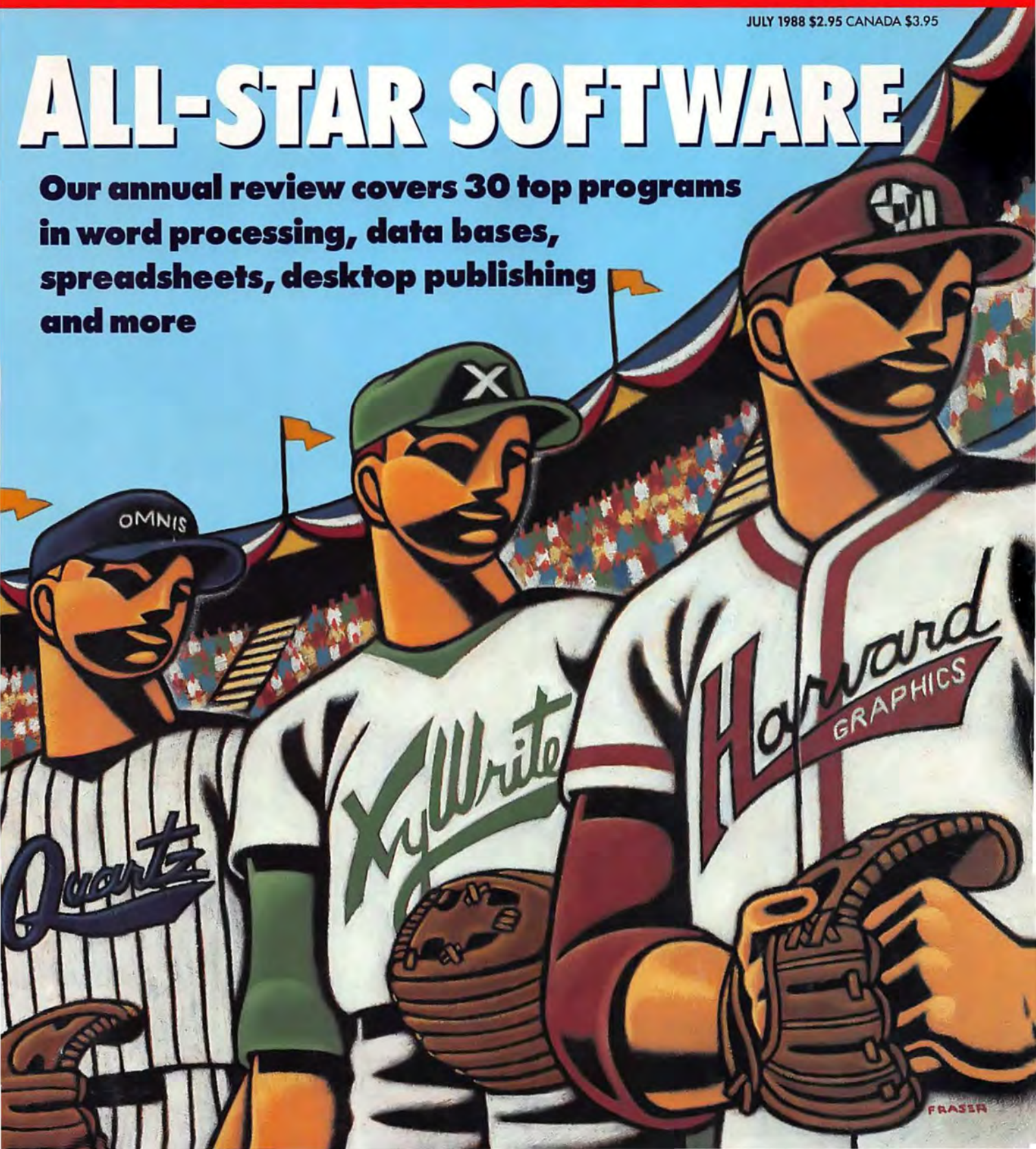
PC WORLD

THE BUSINESS MAGAZINE OF PC PRODUCTS AND SOLUTIONS

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ALL-STAR SOFTWARE

**Our annual review covers 30 top programs
in word processing, data bases,
spreadsheets, desktop publishing
and more**



FRASER

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* ”

*Customer satisfaction is our main concern. If within 60 days of purchase this product does not perform in accordance with our claims, call our customer service department, and we will arrange a refund.

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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.

Find all the items we sold for more than \$1000 and tell me who ordered them.

SALES	Stock #	Customer	Init	Street
1	111	111	111	111

PRODUCTS	Stock #	Description	Price	Quant
1	111	111	111	111

ORDER	Customer	Init	Description	Price
1	Donner	111	111	111
2	Elgeth, III	111	111	111
3	Fah	111	111	111
4	Hanner	111	111	111
5	Hanner	111	111	111
6	Mathews	111	111	111
7	Mathews	111	111	111
8	Mathews	111	111	111
9	Mathews	111	111	111
10	Mathews	111	111	111

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

Whether you're a DOS or OS/2 user, there's a Paradox version for you.



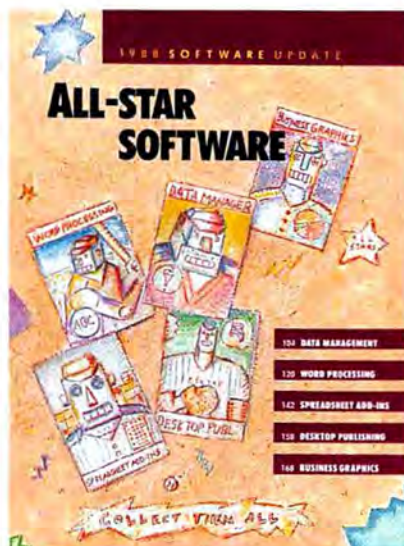
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1988 SOFTWARE UPDATE

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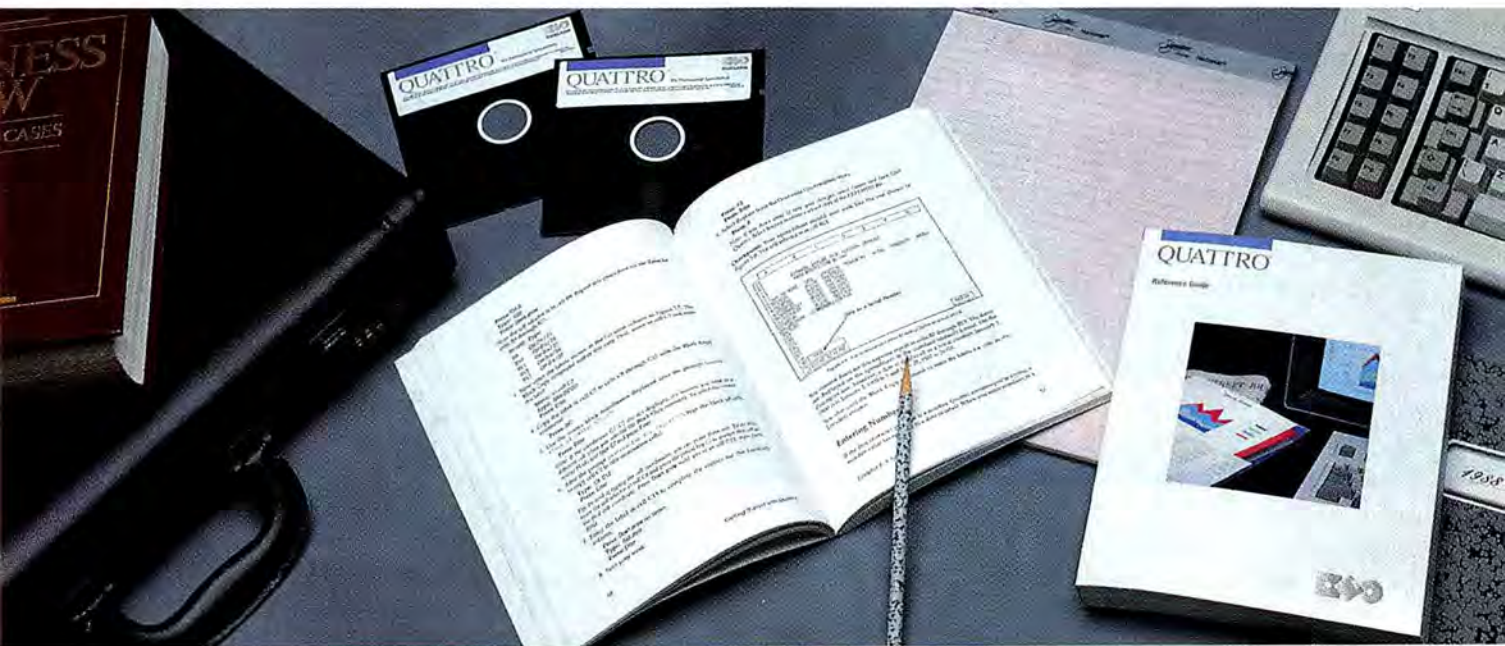
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"Those who are considering purchasing 1-2-3 will be better off with Quattro"

—John Walkenbach, InfoWorld



Here's what InfoWorld had to say about Quattro

"There are some clear advantages in choosing Quattro over the 1-2-3 of today: easier installation, no copy protection, improved speed, much better macros, excellent graphics, a customizable command interface, and direct compatibility with industry standard file formats. If cost is a factor, you can get five copies of Quattro for the same money that would buy two 1-2-3 packages."



Quattro includes SQZ!® Plus data compression

A special implementation of SQZ! Plus, the spreadsheet file compression utility, is built into Quattro and comes to you absolutely free. SQZ! Plus for Quattro automatically compacts and expands Quattro spreadsheets by up to 95% during file saving and retrieving.

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Features: Improving the industry standard

"Quattro takes the industry standard and improves upon it in the areas that count most. It addresses many of the weaknesses of 1-2-3 and adds quite a few of its own unique touches."

"Perhaps Quattro's main advantage over most other spreadsheets is its minimal recalculation capability. When you make a change in your spreadsheet, only affected cells are recalculated, greatly speeding things up in most cases."

"Other Quattro features that improve upon the 1-2-3 standard include auto-record macros, vastly superior graphics, and easy installation."



Performance: Markedly superior to 1-2-3

"Our benchmark tests show Quattro markedly superior to 1-2-3 in file saves and retrieves."

"Quattro's graphics are a sight to behold."

"Quattro makes working with macros practically painless. If you're into complex 1-2-3 macros, the debugging feature alone is good reason to make the switch to Quattro."

"No one can argue that Quattro is anything less than an excellent spreadsheet value."

Excerpts from John Walkenbach's review of Quattro in InfoWorld, January 11, 1988.

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What Makes a Special Issue Special?



JOHN HARDING

Senior Editor
Robert Luhn
(left) and
Assistant
Editor William
Rodarmor,
architects of
the 1988 Soft-
ware Update.

July is a time for barbecues, beach parties, baseball games...and *PC World's* Software Update. An odd mix? Not according to our readers, who made the July 1987 Software Update the best-selling issue in the magazine's history to that point. Thus are traditions born.

This year's special issue started with a set of rules and a wish list, courtesy of Senior Editor Robert Luhn and Assistant Editor William Rodarmor. The criteria were straightforward: Products that had recently been reviewed in *PC World* were ineligible, unless they had been significantly upgraded. As past and present editors, respectively, of *The Software Shelf*, Luhn and Rodarmor were in no danger of running short of candidates. In fact, their first list included some 160 titles.

"When it comes to software, I sometimes feel like King Canute trying to sweep back the tide," says Rodarmor. "There's always more than you can possibly cover. The trick is finding the programs that look really useful, and then putting them to the test."

Cutting that inventory down to 31 finalists in five categories involved weeks of in-depth research by a team of editors, each with his or her own specialty. Luhn, who's coordinated other special issues for the magazine (including January's Fifth Anniversary extravaganza),

likens the process to a chariot race. "Everyone's whipping their own horses in a mad rush, but they're all headed for the same place."

As you partake of the fruits of our labors, you'll discover some fascinating new products. Forward-looking users will find the first word processor for OS/2, *DisplayWrite 4/2*. Those with heavy-duty hardware can compare two data bases optimized for 386 systems, *Paradox/386* and *FoxBase +/386*, while Windows users can check out *Omnis Quartz*, a relational data manager that just might out-Mac the Mac. And for those who churn out their own publications, there's *PagePerfect*, an ambitious and eagerly awaited package that arrived just in time to lead our desktop publishing section.

This year, we've already reviewed the major spreadsheets—*Excel*, *Quattro*, and *Surpass*—so our spreadsheet section focuses on six additional programs. Half of these budget-priced 1-2-3 helpers earned a Best Buy label.

In this special issue, one section stands out: business graphics. Contributing Editor Richard Jantz reviews all six programs in our roundup and delivers a thoughtful sidebar ("Picking a Graphics Partner") as well. Jantz certainly has the qualifications. A desktop publishing consultant, he is the author of *Ventura Publisher for the IBM PC: Mastering Desktop Publishing* and a graphics software primer, *Creating the Best Impression*. We're glad he found the time to tackle this project.

Of course, there's more to life than software, which is why we've scheduled our hardware special issue for December. Till then, enjoy the Software Update. See you at the beach!

Ed Bott

Ed Bott
Managing Editor

Reflex: the database that maximizes your decision power

To get ahead in business, you must make decisions. And you must make them right... the first time. That's why you need the power of Reflex:® The Analyst. It's a no-nonsense flat-file database that stores and organizes your information. Then works like a spreadsheet for sophisticated

what-if analyses. Then shows you your information from every angle and perspective, uncovering all its hidden meanings. Then lets you move full speed ahead!

The view is up to you

Let Reflex break your data down. Turn it around. Show it off. And add it up. All with simple menus and commands that don't turn you inside out.

View your data one record at a time. Or all together in columns and rows. Create five different kinds of graphs. A numeric summary. Or a sophisticated report that makes everything fall into place. Even get a split screen that shows a form and graph at the same time. As you edit the form, your changes are instantly reflected in the graph!

Crosstabs show you the big picture

Reflex can give you a unique Crosstab view of your information—a powerful numeric summary divided into categories and displayed in a numeric summary table. Use it to pinpoint trends and relationships among the data and ask what-if questions. Your Crosstab shows Bob's average percent margin is higher than the other sales reps. Is he pushing too hard on price at the expense of volume? Quickly change the Crosstab for a second analysis, and Reflex will give you a whole new perspective.

Even generate reports for 1-2-3 and dBASE files

The Reflex Report view is a powerful report generator that can also accept files from popular applications like Lotus 1-2-3®, dBASE®, and PFS: File. Use Reflex to generate everything from mailing labels to sophisticated custom reports—it's the only report generator you need!

The Workshop's templates make it easier

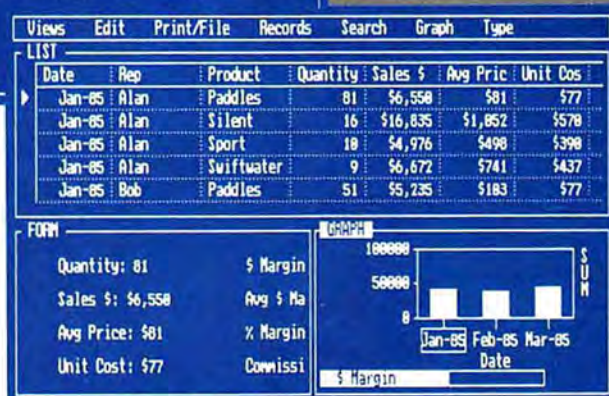
The Reflex Workshop, available separately, gives you 22 master templates for running almost any kind of business. The formats are all there; you just plug in the numbers.



	Alan	Bob	Cathy	Dave	ALL
Paddles	12.8	27.0	9.0	15.7	9.7
Silent	47.4	47.3	43.7	36.8	43.6
Sport	28.6	31.9	38.9	25.8	29.1
Swiftwater	43.0	48.5	43.7	36.7	43.0
ALL	26.6	38.7	31.8	28.4	31.4

Use the Reflex Crosstab view to get the whole picture...

...or split your Reflex screen to show several views at once—and watch your data change as you edit!



Date	Rep	Product	Quantity	Sales \$	Avg Price	Unit Cost
Jan-85	Alan	Paddles	81	\$6,558	\$81	\$77
Jan-85	Alan	Silent	16	\$16,835	\$1,052	\$578
Jan-85	Alan	Sport	18	\$4,976	\$498	\$398
Jan-85	Alan	Swiftwater	9	\$6,672	\$741	\$437
Jan-85	Bob	Paddles	51	\$5,235	\$103	\$77

Quantity: 81	\$ Margin
Sales \$: \$6,558	Avg \$ Ma
Avg Price: \$81	% Margin
Unit Cost: \$77	Commissi

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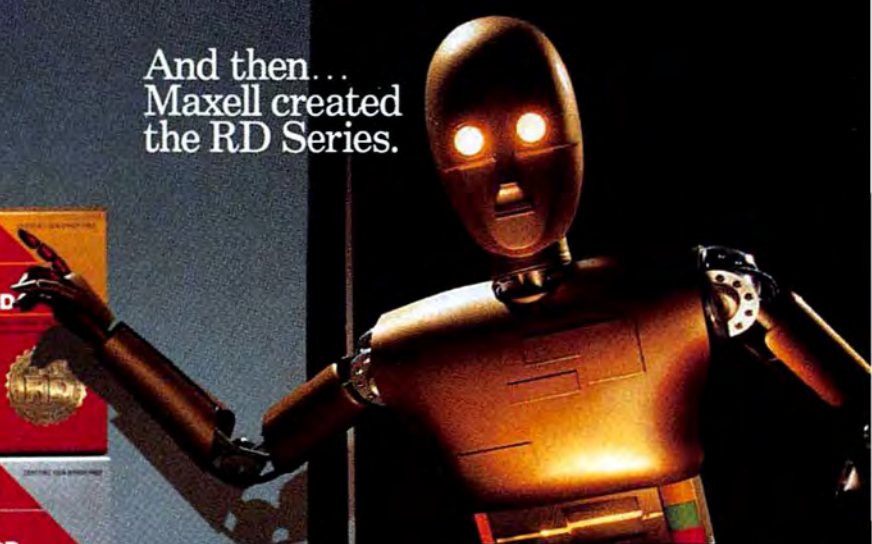
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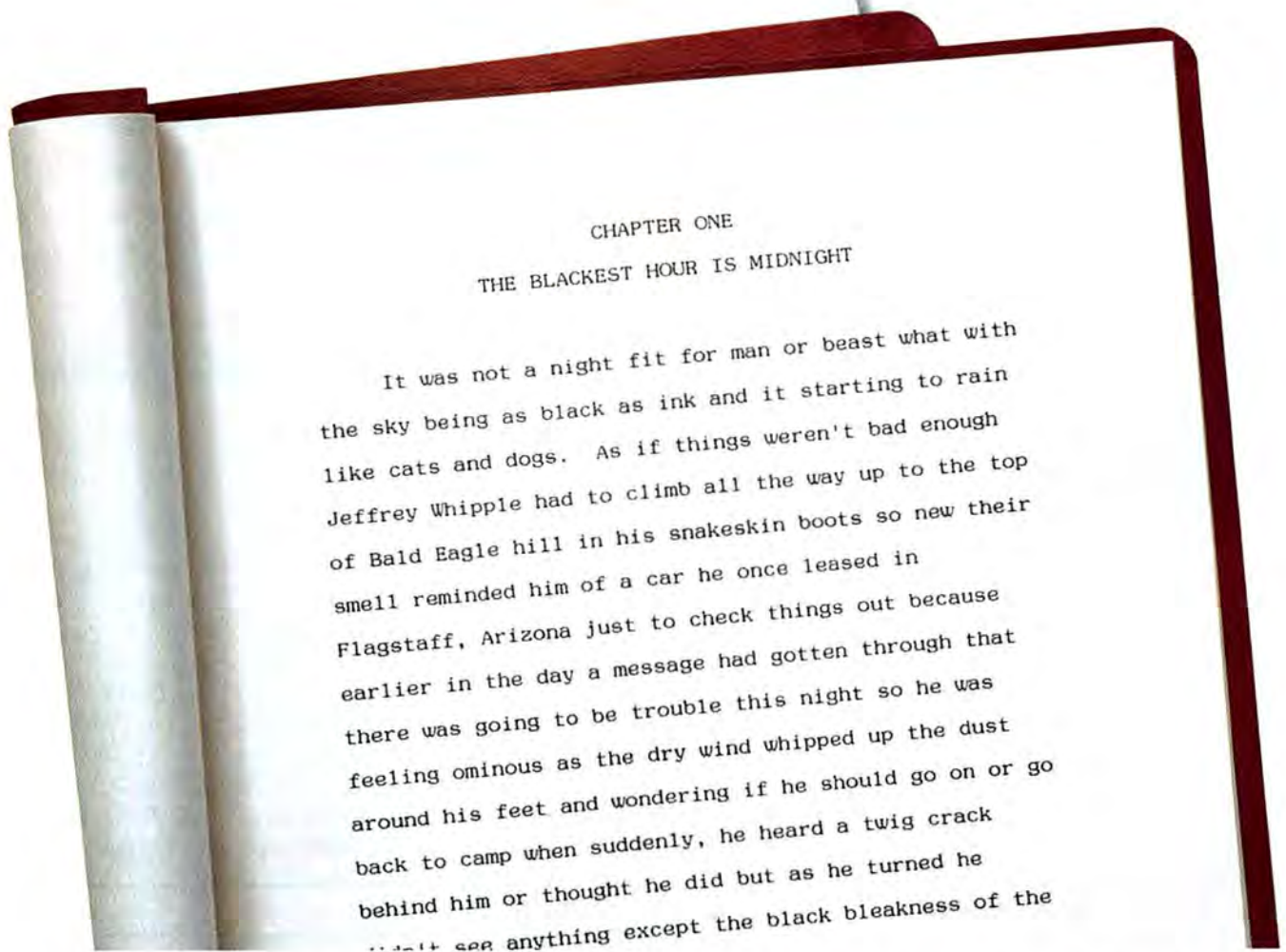
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than conventional floppy disks.
The Gold Standard has always meant maximum
safety for your data. Now it means even more.



maxell
THE GOLD STANDARD

OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.



We're sorry that our new 24-wire Pinwriter® P5200 and P5300 printers can't do much for the quality of your writing. But they can certainly do wonders for the way it looks. The secret is the ribbon. Other dot matrix printers only use a fabric ribbon. Our Pinwriters print with both a fabric and a letter-quality, multi-strike film ribbon—the same kind used on executive typewriters.

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Have you read the latest from PC Magazine about ALR's FlexCache 386?



"Even Compaq's DeskPro 386/20 eats the dust made by the ALR FlexCache 20386 as it screams down the DOS highway..."

PC Magazine, March 15, 1988

A Philosophy of Value

At Advanced Logic Research (ALR) the philosophy of getting more for your money has become a tradition. A tradition recognized by a long line of excellent reviews from all the major trade journals. FlexCache 386 Series is based on the ALR 386/220, PC Magazine's choice as "The Best of 1987". Now the fastest PCs available, the FlexCache Series approach mini-computer performance and offer you the most for your money.

FlexCache dual bus architecture separates the standard 8MHz peripheral bus from the high-speed memory bus. This permits access at the 16MHz or 20MHz CPU clock rate. By keeping frequently used data close at hand, the cache memory controller eliminates wait states 95% of the time. Since 90% of all data transfers relate to the data bus, long delays in computations disappear.

Faster Than IBM or Compaq

This innovative design allows for up to 60% faster CPU/memory data through-put than the IBM PS/2 model 80-071 with the much touted microchannel. And the FlexCache 20MHz CPU "...consistently lays down a coating of dust on Compaq's IBM-basher." -Compaq DeskPro 386/20.



Compatible

Novell, DOS 3.X,
SCO Xenix 386, OS/2

Software

Balanced System/ Fast Disk

Full track data transferring (1:1 interleave) plus ESDI look-ahead buffering, allow FlexCache 386 systems to turn what used to be a data bottleneck into a super high-speed corridor. Compaq wants you to pay \$7490 for their DeskPro 386/20 model 60 with a 60MB hard disk. But for the same price you can get ALR's FlexCache 20386 model 150 with a 150MB hard disk and 200% faster transfer rate.

Room to Grow

The minicomputer-style chassis of the FlexCache 20386 offers space for five internal devices, allowing more data storage than any other PC available.

For the name of the ALR dealer nearest you call:

1-800-366-2574



Advanced Logic Research, Inc.
10 Chrysler, Irvine, CA 92718
Phone: 714-581-6770 FAX: 714-581-9240
Telex: 510-601-4525
Answer back Advanced Logic

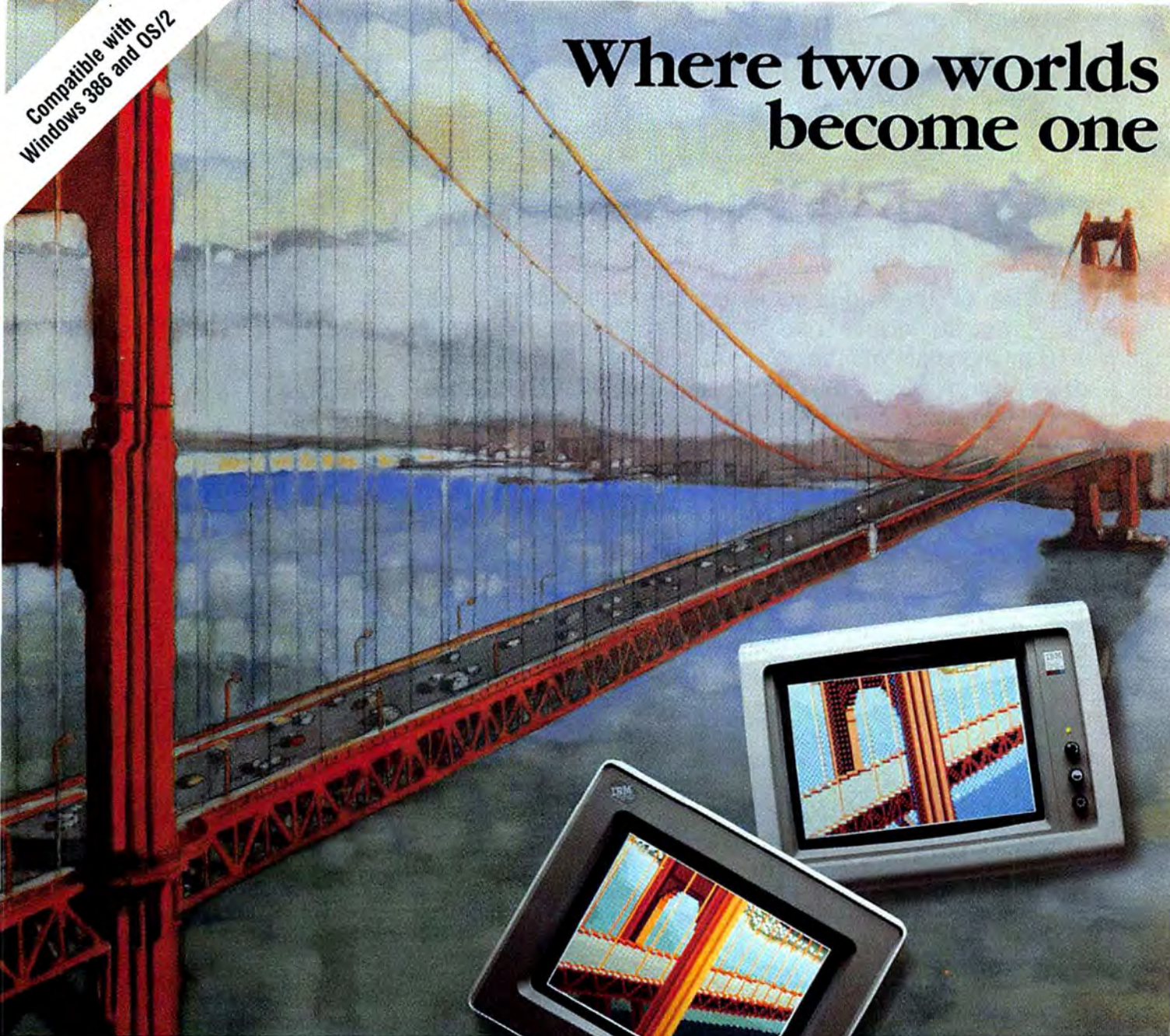
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End users: Circle 128 on reader service card

Dealers: Circle 129 on reader service card

Compatible with
Windows 386 and OS/2

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Circle 97 on reader service card

ORACLE® turns Lotus 1-2-3 into a full function database

ORACLE, the world's best selling relational database, now works from inside your Lotus 1-2-3 spreadsheet program. Familiar 1-2-3 menus guide you through creating, modifying and retrieving data in your database. You can even perform ORACLE database functions automatically using standard Lotus macros and formulas. The point is...



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For a price that's almost unbelievable, this add-in brings the full functionality of a powerful Structured Query Language (SQL) relational database-management system (DBMS) to the PC industry's most popular spreadsheet: Lotus 1-2-3...
...But perhaps the best news is that Oracle for 1-2-3 is very easy to learn and use. Anyone already familiar with 1-2-3 already knows how to use Oracle for 1-2-3.”

PC Week, April 5, 1988

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\$199* Yes, this includes the full function ORACLE database.

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ORACLE for 1-2-3 • Oracle Corporation
20 Davis Drive • Belmont, CA 94002

Yes, I have an ☒ 80286/80386 PC running ☒ DOS 3.0+ and ☒ Lotus release 2.01. I also have ☒ 640KB of RAM, plus either ☒ 1MB of extended memory or I will reassign 1MB of my expanded memory as extended memory. Please send me the database I already know how to use — the ORACLE database add-in for Lotus 1-2-3, on ☐ 5 1/4" or ☐ 3 1/2" disks. Enclosed is my: ☐ check, or ☐ VISA ☐ MasterCard ☐ American Express credit card authorization for \$199*.

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TOP OF THE NEWS

Will IBM Revamp Laptop Line?

*Paper-White
Display Model
Sells in Japan*

IBM has been selling a clamshell-style laptop in Japan that some competitors think will replace the PC Convertible on U.S. shelves. Called the Model 5535, the 10-MHz 80286-based computer comes with a paper-white display like the new Zenith TurbosPort and has been marketed since October. The 5535's double-CGA (640-by-400-pixel resolution) display, described in IBM technical literature as a backlit LCD, can display either black letters on a white background or white letters on a black background. Priced around \$4000 U.S., the 5535

ships with 1MB of memory (expandable to 2MB), a single 1.44MB 3½-inch floppy drive, and a 20MB hard disk. The 17-pound machine is equipped with a slot for a local area network adapter or modem. Other vendors speculate that IBM may introduce a Micro Channel Architecture version of the laptop, which could amount to a death notice for the poorly received PC Convertible. IBM confirmed details of the Japanese model but declined to discuss its U.S. future.

Ashton-Tate Writes New Language

*dBASE and
FRED Will Be
Merged*

Ashton-Tate plans to pull together its *dBASE* and *FRED* development languages and macro formats into a single language currently called *dCAL* (*dBASE* Cross Application Language). The hybrid language is expected to launch in October, about the same time as OS/2 Standard Edition 1.1 with the Presentation Manager, which suggests that the language will support nonprocedural querying with rich visual displays. *dCAL* also will support the data base enhancements that IBM has announced for OS/2 Extended Edition. Almost as important as its consolidation of Ashton-Tate's languages, *dCAL* will provide a single macro facility across both languages and compete with similar products that are on the drawing boards at Lotus

and Microsoft. *dCAL* will be closer to *dBASE* than *FRED*, reveals Ashton-Tate executive vice president Roy Folk. "There undoubtedly and undeniably will be a conversion process," says Folk, "but *FRED* and *dBASE* are fairly parallel in structure." Ashton-Tate estimates that about a third of its 200,000 *Framework* users use *FRED* to create their own applications, templates, macros, or formulas. *dBASE*, the foundation for the data base product of the same name, is used by tens of thousands of commercial and corporate application developers.

SuperCalc 5 Debuts

*Worksheets
Linked,
Graphics
Upgraded*

Sensing opportunity in the current spreadsheet imbroglio, the world's largest independent software company will begin throwing more marketing weight behind its *SuperCalc* offering. Computer Associates' *SuperCalc 5*, to be released in August for \$495, will have worksheet linking, enhanced chart making and handling, complete compatibility with Lotus's 1-2-3, and other features designed to make it the equal of any spreadsheet competitor. First introduced in 1981, *SuperCalc* never gained much fame, but nearly 1 million copies have been sold. Most sales were in the form of volume purchases or site-licensing agreements. Computer Associates leverages its prominent position in large-system software to sell hundreds or thousands of copies of *SuperCalc* at a time to large

companies and government agencies. Noting the difficulty in persuading corporate users to switch programs, Vice President of Sales and Marketing Brett Bullington plans to aim a *SuperCalc 5* advertising and seminar campaign at the 10 million new spreadsheet users expected by 1991. "If Computer Associates has ever been serious about the spreadsheet market, it's now," asserts Bullington. He admits that his product has lost "share of mind" to offerings from Borland International and others. But, he adds, "it's a battle out there and it isn't over yet." Computer Associates sold almost \$60 million worth of micro products last year.

Ashton-Tate Creating High-End Spreadsheet

*PC Tool
to Follow
Macintosh
Offering*

Ashton Tate is laying the foundation for high-end PC spreadsheet software with a Macintosh package scheduled for release this summer. *Full Impact*, to debut in July for \$395, is a graphics-oriented spreadsheet for those with highly analytical job functions. The spreadsheet is tightly integrated with charting and drawing modules as well as a text processor. Ashton-Tate won't say when the PC counterpart will appear. But Robert Kimball, group product manager for Ashton-Tate's new decision-support business unit, reveals that his company will tap both *Full Impact* and *dBASE* technology to develop a full-featured analytic tool with

a graphic user interface for PCs. He adds that his company is committed to file compatibility among like applications across all operating environments. The analytic product, aimed at 1-2-3, will be the third leg in the Ashton-Tate decision-support strategy. It will be preceded by an inexpensive multifunction product like Software Publishing's *PFS: First Choice* and a more sophisticated integrated product growing out of the *Framework* and *dBASE* technologies (see *Top of the News*, PCW, June 1988). Current annual revenues of the business unit are \$25 million a year, based primarily on *Framework* sales.

Hayes Expands Modem Line

*Models Add
Custom OS/2
Support*

Hayes Microcomputer Products has announced a suite of new modems, including an internal modem for IBM PS/2s and a 9600-bps link to mainframes and wide area networks. The Smartmodem 2400P for PS/2 Models 50, 60, and 80 is designed to leap OS/2 communications hurdles by incorporating a 64-byte FIFO (first in/first out) buffer that prevents data loss as the processor switches between multiple OS/2 applications. The 2400P will sell for \$549 without communications software and is scheduled to ship in July. It includes Hayes Auto-Sync, which provides synchronous communications with a mainframe through an asynchronous data port without an SDLC board—thus allowing users to conduct either asynchronous PC-to-PC communications or synchronous PC-to-mainframe sessions. The model 2400Q, which will arrive in Sep-

tember, has the same features and costs the same as the 2400P but fits the unique enclosure of the Compaq Portable III. The Hayes Smartmodem 9600 is designed for mainframe-to-cluster-controller connections or network-to-network remote connections over leased telephone lines. But its automatic sensing mechanism will switch the call to public lines when lease-line connections fail and then back again when they are restored. The Smartmodem 9600, which will sell for \$1999 in July, provides extensive diagnostics, automatic fallback to 4800 bps in case of transmission problems, and support for the Hayes Standard AT Command Set as well as the CCITT V.32 protocols. Additionally, Hayes offers a new \$549 half-card version of the Smartmodem 2400B for IBM PCs and compatibles.

Mitsubishi Enters Laptop Market

*Makes a
Bid With Ad-
vanced Screen
Technology*

Mitsubishi Electronics has unveiled a fast machine with a paper-white screen that the diversified Japanese manufacturer hopes will find a home in the burgeoning high-performance laptop computer market now dominated by Zenith Data Systems and Toshiba America. Based on a 12-MHz, one-wait-state 80286 processor switchable to 8 MHz with no wait states, the mp286L features an oversized (6.7-by-9-inch) screen that displays black characters on a white background or vice versa. The backlit, neutral-twisted-nematic LCD has a double-CGA resolution of 640 by 400. The

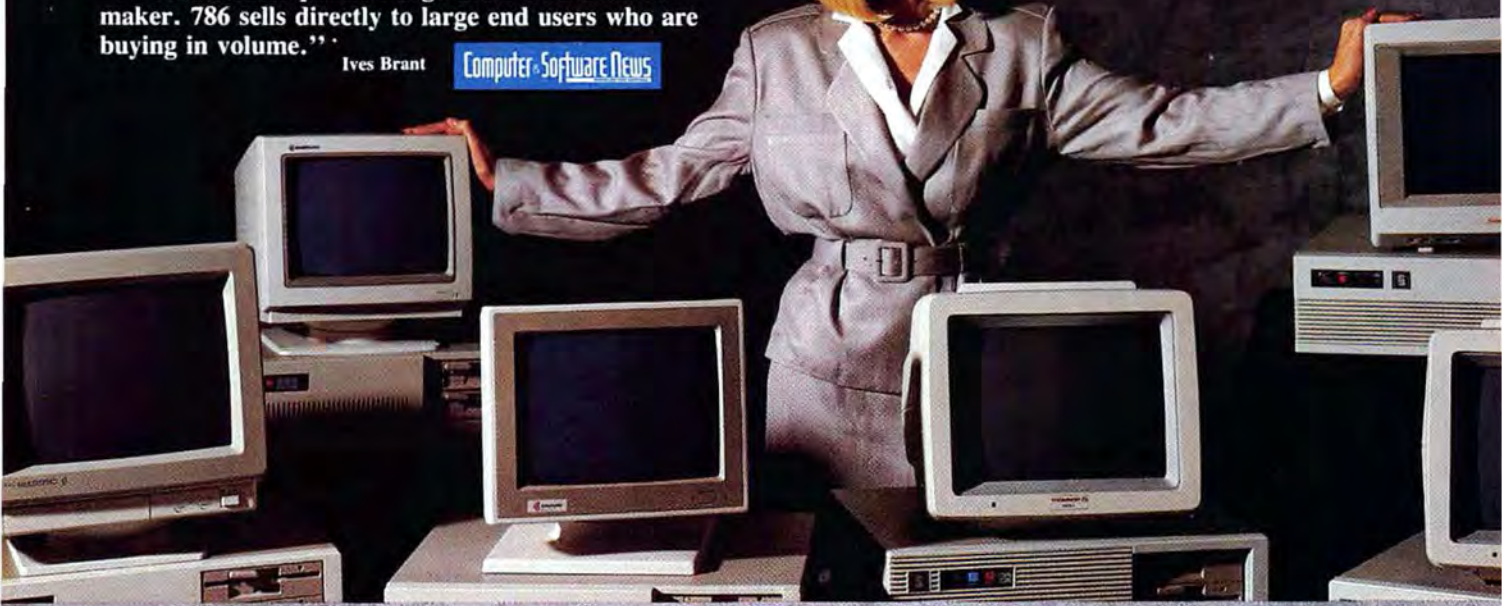
mp286L standard configuration is 640K of memory upgradable to 2.64MB, two 3½-inch 1.44MB floppy drives, and an 86-key keyboard for \$3195. A 68ms 20MB hard drive version is available for \$3995. Mitsubishi previously sold its PC products primarily through other suppliers but began building its own retail distribution channel last year with two aggressively priced desktops. Advances in screen and hard drive technology have several other large-system vendors looking hard at the laptop market.

Stanford Systems. The Computer Maker with a Human Face.

"... a modest public image hides a substantial maker. 786 sells directly to large end users who are buying in volume."

Ives Brant

Computer Software News



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Basic System Features

HD/FD Controller • 1.2 MB floppy drive • Serial port (Com 1) and parallel port • Optional 2nd serial port (Com 2) & optional game port • 200 Watt P/S • High quality metal case • Hardware reset switch and turbo L.E.D. • Optional digital L.E.D. • Clock/calendar w/ battery back-up • Complete documentation • Enhanced keyboard (101 keys) • Heavy duty packaging.

Stanford 386-20

9/20 MHz 23 MHz Throughput
Intel true 32 Bit 80386-20 CPU (20 MHz) 9/20 MHz software (keyboard) switchable clock • CMOS memory, 16 channel Interrupt, 7 DMA channels • RAM can be expanded to 16.5 MB of 32 bit high speed interleaved memory • 2-32 bit, 4-16 bit and 2-8 bit expansion slots • Supports 80387-20 and/or 80387-16 Math co-processors • Award BIOS Ver. 3.03, all set up utilities are programmed in ROM • (Phoenix BIOS optional) • Plus basic system features.

\$2299*

Stanford 386-18

9/18 MHz 21 MHz Throughput
Same configuration as in system 386-20 except: intel true 32 bit 80386-16 CPU • Plus basic system features.

\$2049*

Stanford 286-16

8/12 MHz 16 MHz Throughput
Intel 80286-12 cpu, 8/12 MHz software (keyboard) switchable clock • Award BIOS, Norton SI (Ver 3.0): 15.8 • DRAM can be expanded to 1 MB on M/B • Selectable between 0 wait state or one wait state • 8 expansion slots (5-16 bits; 3-8 bits) • Socket for 80287 math co-processor • Plus basic system features.

\$1119*

Stanford 286-12

6/8/10/12 MHz 1 Wait State
Same configuration as in 286/16 except: Intel 80286-10 CPU, 6/8/10/12 MHz software (keyboard) Switchable clock • Plus basic system features.

\$989*

NETWORKING

Stanford Intelligent Net-II Card

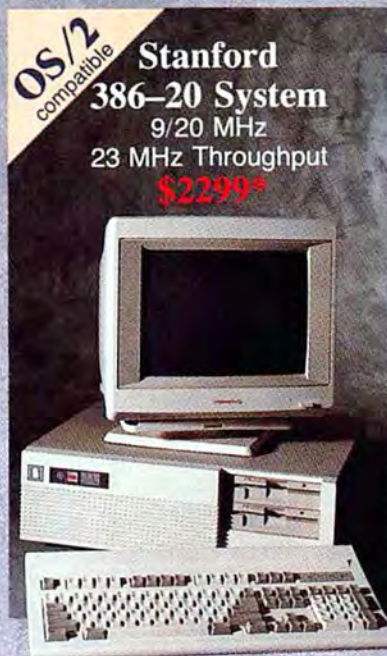
Ether Net/Cheaper Net specification • 80186 processor & 82586 LAN co-processor • Data transfer rate: 10 MB/S. Network software compatibility: PC-NET, MS-NET, Novell.

\$499

Xenix Multi-Terminal Card

Microprocessor-based intelligent terminal controller. Z-80B CPU • 16 KB dual port RAM, 8 KB local RAM • 6 asynch. serial channels.

\$599



OS/2
compatible

**Stanford
386-20 System**
9/20 MHz
23 MHz Throughput
\$2299*

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*System price does not include memory (DRAMS).

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Circle 64 on reader service card

Laptop Sales May Soar

Power Draw,
Screens,
Storage All
Improve

A convergence of downsized, low-power components; improved screen technology; and slim hard drives will make this "the year of the laptop," in the opinion of several vendors at May's Atlanta COMDEX. "The neutral-twisted-nematic LCD is the crowning feature," maintains Chips and Technologies president Gordon Campbell, whose company has introduced a single-chip laptop graphics controller as well as power-efficient, 20-MHz core logic for an 80286 processor. Campbell refers to the backlit, paper-white supertwist LCDs coming from Zenith Data Systems, Mitsubishi Electronics, and other firms. CMS Enhancements president Jim Farooquee echoes Campbell's sentiments and predicts that 1 million laptops will be sold this

year. CMS introduced a 20MB LiteDrive-II hard disk that slides into a laptop's 3½-inch floppy drive space. The 75ms drive has a nominal power consumption of 6 watts but has an auto-turn-off feature that can almost double the time between battery charges. Conner Peripherals is offering its own 1-inch-high 20MB drive that is faster yet uses less power. Conner's CP-3022 boasts an average access time of 27ms and demands less than 2 watts of power. "Now you can truly have a machine smaller than a briefcase with the power of an office machine," declares Conner president Bill Schroeder. "Laptops could become as ubiquitous as calculators."

Software Publishing Moves Upscale

Package
Upgrades
Sans "PFS:"

Software Publishing Corporation (SPC) has released version 2.0 of both *PFS: Professional File* and *PFS: Professional Write* without the "PFS:" prefix, as part of an ongoing plan to reposition the company as an upscale software provider. Seven years ago SPC launched itself into the market for inexpensive and easy-to-use software where its *PFS* file manager, spreadsheet, and word processor have been perennial best-sellers. By mid-1986, though, SPC found itself at odds with dealers over low margins. SPC has since shifted the *PFS* products to higher price points and set up an aggressive corporate sales force that has helped dealers land multiple-unit sales. "They really have turned the company around," observes *Soft-letter* pub-

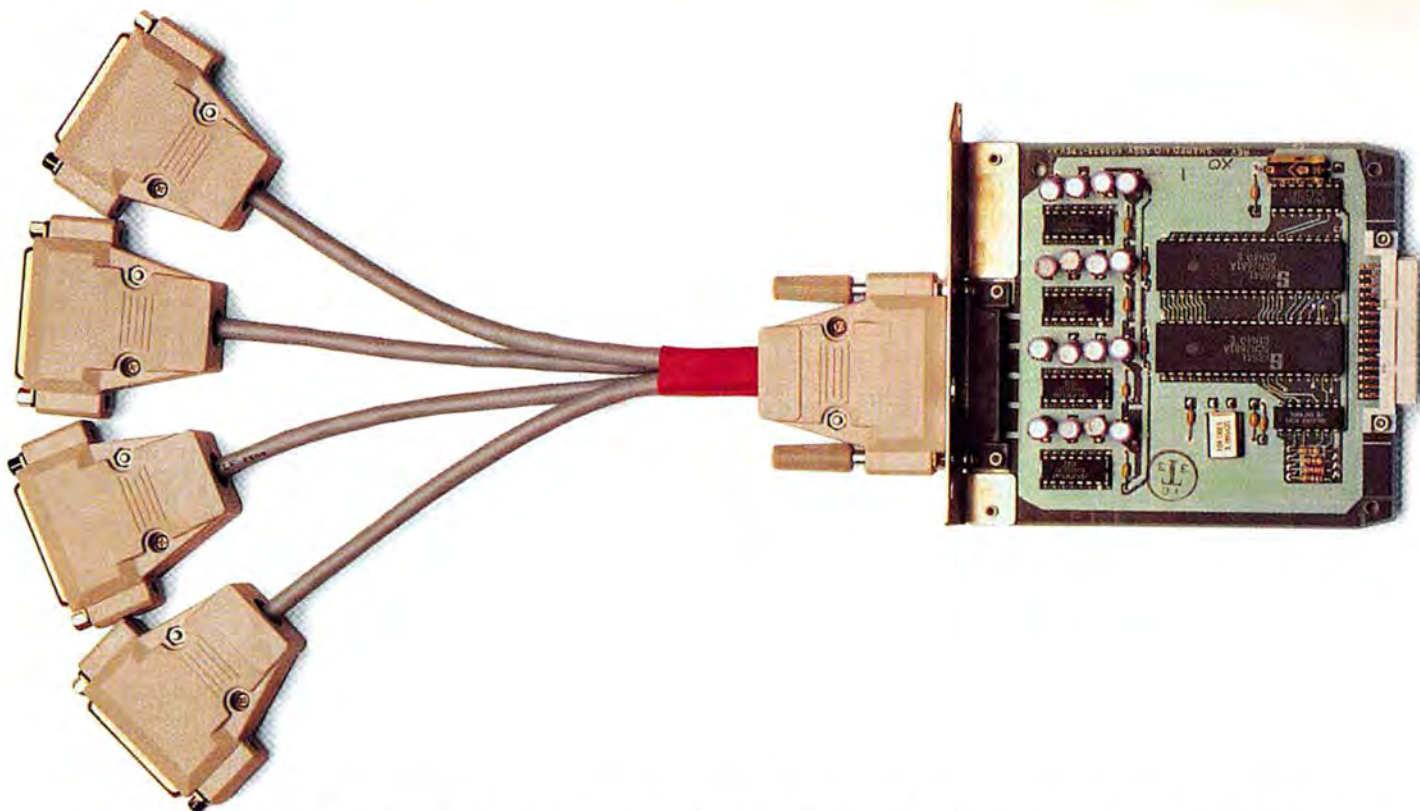
lisher Jeffrey Tarter. Sales were \$15.2 million in the second quarter ended March 31, up 40 percent over the same quarter the year before, while earnings jumped 70 percent to \$2.8 million. Nor has SPC lost its appeal for price-conscious customers. Its \$99 *PFS: First Publisher* has sold 100,000 units. And 200,000 copies of its \$150 multifunction package, *PFS: First Choice*, have gone out the door—half of those since the competing *Microsoft Works* program appeared. "We own this market, we understand it, we created it, and we won't take a back seat to anyone," asserts Wes Richards, vice president of sales and marketing.

Dac Buys a Data Base

Personal
Directory
Offers Ease
of Use

Dac Software, which made its mark in low-cost accounting software and supporting programs, is offering a preformatted data base for small businesses. The Dallas firm, which was purchased by Insilco in October 1987, has acquired *Hold Everything*, a personal information management system from I-Track of nearby Plano, Texas. *Hold Everything* is best described as a personal directory that keeps Rolodex-style records on people, companies, and even places. The disk-based system holds an unlimited number of records with up to 40 fields of fixed length. It offers two preset forms. It's also memory resident, so it pops up at the touch of a

hot key, ready to accept new data or search by as many as nine parameters. The software requires 256K, but its memory-swapping algorithm lets it operate in only 130K of memory. *Hold Everything*, which began shipping in June, retails for \$99.95. Dac also will offer more than 150 templates containing information on hotels, restaurants, and city services in 41 major cities across the country. Dac president Kevin Howe maintains that RAM residency and ease of use will propel *Hold Everything* past the dozens of other flat-file data bases now available. ●



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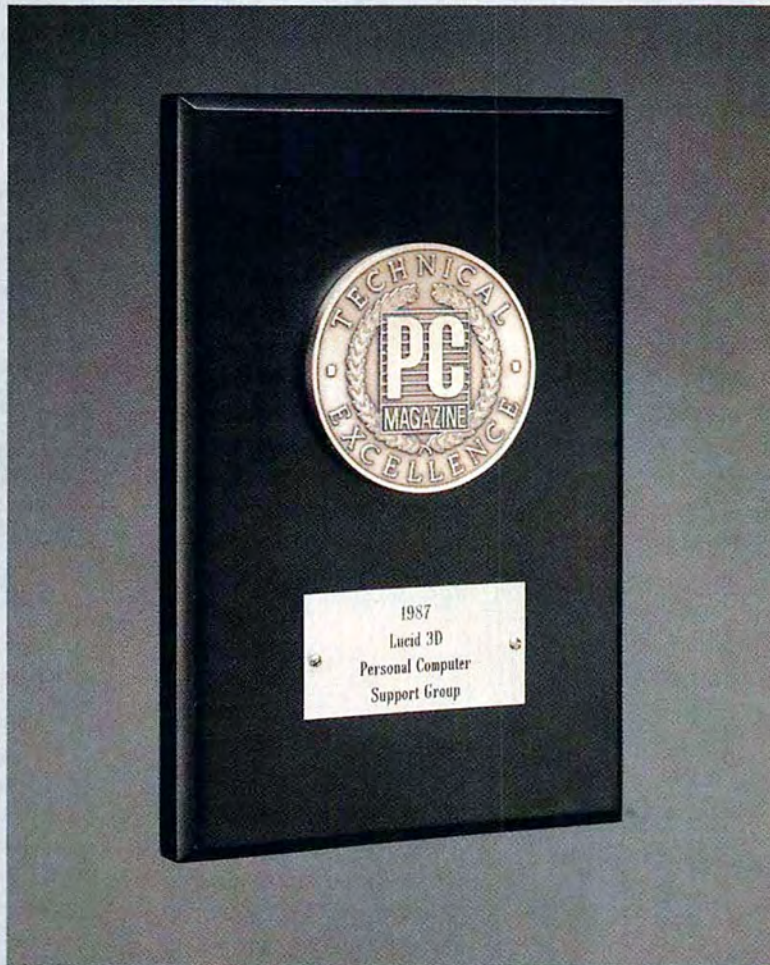
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and Microsoft Excel



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Don't take our word for it. Use Lucid 3-D for 60 days. Return it for a full refund if not completely satisfied. Plus, instead of the \$199 list price, an introductory spread-the-word price of \$149.

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

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

Memory Resident

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

Notepad Behind Every Cell

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

Other Features

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

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



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

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

Masterwork

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

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

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



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

Co-Winner of the 1987 PC Magazine Award for Technical Excellence
The other winner: Microsoft's Excel



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

an interoffice compatibility problem. This means you can have the power and fun of Lucid 3-D, without having to upset your present systems.

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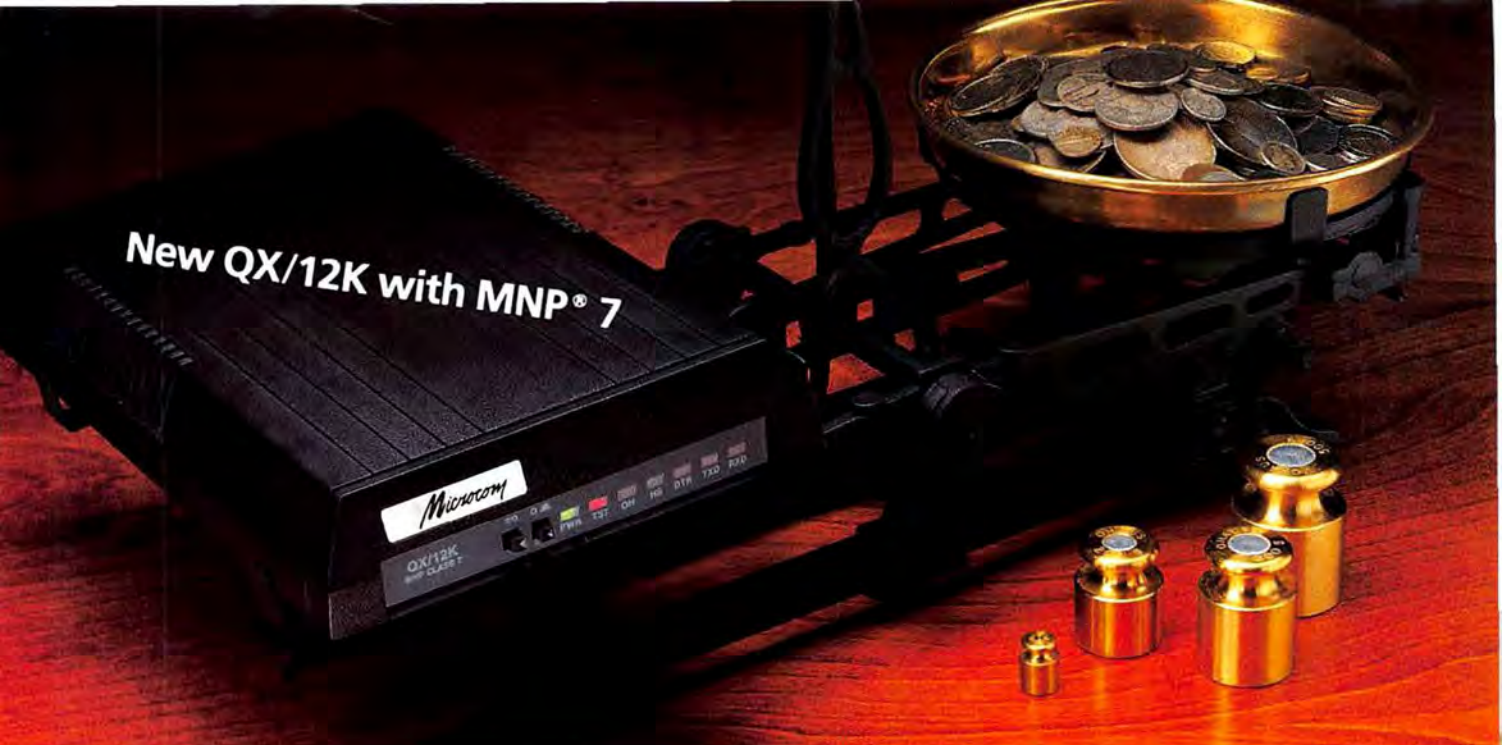
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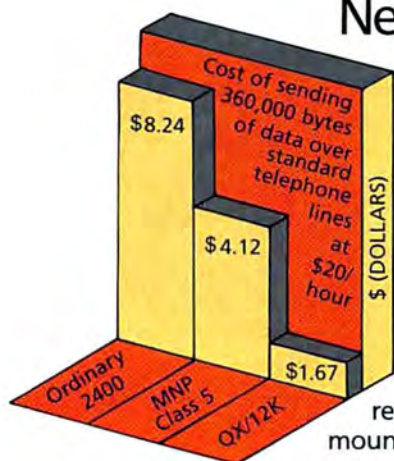


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The Big-Chilling Effect

Creativity and innovation in our industry are being threatened by a rash of reckless lawsuits. Enough already.



**David
Bunnell**

Most personal computer industry observers agree that Apple Computer's recent surprise lawsuit against Microsoft Corporation and Hewlett-Packard jeopardizes future software and even hardware development. Apple claims that Microsoft's *Windows* and HP's *NewWave* graphic user interfaces are illegal copies of Apple's Macintosh system design.

If Apple prevails in this suit, further development of a windows interface for the IBM PC may be seriously delayed, or even killed.

There is yet another, but less-publicized, lawsuit on the horizon that may have a much greater effect on us than the Apple affair. ComputerLand Corporation founder William Millard has filed suit against MicroPro International Corporation as well as former MicroPro chairman Seymour Rubinstein and former MicroPro programmer John Barnaby.

Millard's suit alleges that MicroPro's wildly successful word processor, *WordStar*, was first developed at one of his companies, IMSAI Manufacturing Corporation, over ten years ago. Both Rubinstein and Barnaby were working for IMSAI at the time, and Barnaby developed a text-editing program called *NED*. Rubinstein left IMSAI to

start MicroPro and immediately hired Barnaby, who had left IMSAI two weeks earlier. Millard claims they used *NED* code to write MicroPro's early text editor *WordMaster*, which evolved into the phenomenal *WordStar*. Meanwhile, in 1979 IMSAI went bankrupt and disappeared from the scene.

Until recently, that is. Terry Giles, Millard's chief attorney, claims to have stumbled across the *NED-WordMaster-WordStar* connection while sifting through documents from an unrelated case. Giles maintains that the statute of limitations—three years from the time of his "discovery" in 1986—is still in effect.

Furthermore, Giles and Millard claim that *WordMaster*'s patent information reveals that 98 percent of its source code is "identical" to *NED*'s. Millard is seeking punitive damages and royalties from any and all programs derived from *NED*. This would include *WordStar*, which is estimated to have grossed \$200 to \$300 million for MicroPro over the past ten years.

According to Giles, Millard—who sold his controlling stake in ComputerLand last year and
(continues)

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now lives on the South Pacific island of Saipan—is bringing this action against MicroPro and its two former officials as “a matter of principle.” Millard would use any punitive damages awarded to pay IMSAI’s remaining creditors, who are collectively owed about \$1 million. If he is awarded damages in the form of royalties, however, tens of millions of dollars will be at stake. Millard says he would distribute this money to various charities through a foundation administered by the Millard family.

“I’m about as concerned about [Millard’s] succeeding in this lawsuit as [I am about] an iceberg hitting the Golden Gate Bridge,” insists Leon Williams, MicroPro’s current CEO. “[In] 1979, there were an awful lot of companies starting up, and a few of them were successful,” he recalls. “I think it’s a miracle there haven’t been more lawsuits.”

Williams, who began his own career as a programmer, notes the difficulty facing software developers, whose craft is constantly evolving. “Whenever you work on a particular algorithm, and you change jobs, it’s impossible to unlearn all you’ve learned,” he says. “Programming is a creative path. All artists are inspired by previous artists. They take their techniques and visions, and they evolve them into a higher level of art.”

Though he discusses the Millard suit in less lofty terms, Seymour Rubinstein is also convinced that it will be thrown out of court on a summary judgment, because the statute of limitations has already expired.

(continues)

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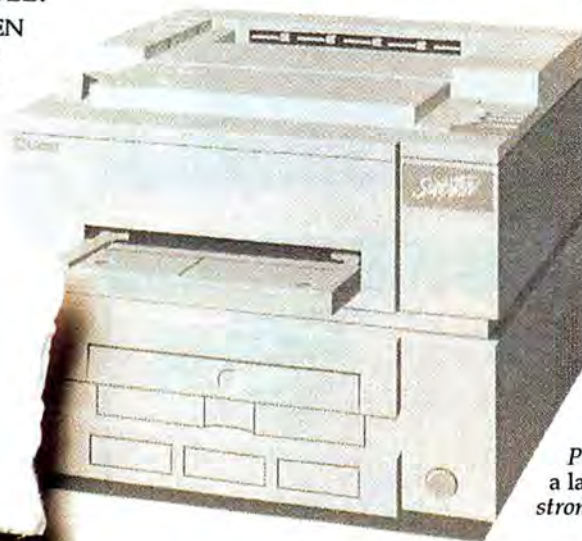
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"It's clear that the program or programs that allegedly contained whatever [Millard] is concerned about were well publicized, and he certainly didn't do anything about it for ten years," he asserts.

Giles is prepared for a long haul, however. "We will be involved in the technical aspects of the lawsuit for a couple of years at least," he predicts. "It will probably get to trial—if we're really lucky—in 1989, or in the first part of 1990."

No matter what the outcome, and no matter who's right or who's wrong, one thing is certain: We'll all pay a price. A lot of software, as well as hardware, is based on existing products. Just as in the television industry, developers create new programs based on past hits. If developers and companies can no longer do that because they'll be sued, then new programs or even new versions will be slow to emerge. If consumers buy fewer products, less frequently, the industry will slump, and eventually even our computing productivity will take a nosedive.

Just think: Digital Research, the creator of CP/M, could sue Microsoft for releasing MS-DOS, because much of its code is based on CP/M. The creator of *VisiCalc* could sue Lotus because *1-2-3* is basically an advanced form of *VisiCalc*. In fact, most data base, spreadsheet, project-management, and word processing programs on the market today are based both on earlier versions and on other programs. (continues)

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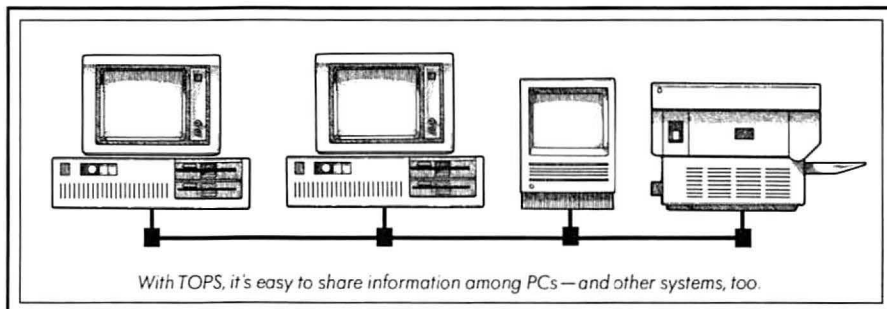
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The fact is that Millard's company, IMSAI, went out of business years ago. Nothing was going to happen to that code at IMSAI; *NED* was dead. Rubinstein and Barnaby allegedly gave it new life at MicroPro. If that was the case, apparently no one else had the imagination to develop *WordMaster* into *WordStar*.

"The success of the [*WordStar*] business came 150,000 instructions later," Leon Williams explains. "That has much more to do [with its success] than with the code of the product called *NED*." In fact, *WordStar* also benefited from very effective marketing and promotion.

I'm not making a judgment about whether the Millard case has any legal merit, although it's not obvious to me that *NED*, the source code that may have led to *WordStar*, is really worth \$200 to \$300 million. I'm concerned that if this case is won, consumers and companies alike might become immobilized by a legal ice age that would freeze a lot of the creativity and innovation that currently exist in personal computing. Glaciers are just fine in Alaska, but I don't want them coming to Silicon Valley. ●



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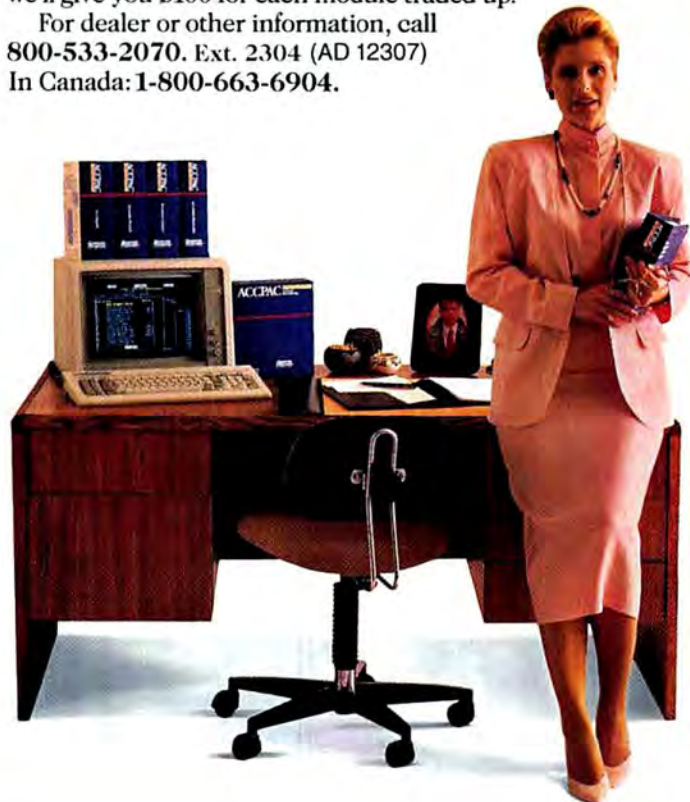
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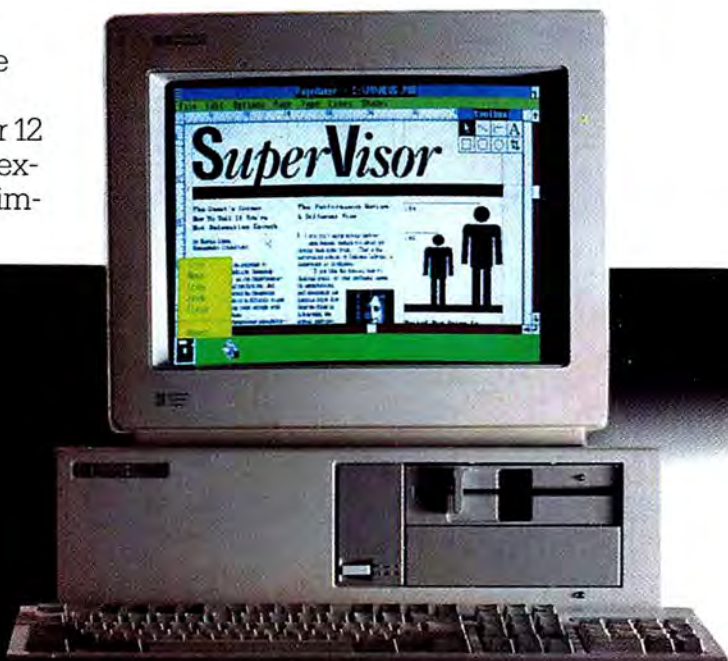
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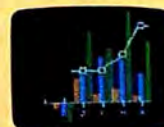
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- **PC-Key-Draw** Complete professional drawing program from OEDware.™
- **The "DETAB" Command** Converts tabs to multiple spaces when printing text files.

(Available as a Back Issue)



FREE the "Best of BIG BLUE DISK"—a collection of nine of the best programs from recent issues—when you order the next three issues of **BIG BLUE DISK** for your IBM PC or compatible computer.

Below are the programs on the "Best of BIG BLUE DISK:"

Calc-Man
SuperDots
Loan Amortization
Disk Indexer
Family Tree

Political Preference
Laser Show
DOS Command History
(Kramden Utility #1)
The "COLOR" Command

Your Satisfaction Guaranteed

If you are not satisfied with your purchase for any reason, return your first issue for a full \$19.95 refund. The "Best of BIG BLUE DISK" is yours to keep. You can't lose.

Circle 66 on reader service card



LETTERS

Reactions and responses from the PC World community

Format Praise and Nays

Thanks for the format change. When I was deciding which magazines to subscribe to, your product had barely enough true "meat" to make the grade. You were a borderline *yes*. With the addition of NSTL reports and your quick-look product reviews, I can justify the time spent reading it. Good work, *PC World*.

Tony Cecil
Nashville, Tennessee

I protest! I used to think *PC World* was one of the most beautifully designed magazines in the United States. Imagine my dismay when the April copy arrived. You have abandoned tall and elegant typefaces for squat and ugly ones, which gives the magazine a cheap and unaesthetic appearance.

It's fine to put more reviews in your magazine, but please don't lose sight of aesthetics. I *loved* your previous layout with its generous margins and use of white space. The old magazine's appearance had a tremendous amount of class, which you are now in danger of losing.

Magne Kristiansen
Chewelah, Washington

Bravo on your new format. It's a breath of fresh air among the competition. It seems easier to "get into" each article, and it's definitely easier to pick and

choose what is meaningful to my work. For a busy PC manager, this is just the ticket.

David J. Buerger
Santa Clara, California

In general, I applaud the new look. The NSTL appraisals and the Executive Summaries are a real step forward, and a move toward sharper appraisal and tauter prose shows through.

You may have gone a little too far in the clean, sans-serif direction and could strengthen the visual impact of editorial material. But while style may have momentarily triumphed over content, overall there is marked movement and improvement.

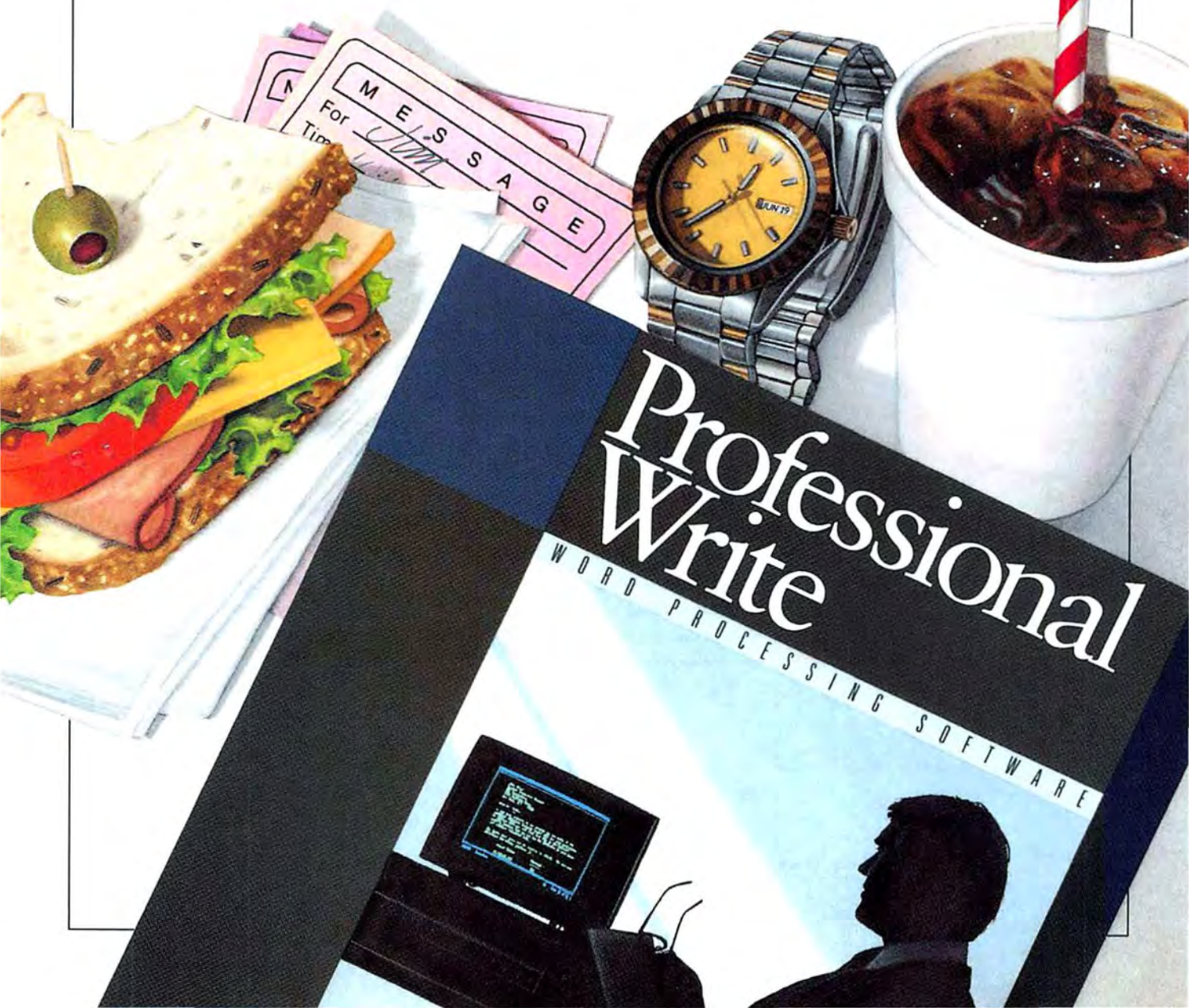
Paul Mace
Ashland, Oregon

I am having difficulty reading your new typeface. Not all of us have 20-year-old eyes (mine are 56). The new font is smaller and lighter than the old, and that puts it at the resolution limit of my bifocals.

If the magazine is getting too fat, you could remove some of the artsy-cutesy layout elements, lose some white space, and reduce the leading. But please, give us back your old *readable* magazine.

John Haas
Decatur, Georgia
(continues)

Today's managers
are expected to learn
word processing
in their spare time.



NEW VERSION 2.0

Fortunately, that's all it takes.



Can Professional Write significantly reduce the time and cost of your training and support? Call 1-408-848-4391, Operator #60 for a free trial disk.

Truth is, the best business people have the least spare time. So Professional Write 2.0 was designed to get them up and running immediately.

Professional Write 2.0 has all the features managers demand, and saves them the frustration of learning programs designed for full-time typists.

Our learning process speeds up the word process.

Anyone can learn Professional Write in a couple of hours. The screen is as familiar as a piece of paper. Pull down menus and an on-line manual means there's nothing to memorize. Our follow-along tutorial is written in plain English, and our context-sensitive help is one of the best available.

It all ensures that your managers spend their time managing, instead of asking for help.

We're the most compatible with your secretaries.

We gave Professional Write the most extensive and direct connections with the other software standards in your office. No other program does it so easily. Professional Write has built-in compatibility with MultiMate™, WordPerfect™, Microsoft Word™, WordStar™, Wang™ PC, DCA, and ASCII. You can directly import Lotus 1-2-3™ worksheets without retyping; include a chart from Harvard Graphics when printing; and mail merge quickly with dBase III™ files.

We give your printers the perfect set-up.

Now using multiple fonts with an HP Laser Jet™, Apple LaserWriter™, PostScript™ or HP DeskJet™ is as simple as underlining. And printer support has never been easier, because Professional Write is pre-configured for quick installation.

We have a fast new way to find your documents.

You no longer have to spend your valuable time hunting down files. Our new *File-Finder* searches through the actual text of *all* your Professional Write files to find any words or phrase, and will call up the appropriate document. We'll also give you sorted lists of files, and the option to identify your files with summary descriptions.

There's more to our feature story.

We know what managers need from a word processor. That's why Professional Write offers speed keys, macros, and column-move. An integrated spelling checker,

CTN CORPORATION
TELEPHONE DIVISION
let's

Sales by Region

Sales increased 20% over the previous quarter. Division sales are up 15% over our first quarter plan.

(All Lines)	Q1
Region A	\$100
Region B	\$120
Region C	\$80
Region D	\$90
Region E	\$110
Total	\$500

We showed a sharp increase in sales over the previous quarter. Division sales are up 15% over our first quarter plan.

Computer products department is not current in selling consumer products line. Sales of consumer products are 20% of the total.

Cellular phone company market is not current in selling consumer products line. Sales of consumer products are 20% of the total.

Cellular phone company market is not current in selling consumer products line. Sales of consumer products are 20% of the total.

CTN CORPORATION TELEPHONE DIVISION let's

April 7, 1988

Dear Curtis,
Regional Sales Manager
CTN Corporation
10000 Wilshire Boulevard Drive
Los Angeles, CA 90024

Dear Curtis,

This has been an exciting quarter for the Division, especially the Western Region. I was just putting the finishing touches on the quarterly performance report, and was struck over again by the excellent results you have achieved. Congratulations, you and your team have exceeded our planned sales goals, and performed well above the company average.

I have included a copy of the performance report, so you will be one of the first to see the results. I'm sure it's no surprise to you that the West is the top region, most again. I hope to see 20% over plan, and 25% over last year, which is well better than we predicted for this quarter.

Comparing these to the figures a year ago, before you took on the task of running the Western Region, you should be very gratified to see the effects of your efforts to the full.

I am looking forward to seeing you next week at the quarter review meeting. I will take great pleasure in presenting these results to the Executive Staff. Please let me know if you would like to discuss your ideas for next quarter's performance in other regions of the country.

Sincerely,

Jim M. Stewart

Jim M. Stewart
VP, Marketing and Sales

We're quick to polish up your image.

thesaurus, on-screen calculator and address book are only a keystroke away. We also support all the popular networks.

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Operator #60
for a free trial disk.**

**SPC SOFTWARE
PUBLISHING
CORPORATION**

The designers of PFS.

SmartKey Is Smarting

Thanks but no thanks for your "positive" review of *SmartKey* [*The Software Shelf*, PCW, April 1988]. The review was off base in several areas:

The version reviewed was actually released in July 1987 and had subsequently been superseded, but true to the standards of the computer press, no one bothered to call and check the facts.

Keyworks Advanced was not the first to explore conditional macros. That feature has been available in *SmartKey* for over a year.

Keyworks' touted ability to edit all macros at once is but a relic of that program's notepad origins. It can't edit a single macro; instead, it reproduces the entire macro table in a separate editor, which it then must recompile. This is a major reason why *SmartKey* requires one-third the RAM of *Keyworks* and can store six times as many macro characters.

Steve Richards
Vice President, Marketing
Software Research
Technologies

Mr. Richards writes that *SmartKey 5.2* was released in July 1987. Calls to Reid Griffin and Stan Brin, president and vice president for development, respectively, at Software Research Technologies, confirmed that 5.2 was actually released in September of that year. And page 1 of the 5.2 manual states that conditional macros are new to that release; *Keyworks Advanced* came out in May 1987, four months earlier.

It's true that you can't edit in-

dividual macros with *Keyworks*, but neither can *WordPerfect* load and edit isolated paragraphs from a document. Most users prefer to see all their macros at once, to be able to cut and paste between them or eliminate redundant ones. And recompiling the *Keyworks* list takes less than a second. Mr. Richards is correct in pointing out that *Keyworks* requires more RAM; however, it does use expanded memory, something *SmartKey* currently does not do. —Ed.

Wrong VP-Planner Version

Due to a misunderstanding over version numbers, an otherwise terrific review of *VP-Planner Plus* [*The Software Shelf*, PCW, May 1988] has become a nightmare for our company.

The review's headline read "VP-Planner Plus 2.0," but the product actually reviewed was *VP-Planner Plus 1.01*. To compound the problem, the features comparison chart does reflect version 2.0. Unfortunately, the timing results are for the older version, so the chart appears to show our new product in a very bad light. In reality, *VP-Planner Plus 2.0* is probably the fastest spreadsheet on the market, and we are very proud of that fact.

Since the cover date of the magazine matches the introduction date for *VP-Planner Plus 2.0*, your readers will think our performance claims for the new product are just a lot of marketing hype. Let me assure you that is not the case.

Ronald Ogg
Executive Vice President
Paperback Software
International
Berkeley, California

Mr. Ogg is correct; the product we reviewed—and recommended as a "Best Buy"—was *VP-Planner Plus 1.01*, not *VP-Planner Plus 2.0*. The features table included an undo command, background and minimal recalc, and the ability to create macro transcript files—features new to version 2.0. We tested and published performance benchmarks for version 1.01. PC World regrets the error. A complete set of version 2.0 performance benchmarks and a features table comparing the two versions will appear in a future issue.

@Liberty Isn't Copy Protected

Your review of *@Liberty* ["Worksheets Without 1-2-3," PCW, March 1988] makes a serious mistake when it claims our software is copy protected. This is absolutely false.

The mere presence of copy protection in today's market has the power of making thousands of PC users refuse to even consider a product. Therefore we request that you advise your readers of the mistake before any further damage is done.

Kenneth Sullivan
SoftLogic Solutions
Manchester, New Hampshire

Mr. Sullivan is right; *@Liberty* is not copy protected. PC World regrets the error. —Ed.

Kahn's Quattro Challenge

Regarding your article "Quattro Goes 1-2-3 Better" [PCW, April 1988], benchmark tests should reflect real-world spreadsheet (continues)

Double Your Productivity With Carbon Copy Plus



Carbon Copy Plus™—the industry standard in remote control software—easily lets two PCs share the same application program over ordinary phone lines.

So now you can share the same keyboard, screen and disk with a remote user thousands of miles away, allowing you to give effective product demonstrations, support remote customers or train new users—without ever having to leave your office!

Remote control and much more!

Of course, Carbon Copy Plus offers other advanced remote communications features, including remote printing, remote access to a local area network and remote session capture and playback. But Carbon Copy Plus also offers many of the same features found in "standard" communications programs, such as file transfer, terminal emulation and complete scripting macros. And much more!

Introducing Version 5.0

If you thought Carbon Copy Plus was powerful before—wait until you see the new Version 5.0. Carbon Copy Plus has always been able to transmit text or graphics, but

now our new universal graphics translator merges incompatible graphics formats. So you can jointly update a CAD diagram using your CGA, EGA, VGA or MCGA system with an associate who is using the Hercules™ standard.

Just as important is our new background file transfer capability. This lets you easily send or receive files, at any time, without exiting your current application. Now you can double your productivity by working on one spreadsheet file while an associate sends you another!

Twice as easy

Find out why Carbon Copy Plus has become the industry standard in remote communications and is fast becoming one of the most popular communications programs overall. Call us today. We'll show you how easily you can increase your productivity.

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Copy plus**

Fully translated foreign versions now available!

MERIDIAN TECHNOLOGY INC 

A SUBSIDIARY OF MICROCOM

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A separate Carbon Copy Plus is required for each PC location.
Carbon Copy Plus is a trademark of Meridian Technology.
All other products referenced are trademarks of their respective companies.

Circle 170 on reader service card

use and include insertions and deletions of rows and columns as well as macro executions. In minimal recalculation, *Quattro* inserts and deletes rows and columns almost instantaneously and boosts the overall speed of macro execution. The consequences are far-reaching. When inserting a column in a complex worksheet, if you do not maintain these dependency trees, all formulas must be reevaluated, making the process extremely slow. *Quattro* rebuilds only the necessary formulas and therefore performs much faster.

I invite you to include such a *real-world* benchmark in your tests, one that performs insertion and deletion of rows and columns as well as macro executions. Any sales forecast, business plan, tax return, or profit-and-loss statement will do as a model.

Philippe Kahn
President and CEO
Borland International

EasyLink Defended

In your evaluation of public E-mail services ["Making the E-Mail Choice," *PCW*, March 1988], I don't think you properly considered function as well as form before drawing conclusions as to the services' usefulness.

Your reviewers, Ken Smith and William Rodarmor, miss the point when they fault Western Union EasyLink for a cryptographic log-on, lack of user friendliness, and outdated telex syntax. What they perceive to be drawbacks actually form the basis for EasyLink's high level of security and feature-rich messaging services.

Far from being a poor choice, EasyLink handles nearly five times more messages than competitors offering fancy menus and executive hand-holding options. While noting that EasyLink carries "a staggering 9 million messages a month," Messrs. Smith and Rodarmor shrank from the obvious conclusion: Western Union EasyLink must be doing something right!

Note that EasyLink service does not charge a 50-cents-per-minute connect fee as reported, nor is there a \$25 annual subscription fee. WATS charges per minute were also reported inaccurately—the correct charge for WATS is 15 cents per minute using Western Union 800 Data service or 35 cents per minute on AT&T WATS.

Joseph Norton
Western Union Business
Communications Service
Upper Saddle River, New
Jersey

Because Western Union's pricing structure is so complex, we consulted the current EasyLink Pricing booklet and called both Western Union and its PR agency to confirm our findings. Page 1 of the booklet lists EasyLink's Instant Mail rate at 50 cents per minute, with WATS charges of 80 cents per minute at 1200 bps. Mr. Norton seems to be confusing the mail rates with those for the data base service listed on page 5. EasyLink's \$25 annual fee appears on page 7; you can avoid paying it, but only if you agree to spend at least \$25 a month on EasyLink service. We

forgot to mention that you're also charged a flat 30 cents every time you connect with EasyLink or one of its services. —Ed.

Just the Fax, Ma'am

Computers are great. Modems are great. But computer-based E-mail can't compete with fax.

When I want to communicate with friends or business associates across town, in Asia, or in Europe, I put my handwritten or word processed note in the fax machine, push the button with their name on it, and they have it 30 seconds later, complete with graphics and ketchup spots.

Robert Mac Phail
Vancouver, British Columbia

Correction

Sharp-eyed readers spotted a misplaced decimal in one of our file transfer program test graphs (*Consumer Watch*, *PCW*, March 1988). In the floppy-to-floppy parallel test, we reported Fastwire II's transfer time as a blinding 1.14 seconds. That should have read 1 minute, 14 seconds.

Letters should be mailed to Letters, PC World, 501 Second St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908. All letters must include the writer's name, city, and state. They should not exceed one double-spaced typewritten page. We reserve the right to edit letters. ●

"The Breakthru 286 performed flawlessly with every application we handed it, including copy-protected programs and nine memory-resident utilities at once."

Stephen Manes, PC Magazine

"...the Breakthru 286 was the card of choice..."
PC BusinessSoftwareview (Rated #1)

"...Breakthru 286 is a good value and a quality product backed by effective support."

Dan A. Griffin
The Newsletter of the AutoCAD User's Group

"The PCSG Breakthru 286 achieved the best performance results of the caching boards tested."

Ted Mirecki, PC Tech Journal (Rated #1)

"The 12-MHz Breakthru 286-12 speedup board is the fastest of those tested, but not the most expensive. On a dollar per-horsepower basis, it could be called the cheapest boost available for an XT."

Mark Welch, InfoWorld (Rated #1)

Think You Need an AT?

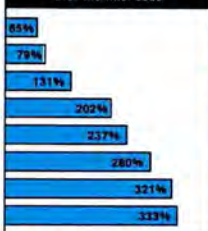
Make Your IBM PC Faster Than an AT in Just 5 Minutes!

Accelerator Cards: Speed and Value

Speed figures are consolidated results from 10 tests of CPU performance (See Accelerator Boards Special Report, December 1, 1986.)

☐ Microspeed Fast 88	\$149
☐ Microsoft Mach 10	\$395
☐ Univation Dream Board	\$512
☐ Orchid Turbo EGA	\$945
☐ ST&D Standard 286	\$995
☐ Classic Speedpack	\$995
☐ Orchid PC-Turbo 286e	\$1,195
☐ Breakthru 286-12	\$595

Increase in speed over the Intel 8088



Cost per percentage increase in speed



REPRINTED FROM INFOWORLD, APRIL 27, 1987

Breakthru 286-8MHz-\$395
Breakthru 286-12MHz-\$595

LIGHTNING™—FREE with Breakthru
speedup hardware—\$89.95 purchased separately

We are excited about our three speedup products. You probably know about our Lightning disk access speedup software that was awarded PC Magazine's Best of 1986 award (see box). After the smashing success of Lightning, in late '86, we

guaranteed the Breakthru 286 board to be literally the most advanced, fastest, most feature-rich board available. The runaway success it has enjoyed truly proved that assertion. Now we go ourselves one better with the Breakthru 286-12. This new board has the clock speed cranked up from 8 to 12 MHz for speeds up to 10.2 times faster than an IBM PC. It is 50% faster than an 8MHz IBM AT, and up to a whopping 1,000% faster than a regular PC.

HERE'S WHY THESE TWO BOARDS ARE SO SPECIAL.

First, they install so easily. A half-slot card means you don't even have to give up a full slot. What's more, unlike competing

products it works in the Compaq Portable and most clones. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, they are advanced. The BREAKTHRU 286 replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. Has a 80287 math coprocessor slot for numeric intensive applications. A 16K cache memory provides zero-wait-access to the most recently used code and data. Speed switching software allows you to drop back to a lower speed on the fly for timing sensitive applications.

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. Our boards operate with LAN and mainframe communication products and conform to the Expanded Memory Specification (EMS). Software compatibility is virtually universal.

Faster and smarter than an AT - PCSG guarantees it.

Fourth, these are the best. There are several other boards on the speedup market. We at PCSG have compared them all, but there simply is no comparison. Many cards offer only a marginal speedup in spite of their claims and others are just poorly engineered.

We are really excited about these products. PCSG makes the unabashed statement that the BREAKTHRU 286 card represents more advanced technology than boards by Orchid, Quadram, P.C.

Technologies, Phoenix...we could go on. Breakthru 286 is undisputedly the turbo board with the biggest bang for the buck. And we include FREE the \$89.95 acclaimed Lightning software. Call today with your credit card or COD instructions and we will ship your card the very next day.

But, no speedup board cuts disk access time in half

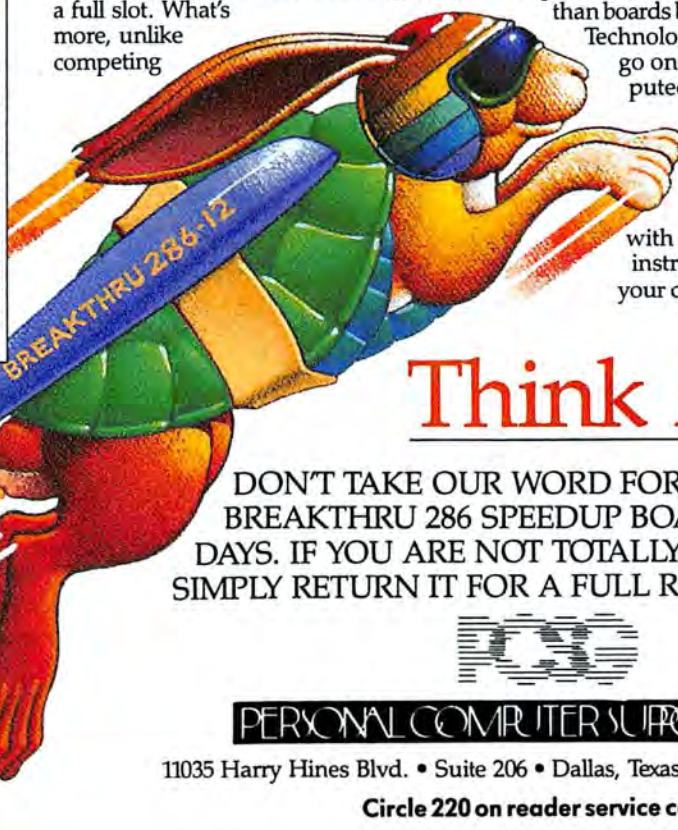
LIGHTNING™

software can - \$89.95 or FREE w/Breakthru

"Lightning is almost mandatory..." -
Steve Manes, PC Magazine
Best of 86 review

Loads with the DOS - always ready as a background program to accelerate disk access. You do nothing - everything is automatic. Programs that frequently access the disk (hard or floppy) are made instantly up to 2 to 4 times faster. Uses a principle greatly enhanced from mainframe technology called caching. Fully exploits Above Board memory.

LIGHTNING is the standard against which all our competition measures itself because we achieve universal compatibility with other software. Data is never lost. Order LIGHTNING separately or get it free with your Breakthru 286 board.



Think Again.

DON'T TAKE OUR WORD FOR IT. USE EITHER BREAKTHRU 286 SPEEDUP BOARD FOR 60 DAYS. IF YOU ARE NOT TOTALLY SATISFIED SIMPLY RETURN IT FOR A FULL REFUND.



PERSONAL COMPUTER SUPPORT GROUP

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Circle 220 on reader service card



If our new 286 computer is so terrific, why doesn't it cost more?

This handsome piece of high-tech wizardry is the new Dell System 220.



It's the first 286 computer that runs at 20 MHz.

Which means it's as fast as most 386 computers, running MS[®] OS/2 and MS-DOS[®] at blistering speed. All from a tiny corner of your desk.

Yet it costs less than half of what most 386 computers sell for.

Which might lead you, quite reasonably, to ask: How can Dell offer so much for so little?

Well, you buy direct from us, the manufacturer. Eliminating computer stores and their salespeople—who can add thousands of dollars to a computer's cost, and the hassle of a middleman.

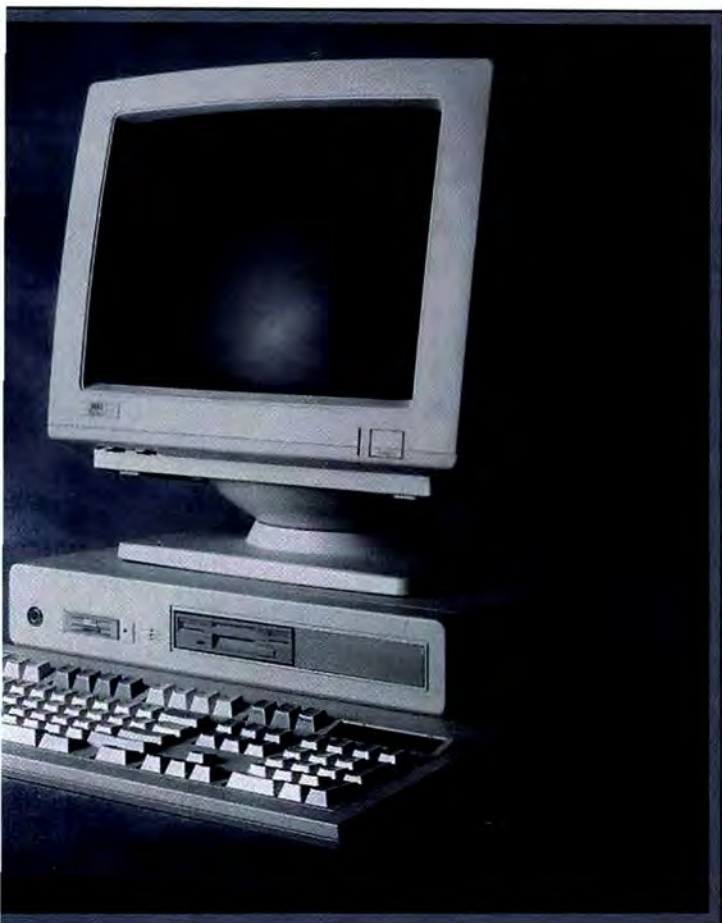


"Speed is a good thing. Safe, reliable, no hassles speed is better still!"—Al Poor, Editor's Choice, PC Magazine

We design and build our computers right here in Austin. Putting a premium on speed, compatibility, and reliability.

We're already shipping our version of MS OS/2, so you can run OS/2 applications, now and in the future.

"...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 business?"—Eric Knorr, PC World

And each computer goes through a battery of diagnostic checks, including a comprehensive burn-in before shipment.



In addition, every computer comes with a level of service most computer stores can only envy.

Including expert technical advice before you buy, and free technical phone support after-

wards. Plus next-day on-site repair during the first year.

We also give you a thirty-day money-back guarantee, and a one year limited warranty.

"If your desire for speed is inexhaustible, (this is) the machine for you...it's reassuring when a computer completes some operations even before your fingers leave the keyboard."

—Harry Miller, PC World

As one of the largest personal computer manufacturers in the U.S., we've sold computers to large companies, small companies, and everything in between. Because of this, you can be confident we'll be here to support you now and in the future.

After all, we've been offering better computers, with better service—at better prices.

Now, if you'd like the rest of the details on our hyperfast 286 computer, and the rest of our line, there's only one more thing you have to do.

Turn the page.



The Dell Computer Store.

Welcome to our store. To buy or lease a Dell computer, call (800) 426-5150. We'll help you select the right system.

For service and technical support, call our highly trained technicians at (800) 624-9896. In almost all cases, any problem can be solved over the phone.

These technicians are also supported by Honeywell Bull service engineers who can be dispatched to your office by the next business day, should on-site service be required. This optional service contract is available in over 95% of the United States, with over 1,000 engineers in 198 service locations.*

We are so confident in our quality products that we also provide a Total Satisfaction Guarantee, which says that any system bought from us may be returned within thirty days from the date it was shipped to you for a complete refund of your purchase price.

We also offer a One Year Limited Warranty, which warrants each system we manufacture to be free of defects in materials and workmanship for one full year. During the one year period we will repair or replace any defective products properly returned to our factory.

Call or write for the complete terms of our Guarantee Warranty, and the Honeywell Bull Service Contract. Dell Computer Corporation, 9505 Arboretum Blvd., Austin, Texas 78759-7299.

Dell products are available on a GSA contract. Call us for GSA pricing.

THE NEW 20MHz 386 SYSTEM 310.

The top of the line. It's the highest performance 80386 computer available, faster than the IBM+ PS/2+ Model 80 and the Compaq+ 386/20. It runs at 20 MHz, with the latest 32-bit architecture for maximum performance. And it's completely MS+ OS/2 compatible. Since it also has Intel's+ Advanced 82385 Cache Memory Controller, and high performance disk drives, the System 310 is ideal for intensive database management, complex research and development, CAD/CAM, and desktop publishing. As a network file server the system offers an unbeatable combination of price and performance.

Standard Features:

Intel+ 80386 microprocessor running at 20 MHz.
1 MB of 80 ns 32-bit RAM expandable to 16 MB without using an expansion slot.
Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM.
Socket for 20 MHz 80387 coprocessor.
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.
8 expansion slots (6 available with hard disk drive controller and video adapter installed).
Dell System Analyzer.
MS-DOS+ and MS OS/2 compatible.
Security lock with locking chassis.
12 month on-site service contract (Available on complete systems).

Options:

1 MB RAM upgrade kit.
20 MHz Intel 80387 math coprocessor.
2 MB or 8 MB memory expansion boards.

SYSTEM 310	With Monitor and Adapter		
Hard Disk Drives	VGA Mono	VGA Color	VGA Color Plus
40 MB-28 ms	\$4,099	\$4,299	\$4,399
90 MB-18 ms ESD+	\$4,899	\$5,099	\$5,199
150 MB-18 ms ESD+	\$5,399	\$5,599	\$5,699
322 MB-18 ms ESD+	\$7,399	\$7,599	\$7,699

THE NEW 20MHz 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 and MS OS/2 applications (it runs OS/2 faster than IBM PS/2 Model 80), and with a remarkably small footprint, the System 220 is the ideal executive workstation for database management, business, or sophisticated connectivity applications. The system uses page-mode interleaved memory; the page-mode RAM operates at less than one wait state, and inter-leaving results in a performance increase of about 15 percent.

Standard Features:

80286 microprocessor running at 20 MHz.
1 MB of RAM expandable to 16 MB (8 MB on system board).
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.
Real-time clock.
Three full-sized AT+ compatible expansion slots.
Socket for 80287 coprocessor.
Dell System Analyzer.
MS-DOS and MS OS/2 compatible.
Security lock with locking chassis.
12 month on-site service contract (Available on complete systems).

Options:

3.5" 1.44 MB diskette drive.
Intel 80287 coprocessor.
1 MB RAM upgrade kits.

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 NEW 12.5MHz 286 SYSTEM 200.

A great value in a full-featured AT compatible. An 80286 computer running at 12.5 MHz, this system is completely MS OS/2 compatible. It's ideal for general business applications, as well as software development, local area networks, CAD/CAM, and desktop publishing. The System 200 offers high speed drive options, industry standard compatible BIOS, and on-site service. At these low prices, the System 200 is the best value in the 80286 marketplace. 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 adapter installed).
Socket for 8 MHz 80287 coprocessor.
Dell System Analyzer.
MS-DOS & MS OS/2 compatible.
Security lock with locking chassis.
12-month on-site service contract (Available on complete systems).

Options:

512 KB RAM upgrade kit.
8 MHz Intel 80287 coprocessor.

SYSTEM 200	With Monitor and Adapter			
Hard Disk Drives	Mono	VGA Mono	VGA Color	VGA Color Plus
20 MB	\$2,099	\$2,299	\$2,499	\$2,599
40 MB-40 ms	\$2,299	\$2,499	\$2,699	\$2,799
40 MB-28 ms	\$2,499	\$2,699	\$2,899	\$2,999
90 MB-18 ms ESDI	\$3,299	\$3,499	\$3,699	\$3,799
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Options:

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8 MHz Intel 8087.

SYSTEM 100	With Monitor and Adapter			
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Circle 76 on reader service card

Beyond the Speed Trap

Users demand standards and want effective, low-cost solutions, but vendors often offer incompatible products to gain marketing advantage.

Here are some tips for keeping your balance on different hardware and software platforms.



**Richard
Landry**

Of all the areas where computer users and vendors disagree, standardization is the most vexing. Users want standards for obvious reasons. Standards heighten competition by letting users compare price and features, even when they buy from multiple sources. Standards also help clarify the future direction of technology. When vendors are convinced that users will buy only standardized solutions, they think twice before launching a "better" technology that doesn't have a clean upgrade path.

Unfortunately, as Stewart Alsop points out this month in his column, vendors also use standards as a way to mask the competitive games they play with each other. Usually a vendor introduces a proprietary technology that it proclaims a new standard—an innovation necessary to deliver the performance that customers demand. In a growth industry like PCs, where the installed base expands and changes practically overnight, vendors dismiss the incompatibilities caused by the new standard as a temporary dislocation worth the improved performance.

But sometimes things don't work out as planned. Take IBM's AT and the multitasking operating system that was meant to support it. When the AT was in-

troduced in 1984, it didn't matter that the native mode of its 286 chip was incompatible with the PC's 8088; nor did it matter that a multitasking operating system to tap the 286 wouldn't be ready for an unspecified period. The 286 could run DOS programs, and PC boards could fit into the AT's slots. For the time being, the AT served as a faster (if pricier) XT for applications that needed the added power.

Four years later, the 286's deficiencies are crystal clear to anyone trying to preserve a sizable investment in DOS applications while preparing for an OS/2 future. The answer is the 386 platform, but 386-based systems capable of both multitasking old applications and running OS/2 still cost too much. Buyers find themselves trying to determine the lesser of two evils: whether to purchase a low-cost 8088/8086 machine and learn to live with single-tasking capability in a multitasking world; or to buy a reasonably priced 286 machine and learn to live with the limitations of OS/2's DOS compatibility box. One added complication: A version of OS/2 that takes advantage of the 386's virtual 8086 mode is slated to appear sometime in 1990; until then, 386s will *(continues)*

just run OS/2 as if they were faster, more expensive ATs.

That's what makes Intel's announcement of the 386SX microprocessor family so important (see *Industry Outlook* in this issue). In many ways, the 386SX is the chip the 286 should have been. With a control program like *Windows/386* or *Desqview*, it can multitask old DOS applications. It takes advantage of 386-specific software like *Paradox/386* and *FoxBase +/386* (reviewed in this issue). It has a 32-bit internal architecture and runs OS/2 just fine. And it's compatible with both the standard 386 and the more powerful chips (like the 80486) that will come after it. Moreover, because the 386SX has a 16-bit external data pathway like the 286, manufacturers will be able to sell 386SX systems for nearly the same price as current 286s.

What does that mean for the 286 market? Prices will plummet, making it unnecessary for buyers to consider 8088 or 8086 machines for any but the simplest applications. In this respect the 386SX chip is the most significant boon to users since the birth of PC clones.

For a time, you'll hear 286 vendors claim that the 386SX offers no special advantages for users who expect to operate entirely in an OS/2 world. Because the 386SX will first be available only in a 16-MHz version, OS/2 will perform slower on that chip than on higher-speed 286s. But 20- and 25-MHz 286 systems are fashioned from 16-MHz chips that are being pushed beyond their design specifications. It's unclear what data integrity problems a multitasking environment may uncover. These fast

286s might still make great OS/2 machines; but you won't be able to run either 386 control programs or the future OS/2 386, so make sure the price is right.

While the 386SX represents a solution that offers tangible benefits for the present and an upgrade path to the future, there's still no lack of minefields for users to navigate. Other new technologies—VGA graphics and the Micro Channel Architecture—are being pitched as inevitable next directions for the computer industry. The incompatibility and added expense are again being passed off as the price users must pay for added performance. But as in the past, it seems quite possible that these technologies will be leapfrogged by still more advanced versions.

For one thing, the VGA is likely to enjoy just a fleeting moment in the spotlight before it takes its place at the low end of the graphics spectrum. Most likely, the 1024 by 768 standard represented by IBM's 8514/A monitor and adapter will end up dominating the highly graphical environment of OS/2's Presentation Manager. Already Enertronics has introduced an 8514/A clone, and other graphics vendors tell me that the move toward higher-resolution graphics will happen sooner rather than later. Meanwhile, EGA cards can be bought for a song.

Second, it's true that the multimeter capabilities of the MCA will play an important role in speeding up I/O devices like graphics adapters, hard disk controllers, and network cards. But Compaq, among others, asserts that the current incarnation of the MCA in PS/2 products simply doesn't have the oomph to handle multiple intelligent devices—a claim IBM hotly denies.

Further, several vendors are privately showing minicomputer-like designs still based on the AT standard that, like AST's Premium/386, deliver high performance and handle multiple bus master devices. So unless IBM relents and offers clone vendors MCA licenses cheap enough to make it a true standard, we're likely to see several variations on the multiple bus master theme, all compatible with OS/2.

Several months ago in this column I reported Bill Gates's statement that *Windows/386* offers the best migration path to a new, more stable 386-based technology, while OS/2 represents the best way for developers to get up and running on that technology (see "Good News for DOS, Bad News for IBM," December 1987). Now more than ever, it's clear that he's right. Although there are a number of ways to get there—*Windows/386* and *Desqview* among them—the future belongs to the 386.

It's less clear, though, that the MCA or any other bus technology really matters. If that's the playing field on which computer vendors want to butt heads, then let them knock themselves silly trying to outdo each other in price and performance. Smart users will stick with tried-and-true performers until the dust settles and new standards have really taken hold.

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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REVIEWER'S CHOICE

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WHAT OUR REVIEWERS SAY...

PC users employ a slew of RAM-resident programs—spell checkers, thesauri, keyboard macro programs, print spoolers, desktop organizers, notepads, calculators and more. These “pop-up” programs provide convenience and enhance productivity.

The problem with these programs is managing them. Some create memory or keyboard conflicts and therefore can't be loaded with others, while some gobble up so much memory that you can't use anything else. POP DROP solves these aggravating problems by allowing you to actually remove, replace, even deactivate RAM-resident programs—*without rebooting your system!* This program will also let you manipulate programs that reside in EMS—so you won't have to perform mental gymnastics just to “make room” for programs you need to run. POP DROP is an excellent tool for making different programs resident when you switch to another program that may not accept them. And POP DROP won't interfere with your backup program.

Voted one of “The Best Of The Best Utilities” by *PC Magazine*, POP DROP is one program you shouldn't be without—reasonably priced, 100 percent reliable and *very* easy to use. Stop wasting valuable time—put POP DROP to work for you.

The Answer To RAM-Resident Conflicts

PopDrop works by dividing your memory into layers—*up to 16*—each of which may contain several programs. After loading DOS and your permanent programs, RAM-resident programs are loaded with these layers between them, the most permanent at the bottom, the least permanent at the top. You can create batch files to remove layers one at a time, or several at once.

You can clear all memory or all layers with one command, freeing up the RAM those programs required—it couldn't be easier.

For example, if you want to run RAM disk, a print spooler and one or more pop-up programs most of the time, but need them out of the way to work on a large spreadsheet, you can do it easily with POP DROP. If you need different programs resident when you switch to another application—it's no problem. In fact, you can use POP DROP in your batch files to make this automatic.

In addition, PopDrop will let you “activate” and “deactivate” programs in a specified layer of RAM that may conflict with the program you're using. The programs remain intact, but stay out of the way until you “activate” them again.

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PopDrop displays show how much memory is being used, and which programs are active, the order in which they're loaded and how many bytes each consumes. You'll never see another “Insufficient Memory” error on your screen again.

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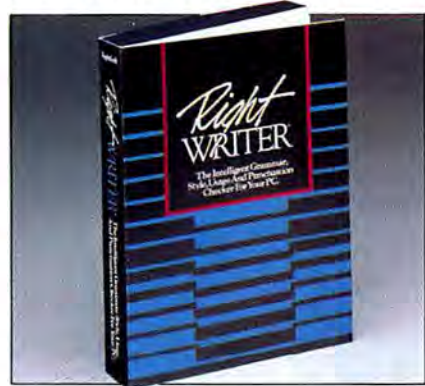
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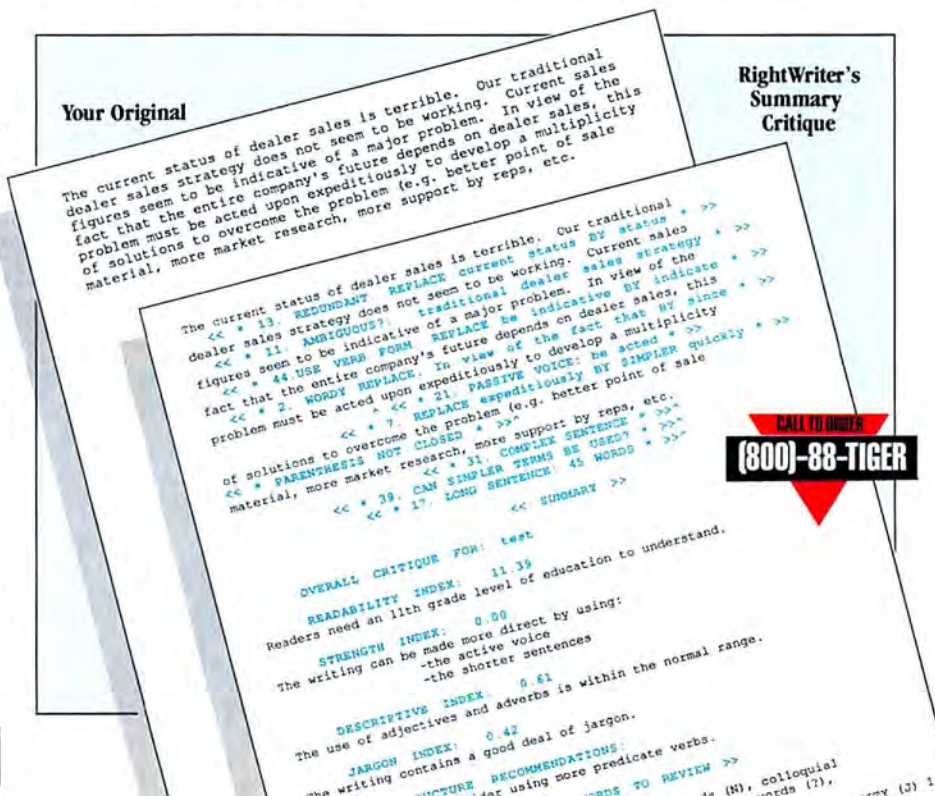


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FORMTOOL will allow you to incorporate dozens of special characters and graphic symbols into your forms, and it has powerful text manipulation capabilities. Just wait until you see how miraculously easy it is to draw lines!

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Anatomy Of A FormTool Form

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

Perfect Corners

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Line Width

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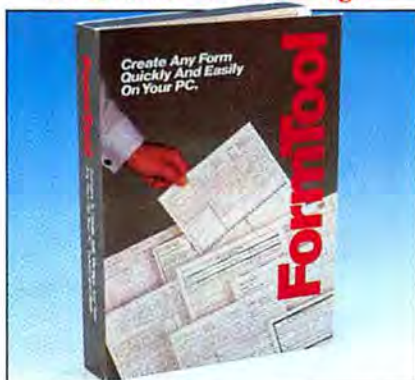
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Reason:	☐ Pre-Sale Info	☐ General Product Usage	☐ Product Problem	☐ Product Defect	☐ Other Inquiry
Area:	☐ Program	☐ Printing	☐ Data	☐ Files	☐ Disk
SYSTEM RELATED PROBLEMS		PRINTING RELATED PROBLEMS			
Computer Brand:		Printer Brand:	Printer Model:		
Computer Model:		Printer Type:	☐ Dot Matrix ☐ Thermal ☐ Laser ☐ Daisy Wheel ☐ Plotter ☐ Other		
DOS Version:		Program Selection:	☐ LPT1: ☐ LPT2: ☐ LPT3: ☐ MIN: ☐ FILE		
RAM Memory:		Program Port Selected:	☐ COM1: ☐ COM2: ☐ LPT1: ☐ LPT2: ☐ LPT3: ☐ MIN: ☐ FILE		
Vide Card:		Actual Port Selected:	☐ COM1: ☐ COM2: ☐ LPT1: ☐ LPT2: ☐ LPT3: ☐ MIN: ☐ FILE		
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PC WORLD

August

Low-Cost Computing

As the computer industry focuses on building high-powered 386 machines, the bottom is falling out of the 286 and XT markets. Yet those systems have all the power that most people need to do their business computing. PC World looks at five ATs for under \$2000 and five XTs for under \$1300.

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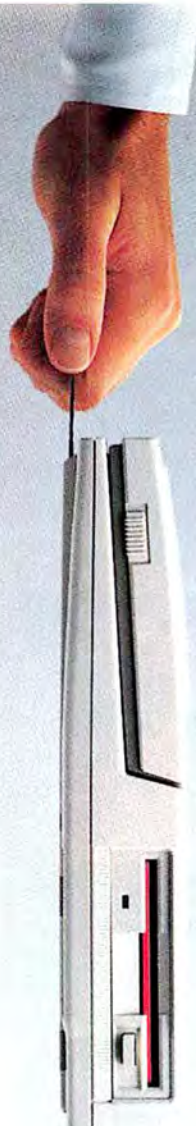
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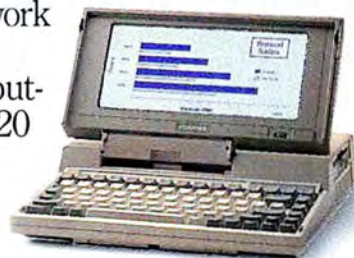
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Stop That Bus!

IBM says that if you don't jump on the Micro Channel bus, you'll get stranded in the technological past.

But you may be better off skipping the ride altogether.



*Stewart
Alsop*

Did you ever see the IBM PS/2 ad that's headlined "Don't Miss the Bus"?

In case you don't remember (which would only speak well of your ad-reading habits), IBM placed a two-page ad with that headline in several prominent business magazines to sell the idea that the most important feature of its PS/2 line was the Micro Channel Architecture. The ad copy claimed that you could install multiple processors without suffering as much performance loss as you would with the PC AT bus, that the Micro Channel was more reliable, that it worked better with multitasking operating systems, and so forth.

Most of us could have continued to live in blissful ignorance of the PS/2's underlying architecture had computer manufacturers not conspired to convince us that the underlying architecture of their systems is the most important factor we should consider when buying a computer. When I say conspire, I am dead serious. In reality, this is a technical smoke screen behind which the various competitors have hidden their marketing strategies. Nothing more and nothing less.

The motivation behind IBM's marketing hype is clear. In trying to regain some market advantage, IBM introduced a new

and theoretically better architecture for its established profit base: large corporations already on line with mainframes. IBM says the way to satisfy that market is to provide machines with multiple processors that can run many tasks quickly, all communicating either directly or through local area networks, without any loss of data.

Compaq, on the other hand, has the task of convincing PC buyers that Compaq's computers represent a safer investment than Big Blue's. By promoting its own proprietary architecture, the Flex Bus, Compaq offers users improved performance coupled with PC compatibility—a direct challenge to the Micro Channel tack. Compaq says the cards you connect to personal computer architecture—stuff like network adapters, communications processors, and graphics adapters—don't and won't run any faster than the speed allowed by the existing PC AT bus, even if those cards are enhanced with faster processors. So Compaq has adopted an architecture with multiple buses where the speed of the input/output bus (for communications between peripheral cards and memory) is as
(continues)

fast as the fastest peripheral card; the speed of the memory bus (for communications between cache memory and main memory) is as fast as the fastest memory; and the speed of the processor bus (for communications between cache memory and the processor) is as fast as the fastest processor. That way, Compaq says, everything is optimized for peak performance without forcing users to buy new expansion cards.

AST Research has a somewhat harder task. Coming from behind as a new system supplier, AST is trying to show that not only are its new systems high performers like Compaq's, but that they also have the multi-processor capabilities IBM offers—all without sacrificing compatibility. So AST introduced Smartslot, which modifies the existing AT architecture by adding a few new electrical signals and a new controller chip to give it the ability to handle multiple processors. This allows users to keep their existing cards while adding new ones with the cards' own processors. AST has implemented Smartslot in its Premium/386 and says it will allow anybody else to implement the same bus in their computers in the hope that the extension will become part of the standard.

Dell and Tandy have taken a slightly different approach, producing Micro Channel-compatible systems that they claim offer superior performance. In fact, manufacturers can implement a multiple bus for the Micro Channel just as easily as they can for the PC AT (for example, Compaq's Flex Bus). So not only can

Events in the computer industry are rendering arguments about the virtues of one hardware architecture over another moot.

these companies design a Micro Channel machine that is fully compatible with IBM's PS/2 Model 80, they can also build one that outperforms it.

Finally, Acer Technologies—the biggest Taiwan-based maker of PC compatibles—is taking the most audacious approach of all. As long as you're asking customers to buy entirely new add-in cards, Acer says, you might as well go all the way and use the best bus available. Many people believe that Acer's Nubus, which it licensed from Texas Instruments, fits that bill. Similar to the Micro Channel, the Nubus is slightly better at handling multiple processors simultaneously and can be implemented in a computer design using any processor. The most famous licensee of Nubus so far is Apple Computer, which has used it for the Motorola 68020-based Macintosh II. Acer is hoping to capitalize on board development for the Macintosh, since Macintosh Nubus boards would work on PC Nubus computers with the appropriate software drivers.

But none of this really matters because events in the computer industry are rendering arguments about the virtues of one hardware architecture over another moot. The industry is undergoing a broad transition from unconnected, single-tasking, character-based, interrupt-driven computers to networked, multitasking, graphical, integrated computer systems. This transition will produce two results.

First, personal computers will be "virtualized," which means simply that the application software you and I use won't talk directly to the hardware anymore. As we begin to use virtual operating systems such as OS/2 and UNIX (and whatever Apple might have up its sleeve), the specific circuitry in the underlying hardware design will simply cease to matter since you will be able to move between different machines without changing your software or your style of computing.

Second, processing will be distributed so that the key issue will not be how much processing power is available inside your machine (although that will still be important), but how much is available within the network to handle the task you want to perform. You might be in the middle of sorting a data base of prospects when you suddenly need to write a memo. The network operating system will parcel out the data base sort to the file server or to another machine in the network while you use your processor for word processing.

(continues)

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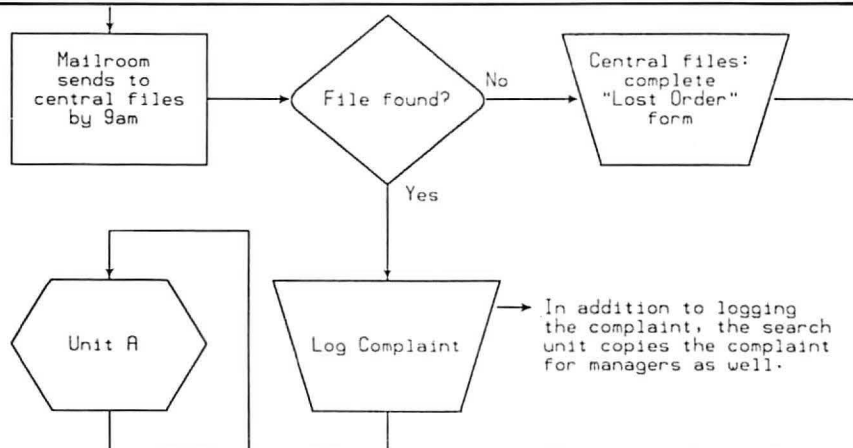
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* March 10, 1987 issue, page 278

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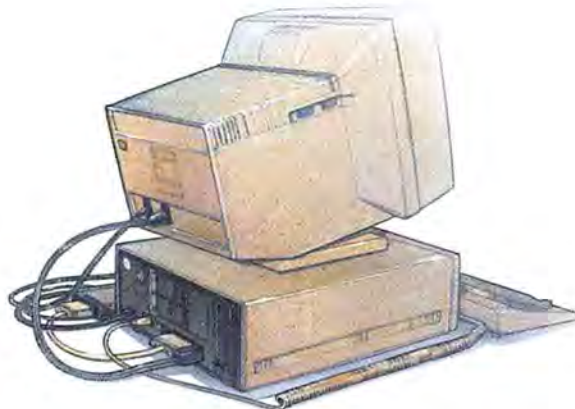
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And you won't notice any performance hit. In that sense, IBM is right in stressing the need for a high-performance "channel" that moves data efficiently in and out of your machine. And the other companies are right in saying that you don't need IBM's specific solution to the problem.

Meanwhile, I'm beginning to get a little weary of the bus wars, which serve only to confuse a lot of people and force many others into a level of technical training that is absolutely contrary to the spirit and tradition of the personal computer industry. Indeed, the company that makes the most sense to me is the one that says: "The hardware doesn't matter." That company is Sun Microsystems. So far, Sun has introduced hardware based on three different processors—the Motorola 68000 family, the Intel 80386, and the SPARC family that it designed and licensed—yet the basic set of operating systems and applications it sells runs on all three kinds of hardware. Now, that's interesting. It's so interesting that I can't wait to see Sun Microsystems really get into the personal computer business and give the bus warriors a little taste of hardware independence. ●

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



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IBM and Compaq: A Contrast in Strategies

IBM may have thought itself into a corner with its proprietary Micro Channel Architecture and the Personal System/2 line of computers. Just ask Compaq.



**William F.
Zachmann**

Over the past few years, as everyone knows, IBM hasn't been nearly as successful as Compaq in selling personal computers. Compaq virtually came out of nowhere (Texas, actually) six years ago to become IBM's single biggest challenger in personal computer sales.

In 1987, although IBM's overall sales remained well ahead of Compaq's, its personal computer revenues barely grew while Compaq rocketed ahead in market share. Compaq actually sold more 386-based personal computers in 1987 than IBM did, and it has continued to outsell IBM in this category in retail stores through early 1988.

Compaq's original transportable system established an early lead that IBM has been unable to overcome. IBM's own transportable was a dismal failure: Aside from those unfortunate Harvard Business School students who were required to purchase it a few years back, hardly anybody bought it.

In last year's *PC World* World Class PC Contest, the Compaq Deskpro 386 became the first non-IBM system to win in the desktop category. That award is particularly significant because in every other contest category

to date, Big Blue has never regained a title once it lost to another vendor. Compaq may even retain its lead over IBM in sales of 386-based systems.

Despite millions of dollars spent promoting and advertising the more proprietary PS/2 line and the Micro Channel Architecture, IBM hasn't even put a dent in Compaq's market share—after more than a year of trying. On the contrary, Compaq continues to gain share from IBM.

How can this be? How can a company that didn't even exist when IBM introduced its original PC pose a serious challenge to IBM's dominance in the personal computer market? What is Compaq doing that IBM hasn't done?

The answers to these questions reveal a great deal about IBM's approach to the personal computer market, the market itself, and both IBM's and Compaq's competitors. The answers also suggest what it will take for IBM to retain its position as the world's largest computer vendor.

The first thing about Compaq's success is that it is unquestionably not based on lower prices. On the contrary, Compaq's price points are typically quite high compared to those of the more aggressively priced products from competitors.

(continues)

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In fact, the real costs of acquiring Compaq personal computers aren't much lower than for comparable IBM models. And in some cases, heavy IBM discounts for large corporate buyers can drop IBM's prices below Compaq's. Buyers concerned primarily with price can do much better with other vendors than they can with either IBM or Compaq.

Two important factors in Compaq's success have been quality and performance. Compaq's systems have a reputation for reliability that is every bit as good as IBM's. At any point in time, Compaq systems have offered better performance than have comparable IBM models.

For example, a recent best-seller has been the Compaq Deskpro 386/20. Despite all the hype about the Micro Channel Architecture and the supposedly superior technology of IBM's PS/2 line, the Deskpro 386/20 outperformed IBM's top-of-the-line PS/2 Model 80-111. While the superior performance of recent Deskpro 286 models compared to PS/2 Models 50 and 60 was due largely to the Deskpro's faster clock speeds (12 MHz versus 10 MHz for the IBM systems), the Deskpro 386/20 outperformed the PS/2 Model 80-111 at identical clock speeds despite its MCA bus.

But Compaq's superior performance doesn't sufficiently explain its success, either. Individual products from other vendors have often performed better, sometimes at much lower prices. True, Compaq has consistently and reliably delivered better performance than IBM has, while others have done so much more

sporadically. Still, there is more to the bigger picture.

A fourth factor in Compaq's competitive success, the consistent ability to deliver products to market ahead of IBM, gets closer to the heart of the matter. From the start, Compaq's strategy has been to offer capabilities that IBM doesn't.

The initial Compaq Portable is a perfect example. Although Adam Osborne's innovative systems preceded Compaq's, they were Z80-based CP/M—not DOS—systems. Compaq offered IBM PC compatibility in a quality transportable system well before IBM did.

More recently, Compaq's original Deskpro 386 was months ahead of IBM's first 386-based PS/2 Model 80. By the time IBM was ready to ship the initial 16-MHz Model 80, Compaq was already shipping the 20-MHz Deskpro 386/20. Similarly, even before IBM announced the 10-MHz 286-based PS/2 Models 50 and 60, Compaq had moved to 12-MHz 286 parts for its Deskpro 286 models.

Compaq's excellent 386-based transportables are yet another example of the company's consistent ability to stay well ahead of IBM in providing users with real product capabilities. Once again, IBM has lagged far behind Compaq in offering a comparable product. IBM seems to be constantly playing catch-up with Compaq's innovations.

Yet another factor in Compaq's success has been its ability to remain faithful to the underlying standard that IBM created
(continues)

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with the original IBM PC, XT, and AT. The innovations that have kept Compaq ahead of IBM in real product capabilities have been in better ways of implementing the standard that IBM unintentionally created.

Compaq has obviously excelled in this regard. IBM, with the PS/2 line and the Micro Channel Architecture, created a partially incompatible variation on its standard that cannot use earlier add-in cards and gives users a major conversion headache. To make matters worse, IBM has been unable to offer performance or functional capabilities as good as those Compaq continues to provide with "industry standard" systems.

Perhaps the most significant difference in IBM's and Compaq's strategies, however, is to be found in their degree of commitment to a truly open architecture. For IBM, the days of full disclosure and complete documentation of its systems are over. One purpose of the more proprietary Micro Channel Architecture of the 286 and 386 PS/2 models was to eliminate competitors rather than deliver real value to customers.

The contrast between the strategic approaches taken by IBM and Compaq could hardly be more dramatic than in their current personal computer system documentation. The detailed specifications and the BIOS listing of the first IBM Technical Reference for the IBM Personal Computer are little more than a memory today.

While IBM's current documentation policy comes up short, manuals like the two-volume

Compaq Deskpro 386/20 Technical Reference Guide contain component layouts, precise schematics, and detailed descriptions of BIOS functions.

Compaq's thorough documentation improves on the standards IBM set with its original PC documentation (but later abandoned in favor of a more closed, proprietary approach). In addition, the documentation distinguishes Compaq's approach from that of most vendors of lower-cost compatibles who often provide minimal (if not downright inadequate) documentation.

Had IBM, like Compaq, concentrated less on the sizzle and more on the steak; had IBM invested more of its resources in real innovation rather than in ways of building more proprietary systems; had IBM worked harder trying to figure out how to deliver real value to customers instead of eliminating competitors, then Compaq's competitive gains probably would not have been as great. IBM would do well to learn from these facts if it is not to suffer even greater competitive losses in the future. ●

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

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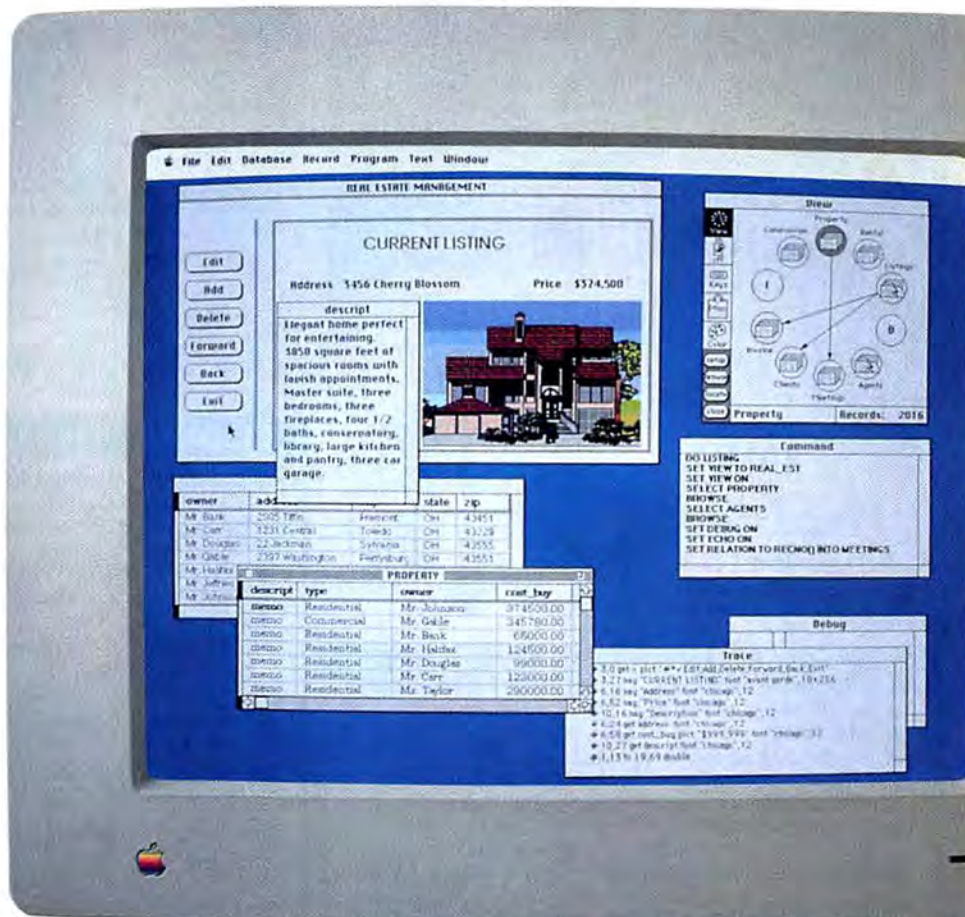
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INDUSTRY **IO** OUTLOOK

Edited by ERIC BENDER

Micro Channel Clones Arriving

Tandy, Dell First to Market With PS/2 Compatibles

Vendors Question Demand; Many Await Backlash



These generic-looking Tandy (right) and Dell (left) PCs hide Micro Channel functionality.

A year after IBM's PS/2s first appeared in public, two Texas firms won the footrace to copy IBM's highly touted, controversial Micro Channel Architecture. But even as they broke the tape, the two vendors dismissed suggestions that the Micro Channel is a sure ticket to success.

Although Fort Worth's Tandy may be first to market, Dell Computer garnered the product announcement honors in mid-April. The Austin firm slated fourth-quarter shipments for both Model 60 and Model 80 work-alikes. Dell's top-end ma-

chine includes a 20-MHz 80386 with Intel's fancy 82835 memory-caching controller; 2MB of memory, VGA graphics, and a 3½-inch drive. Its high-speed hard disk options range up to 610MB. Dell wouldn't disclose prices but indicated the machines would cost about 30 percent more than equivalent AT-style offerings.

Three days later, Tandy made its move with a Model 80 compatible that looks very much like Dell's 80386 system. This machine is scheduled to arrive in July in many variations; a configuration with a 40MB hard disk but without a monitor will cost \$6499.

Dozens of other suppliers also have been polishing prototypes, and a few joined the parade in the weeks following. But Compaq, Zenith, and most other prominent vendors stayed on the sidelines, though they admitted they have been quietly "studying" compatible designs for months.

The PS/2's VGA and its accompanying analog monitors have quickly grown into a graphics standard. IBM's 3½-inch floppy drives are also popping up with increasing frequency, although they're not necessarily re-

(continues on page 78)

Battling Spreadsheets

Under Fire, 1-2-3 Still Dominates

Quite suddenly last spring, Lotus Development realized that its next-generation 1-2-3 release 3 wouldn't be ready for prime time until the fourth quarter. That leaves the 2½-year-old release 2.01 under increasing fire from a bevy of ruthless competitors.

"This is certainly a year when other people are going to make inroads with spreadsheets," remarks Paul Funk, president of Funk Software in Cambridge, Massachusetts, which supplies 1-2-3 tools.

(continues)

Sales: DOS Spreadsheets



Infocorp estimates show a steady expansion for U.S. sales of DOS spreadsheet packages, though by 1990 the market is predicted to dip slightly as OS/2 spreadsheets enter in force.

Spreadsheets

(continued)

No one expects Lotus to lose its dominant position. "Last year, it shipped more than a million copies of *1-2-3*," estimates Bill Higgs, analyst at Infocorp. The closest competitor, Computer Associates' *SuperCalc IV*, sold less than a tenth of that.

But now Lotus is fighting off fierce attacks from above (Microsoft's *Excel*) and below (Borland International's *Quattro*).

Selling at less than half the price, *Quattro* is roughly comparable to the current *1-2-3* in features, "and it's from a company that has a well-established reputation for good price/performance," notes Higgs. The release 3 delay "opens it up a bit for *Quattro*; nine months is a long time to wait.

"*Excel* is arguably a better product, and it has the necessary amount of *1-2-3* compatibility," Higgs says. "But it's for a very restricted subset of the market—fast 286s and 386s. Microsoft has to be ecstatic if it gets 10 percent of the overall market." Microsoft is focusing on an upcoming version for OS/2's Presentation Manager, which will compete with Lotus's *1-2-3/G*, Higgs maintains.

"*1-2-3* has been on top of our Hot List for more than 270 weeks, and we don't think anything will replace it in the near future," says Jim Novy, spokesperson for Softsel, a major distributor. "Sales remain strong, and it doesn't appear that *Excel* or *Quattro* is taking busi-

ness away from it. But all three products are doing really well."

"Lotus will remain the dominant spreadsheet supplier for the foreseeable future, but that doesn't mean things aren't changing," predicts Mort Rosenthal, chairman of reseller Corporate Software. "It's lost some market share, but not that much in the corporate market."

According to Rosenthal, "some accounts are turn-

ing to *Excel*, but most of those are typically switching only for new users." While *Quattro* gets a lot of attention, its not luring large numbers of corporate customers, who want *1-2-3*'s support infrastructure and aren't tremendously concerned with price, he says. Rosenthal remarks that "release 3 is a really terrific product and probably will embarrass some of the people who switched."

It's far too early to predict how many current

users will upgrade, but release 3's delay is bound to reduce Lotus's sales and profits in 1988. Even when volume discounts and reseller margins are subtracted, half a million upgrades at \$150 each would have represented a nice piece of change. But Lotus isn't hurting too badly, posting sales of \$117.3 million (a record) and income of \$18.3 million in the quarter ended April 2. —E. B.

Intel Debuts Cheap 386

Lower Cost Versions of 386 Computers to Appear by Year-End



Intel's downsized 32-bit processor: the 386SX (bottom)

If the high price of 80386-based PCs has kept you putt-putting along in an 80286-based machine, Intel may have a solution. In June, the Santa Clara chip maker unveiled a new lower cost version, the 386SX microprocessor, that it hopes will replace the 286 altogether.

Intel plans to make the 386SX, which runs at a respectable 16 MHz, the

keystone of an 80386-based PC world. According to the Intel blueprint, faster 386s like the firm's new 25-MHz chip will drive high-end office PCs, file servers, and workstations, while the 386SX will reach the middle-to-low-end market now dominated by 286s.

"Intel would eventually like to be out of the 286 chip business," asserts Intel marketing director Claude Leglise. His company's motives aren't entirely altruistic; the chip maker could save millions in production costs by tooling up only for 386s. Additionally, Intel is eager to promote its 32-bit microprocessor because, unlike its previous processors, the 386 will be available only from Intel.

The 386SX is not aimed at the millions of users who might want to pop a

386 processor into their 286 machines, but it is compatible with the system-board architecture of 286 machines and will sell to manufacturers for 30 percent less than standard 386 chips.

The chip combines 32-bit internal processing with 80286-style connections to surrounding circuitry (a 16-bit data bus and a 24-bit memory-address bus), in a package roughly a third the size of a standard 386. Additionally, "with the exception of the motherboard," says Leglise, "manufacturers will be able to use the 286 parts inventory to build an SX machine." Those parts are considerably less expensive than their 386 counterparts.

To further help manufacturers make the transition, Intel plans a family of SX silicon.

The 386SX is already on its way to system builders, and Intel believes the first PCs incorporating the chip will appear in the fourth quarter. At least three manufacturers are creating 386SX products. —Wes Nihei

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Quadram Stays Diverse

But Delays Hurt Market Share

Once famous primarily for memory add-ins, Quadram is now spread all over the map—from video adapters and accelerator boards to printers, terminal emulators, and fax cards. In the past two years, it's been struggling for visibility in many of these markets.

Quadram's image is further obscured by the shadow of its parent, Intelligent Systems, which owns a diverse portfolio of vendors. The Norcross, Georgia-based Quadram is the largest employer among Intelligent Systems' companies, with just under 200 workers. Video-7, one of the hotter graphics suppliers, is first in sales. Intelligent Systems also owns Princeton Graphics (monitors), Peachtree Software (accounting software), and Datavue (portables).

Although Quadram has helped some of its siblings expand distribution, such favors are not always returned. Currently, Video-7 is a direct rival in graphics. "We do compete with them, but we don't sell the same product," says Quadram president Frank Marks. "That's the philosophy that Intelligent Systems works under."

It's not a philosophy that's helped Quadram's graphics results, however. "They've lost some market share in the EGA and VGA markets," says Joan-Carol Brigham, an analyst with International Data Corp. "They were late with their VGA board, and they have

about four-tenths of a percent of market share for VGA. In terms of their market share for EGA, they're not in the top five; they're in the 'Other' category."

Quadram increasingly engineers its products in-house rather than relabel-

ing equipment from other suppliers, and it's come up with promising concepts. Today, 40 percent of its shipments are for offerings introduced in the past year, Marks says.

Delays have hurt. The Quad 386XT, for example, which was to be the first 80386-based accelerator card that worked on XTs, shipped considerably behind schedule.

Intelligent Systems, which showed profits of \$10.2 million on revenues of \$163.2 million in 1987, does not break out Quadram's results. However, while margins are not as high as Marks would like, he says the company is profitable. "The financial situation at Quadram is acceptable," he adds. "We are doing a better job than we were doing several months ago." —Daniel J. Rosenbaum

Erasable CDs on Horizon

Tandy's THOR Promises Cheap, Very Large Storage Capabilities



PHIL ANDERSON

Tandy has startled the recording and data-storage industries by abruptly revealing technology for erasable compact disks. THOR (Tandy High-intensity Optical Recording) will let customers record music or other digital data on a special drive and then play it back on any standard CD audio or CD ROM player.

THOR leverages a thermo-optical process that creates bubbles on the CD's recording surface.

The CD then behaves exactly like a conventional CD or CD ROM disk, holding more than half a gigabyte of data.

Tandy expects to release consumer audio drives within two years for less than \$500 and follow that a year later with data-storage devices that will carry a higher price tag. The technology will be licensed to other manufacturers.

If this comes out of the lab and into customers' hands, "it's a technology breakthrough," declares John Dunkle, senior analyst with The Yankee Group. "It blesses erasable optical storage and puts it into the price realm of what people are willing to pay."

However, Scott McCready, a senior analyst at CAP International, remains skeptical. Noting that Tandy showed the results for only 40 erase/write cycles, he comments that "I'd like to see half a million cycles." He also notes unresolved questions about the stability of the recording medium. Other electronics giants with strong optical development efforts, most notably Sony, are likely to make a move.

THOR already has fed the fire of copyright debates. The recording industry, which has done its best to stonewall digital audio tape, fears a hammering by THOR. But Tandy chairman John Roach expects the massive installed base of CD players will override the opposition: "How do you stop a train that's going down the track?" —E. B.

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Traveling Software's Secrets to Access

Taking the Show Off the Road

Traveling Software, one of the first companies to write software for laptops, has expanded its target from traveling people to traveling information.

President Mark Eppley defines his company's focus as "accessibility software, which allows different computing and functional environments to work together painlessly." That approach brings harmony between your accountant's laptop running 1-2-3 and your desktop running *Microsoft Excel*, between your *WordStar* documents and your partner's *Microsoft Word* files, or between your PS/2 and your maverick assistant's Macintosh.

The Bothell, Washington, firm combines two approaches. In March 1987, it introduced *Lap-Link* for file transfer between desktops and laptops. But, Eppley reports, about 40 percent of the 10,000 *Lap-Link* cabling/software packages sold every month end up transferring data between 5¼-inch and 3½-inch floppy drives.

This year he introduced *Desk-Link*, which is optimized to connect desktop PCs via standard phone wire and transfer files at speeds of more than 115,000 bps. The \$169.95 hardware/software solution lets you use programs and files on both



Mark Eppley has given PCs some good connections.

machines, transfer files between them, run printers attached to either, and swap messages with the person sitting at the other machine. A

short time later, Traveling Software rolled out *Lap-Link Mac*, a \$139.95 PC-to-Mac connection.

But the company is not abandoning the laptop—which Eppley calls the only remaining personal PC. Instead, it aims to integrate laptops into the corporate computing environment.

Corporations keep buying the little machines because they can be easily reassigned from one employee to another, taken home or on a trip, and stashed in a drawer when not needed. And the breed is improving. "1988 and 1989 will bring incredible breakthroughs in flat-panel display technology," Eppley forecasts, "and before 1990 we'll see laptops with EGA and VGA color."

Eppley was living on the road for the Big Eight

accounting firm of Peat, Marwick, Mitchell & Company when he first saw the potential for the laptop market. Formed in 1981, Traveling Software today supplements accessibility software with catalog sales of other laptop software, hardware, and accessories—all of which the fast-talking founder loves to demonstrate.

The company continues to hold Friday afternoon beer-and-popcorn meetings, and "we haven't installed the bureaucracy yet," Eppley says, grinning. But sales have tripled since last July, employee count has grown to 22, and he expects to double sales and staff within a year. What's the secret? "Pay attention to customers and listen to what they want," Eppley replies. "I know this sounds trite, but very few people really do it." —Nancy Andrews

DRAM Inconvenience

Memory Prices Rise Sharply

Partly it was the unexpected demand—particularly the strong sales of expensive machines with heavy helpings of dynamic random access memory (DRAM).

Partly it was the effect of the falling dollar on the Asian suppliers who dominate DRAM.

Partly it was the lagging effect of pricing restrictions that the U.S. enforced against Japanese vendors accused of dumping memory chips. (As disgruntled PC manufacturers put it, the government slammed the door

after the horse was stolen, and then decreed higher prices for horses.)

Mostly, DRAM manufacturers simply guessed wrong—gearing up for 1-megabit memory modules and down-scaling their 256-kilobit production lines too soon.

Whatever the reasons, DRAM prices clearly soared this year, and customers felt the pinch. "Our prices have doubled or tripled since December," laments Nora Gildea,

marketing director at IDEAssociates in Billerica, Massachusetts. Vendors passed the increase along to customers. The effect on system pricing was less severe, but the customary 20 percent annual price decreases will be pared down.

Demand, particularly for 1-megabit chips, is being met slowly. But factories are cranking up, and many observers expect the picture to look much brighter by year-end. "The semiconductor industry periodically has its little quirks and hiccups," remarks Dataquest's Peter Teige. "There may be a glut of memory by early next year." —E. B.

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Less: Returns	324	338	681	452	461	478
Less: Sales Discounts	268	273	279	284	298	296
Net Sales	18,188	18,463	18,495	19,109	19,482	19,868

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Gross Sales	18,780	19,074	19,455	19,845	20,241	20,646	21,059	21,480	21,910	22,348	22,795	23,251
Less: Returns	324	338	681	452	461	478	489	495	509	519	527	537
Less: Sales Discounts	268	273	279	284	298	296	304	314	324	334	344	354
Net Sales	18,188	18,463	18,495	19,109	19,482	19,868	20,276	20,683	21,097	21,515	21,938	22,369

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Tandy, Dell

(continued)

placing 5¼-inch drives anytime soon.

But the PS/2's key innovation is its Micro Channel Architecture—the radical revamp of the AT's internal structure that rules out traditional add-in cards. The Micro Channel has variously generated hype, yawns, and confusion during the past year. Those who duplicate it face both legal and marketing risks.

IBM warns that it will protect its PS/2 intellectual property rights—particularly the patents now pending for the Micro Channel. Competitors generally acknowledge that even after they produce original designs equivalent to the PS/2, they'll need a license to bring their creations into 100 percent compatibility with IBM's architecture.

For more than a year, the rumor mill has churned away: What would IBM license, under what terms, and to whom? The first real clarification came only days before Tandy and Dell's mid-April announcements. IBM disclosed plans to license patents but to charge up to 5 percent of product cost—five times its previous rate.

Like so many contenders, Dell and Tandy have lately grown very familiar with IBM's lawyers. "IBM has assured us that a license will be available," states Dell chief Michael Dell, who adds that he expects IBM to make such a deal with many firms. Tandy declares that its entry is

currently covered by an existing cross-licensing agreement and that when IBM gets the PS/2 patents, another agreement will be struck. "We are not aware of any ground for challenge," says Chairman John Roach.

Outsiders speculate that Dell and Tandy got an early nod from Big Blue because they don't directly challenge IBM's corporate customer base and dealer distribution channel.

Still, the two manufacturers announced their products before final legal papers were signed. "I don't think anyone knows how IBM is going to react," remarks David Carnevale, Infocorp's vice president for micro systems research. IBM could decide to take PS/2-compatibles makers to court and tie them up there for years, he points out.

But Carnevale and others add that IBM's best course may be to let these products reach the market. "IBM needs this to happen," suggests Dataquest analyst Peter Teige. "Building the Micro Channel to critical mass is more crucial than [ensuring that] all the boxes have the IBM label on them. IBM is probably offering assurances behind the scenes."

With hundreds of Micro Channel add-on products now available, IBM clearly has convinced board makers. But many customers remain unmoved, because the Micro Channel's benefits seem to be almost as far away as when the bus first appeared.

Some features will prove important, like "bus master" support for jug-

gling multiple intelligent devices, predicts Tandy senior vice president John Patterson. But Patterson says flatly that today the Micro Channel offers no advantage over AT designs in overall system performance.

Even Tandy and Dell are soft-pedaling the Micro Channel's advantages, admitting that they are simply offering the feature as a customer option. "They're hedging their bets in case the Micro Channel becomes a significant product," according

to Carnevale. "No one has done a good job of separating the customer requirement for the name IBM from the customer need for the Micro Channel."

IBM's Models 50 and 60, meanwhile, are seeing rather dramatic discounts on the street. But IBM was expected to bolster margins in June with upgrades of current models, as well as a 386 desktop system and 286 and 386 "lunch box" portables. —E. B.

Fluegelman Award Shared



David Bunnell (holding plaque) with Andrew Fluegelman Award winners (from left to right) Bill Atkinson, Jeremy Jaech, Clyde McQueen, and Ted Johnson.

This year's Andrew Fluegelman Award went to the developers of *PageMaker*, Aldus's desktop publishing pioneer; and *HyperCard*, Apple's unique tool for cataloging and linking Macintosh information.

The authors—*PageMaker*'s Jeremy Jaech, Ted Johnson, and Clyde McQueen and *HyperCard*'s Bill Atkinson—shared a \$5000 cash prize.

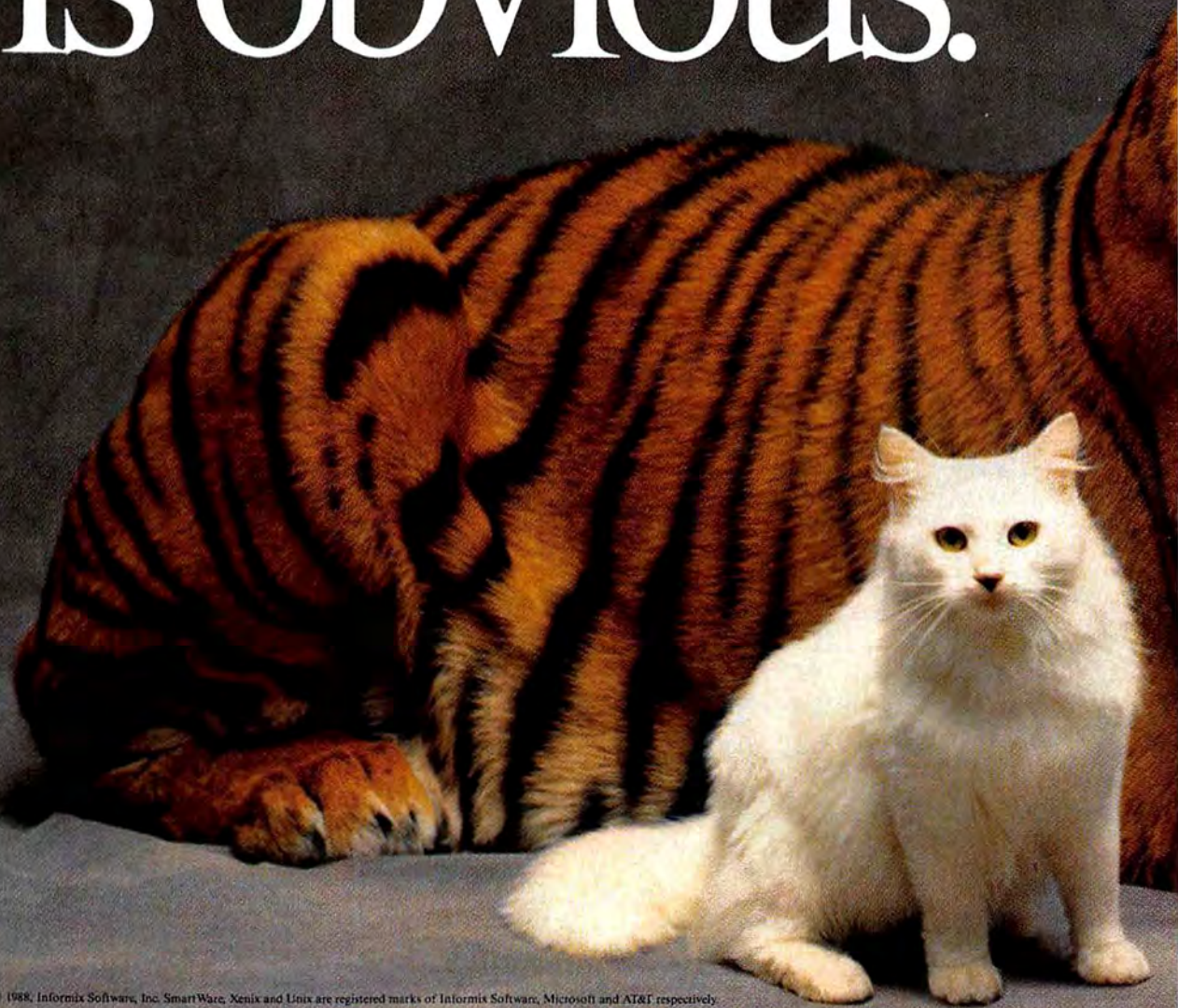
Designed to recognize programmers who make substantial and innovative

contributions to personal computing, the award is sponsored by the Software Publishing Association and PCW Communications. It commemorates Andrew Fluegelman, founding editor of *PC World* and *Macworld*, creator of the shareware concept, and author of the *PC-Talk* communications package. —E. B.

Nancy Andrews is a freelance writer in Seattle; Wes Nihei is a PC World assistant editor; and Daniel J. Rosenbaum is a frequent contributor to PC World. ●



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Waiting for dBASE IV

A built-in compiler, 240 added commands, and support for SQL will make dBASE IV far more powerful than previous versions.

William
Urschel

But will users find the new front end more comfortable?

Few programs have rumbled as loudly before their release as *dBASE IV*. Ashton-Tate announced this major upgrade in February, yet at press time the release was set for late July. Can Ashton-Tate really address all the criticisms of its aging monarch with this long-awaited revision?

Judging by a recent beta copy of *dBASE IV*—which appears to be close to a finished product—the preliminary answer is: mostly. *dBASE IV* parries attacks on *dBASE III Plus*'s ease of use with a new front end, an improved application generator, query-by-example capabilities, and menu-driven report and screen generators. A built-in

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.

compiler may close the door on complaints about slow execution. Furthermore, the upgrade understands data management's evolving lingua franca, Structured Query Language (SQL), broadening the program's connectivity potential. *dBASE IV* will also include at least 240 new commands while purportedly maintaining complete compatibility with previous *dBASE* applications and data. As always, *PC World* will test all these claims in depth in a full-length review after the product ships.

Gaining Control

dBASE IV's new front end, the Control Center, is designed to replace *dBASE III Plus*'s Assistant. An array of pull-down menus divides the program into six parts: data, queries, forms, reports, labels, and applications. The first time you select any menu option, a window of context-sensitive on-line help tells you what's going on.



Serving as the main menu, *dBASE IV*'s Control Center packs a lot of help and information on the screen.

Overall, the Control Center is easier to use than the Assistant, but it's still a bit confusing, as if it were stuck onto a command language. In contrast to *Paradox*'s 1-2-3-like hierarchical menus or even *R:base*'s menus (which simply lump related functions together), there's little sense of structure to guide strangers through uncharted areas, and many of the awkward <Ctrl>-key

commands remain.

Nonetheless, *dBASE* developers should welcome the truckload of new features. Programmers will be able to define up to 2048 memory variables, create two-dimensional arrays that allow mixed data types, and use a new data type for floating-point calculations that rectifies the rounding error in earlier versions. In addition to the 240 new commands (not including the SQL vocabulary), the program will offer an enhanced set of mathemati-

cal, statistical, and financial functions, plus date and currency formats that rival those of the best spreadsheets.

dBASE IV promises to outshine its predecessor in more fundamental ways. Each record will hold as many as 255 fields (up from 128), and you'll be able to open up to 99 files at once, 10 of which can be .DBF files. As many as 48 of the old, single-index .NDX files can be combined into one .MDX file. Better yet, you can relate a file to more than one other file at a time, overcoming a serious obstacle to true relational flexibility.

The *Paradox*-like query-by-example method offered by *dBASE IV* appears to be well implemented, if derivative. The query fields you select create columns. Entering two values in the same row forms a logical AND relationship, while creating a second row for the second value (or values) forms an OR relationship.

The new screen and report generators offer an approach that's far superior to the old command-driven style. When you create a data entry screen, a mail merge-type report, or a label, you're presented with a blank work area on which to place data fields, calculated fields, text, or boxes. You then simply arrange these elements anywhere on screen, picking menu items to identify field

types. The ability to store formats as source code enables you to build report templates into your own applications.

dBASE IV's new application generator, ApGen, isn't as intuitive as it could be, but it still makes linking menus with forms, reports, and data files easier than with *dBASE III Plus*. ApGen's menus walk you through every step of application development, and a Quick Application option expedites building simple designs. If you want to get down to the nitty-gritty of *dBASE* coding, the built-in text editor is now a *real* text editor, with block moves, search and replace functions, unlimited file size, and support for expanded memory.

Developers and diletantes alike will appreciate the speed delivered by *dBASE IV*'s built-in compiler. It promises to propel *dBASE* applications to the *FoxBase +* and *Clipper* zone—making them purportedly ten times faster than *dBASE III Plus* interpreted programs. Even simple indexing operations should run nearly twice as fast.

Translating the SQL

One of *dBASE IV*'s most exciting (and curious) features is its implementation of SQL, which Ashton-Tate claims will be completely compatible with IBM's standard. However, *dBASE IV* differs in a fundamental way from most SQL-based data managers.

A SQL data manager usually has two levels: a user-friendly front end, and a SQL engine that does the actual processing (see "Tomorrow's Data Bases Today," *PCW*, February 1988). *dBASE IV*, however, retains its *dBASE* engine, using a translation routine to convert SQL statements into *dBASE*. The extra step required for translation slows things down and may even increase the possibility of corrupting data.

Ashton-Tate avers that a future release of *dBASE IV* will have a bona fide SQL engine. Any applications written in the meantime are supposed to run on the future version's engine, which is supposed to understand both SQL and *dBASE*. It will be great when it arrives—and if it works.

One major benefit of *dBASE IV*'s current SQL support is expanded LAN functionality. You can implement automatic file and record locking in SQL's BROWSE, CHANGE, EDIT, READ, and REPLACE operations and even tell how long a record has been locked and by whom. In addition, SQL's support for transaction processing enables you to ROLLBACK a session after a crash and reconstruct your data.

dBASE IV will come in three flavors: a \$795 single-user version (up from \$695), a \$995 five-work-

station *LAN Pack*, and a \$1295 *Developer's Edition*. The single-user version consumes 3MB of hard disk space and 640K of RAM (up from 256K); updates from *dBASE III Plus* bought before the new version's actual release cost \$30, while updates from earlier versions are \$175. *Developer's Edition* will include an animated debugger similar to Microsoft's superb *CodeView*, a complete set of programming tools, and a no-royalty run-time module that supports an unlimited number of LAN users.

Even with the improved front end, non-programmers will probably find *Paradox*'s and *R:base*'s user interfaces more hospitable. But for the army of *dBASE* programmers out there, the faster, feature-laden *dBASE IV* will likely remain the data manager of choice. ●

William Urschel is president of Arc Tangent, a software development firm in Santa Barbara, California.

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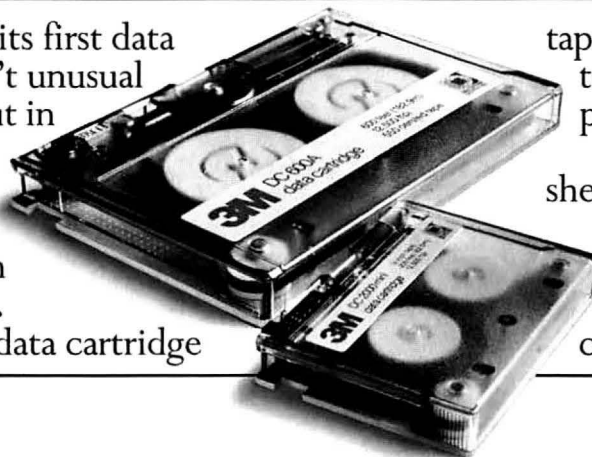
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A new type of pointing device that's as precise as a pencil, Felix handles the fine detail that a mouse can't finesse.

DeskScan 2000

Best suited for individuals or small groups, this inexpensive, lightweight scanner uses normal office lighting to produce 200-dpi output that is barely distinguishable from higher cost solutions.

92 BRIEFLY NOTED

NETremote

Networks of up to 15 PCs can share files and peripherals with this *Crosstalk*-compatible program.

Star 2

A low-priced laser printer, Star 2 holds 128 fonts in memory simultaneously and stores 128 forms as macros in firmware.

NX-1000 Rainbow

This dot matrix printer has seven colors and prints at a tolerable speed. As a bonus, it automatically does that nasty job of switching pin-feed to single-sheet printing.

RamQuest II, RamQuest Extra

Two boards that give PS/2s up to 8MB of added memory to milk LIM 4.0 and OS/2 multitasking applications.

WYSIfonts

Install fonts, logos, and symbols as soft fonts in your applications so you can pick them from a menu; naturally, they're WYSIWYG.

1 on 1 = 3

This dirt-cheap data base includes most dBASE commands and lets you run DOS commands from within it. You build the interface.

96 UPDATE

Lap-Link Plus, Desk-Link

Lap-Link hooks up your laptop with your PC or PS/2, enabling them to share disk drives and printers at top speed. *Desk-Link* connects different-size media in different offices.

PopDrop 3.1

A traffic cop for memory-resident programs that also diagrams traffic patterns and unloads applications in the right order.

SuperProject Expert/2

For OS/2 Standard Edition 1.0, it exploits 16MB of virtual memory for those monster projects.

Powermate 1

Now you can switch clock speeds and expand memory to 10.6MB on your Powermate portable.

Publisher's Paintbrush OS/2

A multitasking graphics program for Standard Edition 1.0, it supports larger graphics files and lets you doctor images without leaving your desktop publishing program.

P351SX Upgrade Kit

A four-band ribbon for Toshiba's dot matrix printer that will print seven colors and black on paper or transparencies.

Brooklyn Bridge 1.5

The *Bridge* gets four new DOS utilities to speed file transfer between desktops and laptops or 3½-inch and 5¼-inch drives.

ColorScript 100

Color It PostScript

Color meets high-end graphics meets desktop publishing in the ColorScript 100, the first PostScript-compatible color printer to hit the market.

Priced at \$24,995, the ColorScript 100 isn't likely to appear on all that many desktops, but it probably will cut the final tie between many companies and their outside graphic arts and printing contractors. This heavy-duty thermal transfer printer is designed to be a shared resource for midsize companies and Fortune 1000 departments that want to churn out their own brochures, project proposals, architectural renderings, and color transparencies, or color proofs and masters of the same.

The ColorScript's thermal printhead melts wax-based ink off a ribbon and fuses it on coated paper or transparency film, producing intense, saturated colors. It prints black and the subtractive primaries—yellow, magenta, and cyan—which it combines to build full-color images. The unit's resolution and color capabilities make it particularly attractive for users running sophisticated desktop publishing or CAD applications who need to produce high-quality color hard copy.

QMS has built the ColorScript 100 around the same 300-by-300-dpi Mit-



The first PostScript-compatible color printer on the market, the ColorScript 100 tackles high-end graphics and sophisticated desktop publishing.

subishi thermal-transfer engine used in its non-PostScript-compatible ColorGrafix 100. The ColorScript 100 keeps its complex controller in an external box that sits under the print engine. A parallel interface connects the two. You can connect your PC to the controller through a serial, parallel, or AppleTalk interface.

Besides the PostScript page-description language, the controller gives you 8MB of memory and a 20MB hard disk—plenty of room for downloadable and soft font storage. The controller supports the 35 standard Adobe typefaces.

The unit handles 8½-by-11-inch, 11-by-17-inch, and A3 and A4 paper. It produces a page every 1 to 2 minutes, depending on the paper size and whether you use three colors, three colors plus black, or black only. You can load

up to 150 sheets of thermal paper in the cassette, and you can expect to get a 4000-print-per-month duty cycle. QMS, One Magnum Pass, Mobile, AL 36618; 205/633-4300.

SideKick Plus

SideKick's Expanded Role

Many software packages seem to enroll you in a version-of-the-month club. SideKick's suite of utilities has remained comfortably familiar, residing in a quiet corner of computer memory since users began loading the program four years ago. But RAM real estate has since become crowded with ev-

ery conceivable variety of memory-resident programs. So Borland International's new version of SideKick stakes out turf in the expanded or extended memory of a 286 or 386 machine.

SideKick Plus offers all the features of its predecessor, but in a much bigger way—for example, each notepad document now holds up to 54K, or 11,000 words, and you can have nine documents. The single calculator has been replaced by business, scientific, and programmer calculators. The calendar now allows you to view a month's worth of appointments graphically, to set repeating appointments, and to attach agendas. SideKick Plus includes network support for IBM, 3Com, and Novell networks, so you can even share calendars.

Borland bills SideKick Plus as a time- and task-management tool; the added features support that claim. Its background communications utility has a full script language for automating that function. Its outliner lets you work with nine windows at a time and print the outlines in tree format. With the File Manager you can copy, delete, move, and rename files and directories—even format disks—without leaving SideKick Plus. And the new clipboard makes cut-and-paste operations between utilities a breeze. Users can append notes to all of the utilities independent of the notepads.

SideKick Plus runs without expanded or extended memory, but not comfortably. It is designed to keep a 70K kernel in conventional memory and swap its 384K worth of utilities in from high memory as needed. As always, to get a slimmed-down version you use only those modules that you want. However, *SideKick Plus* requires a hard disk, if only for the installation routine.

SideKick Plus currently runs on DOS 2.00 or a later version, but an OS/2 version is expected later this year. If you own *SideKick*, Borland will rebate \$35 or \$25 on your purchase of the \$199.95 *SideKick Plus*, depending on whether or not you are a registered user. Borland Int'l, 4585 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-8400.

AT&T 6300 WorkGroup System

Catching Up

AT&T rolled out its 8086-based PC 6300 four years ago, and that's a very full life for a PC. Ma Bell's new baby has a faster processor and more memory, and WorkGroup is its middle name.

Please don't call it a personal computer. The AT&T 6300 WorkGroup System was born and bred for a networked environment, preferably a Starlan network, although it supports other major nets. You can add a Starlan card and other net-



Built for connectivity, the AT&T 6300 WorkGroup System has a faster 8086 processor and more memory.

working extras like AT&T's Fax board to the XT-style bus and still have plenty of room among its seven expansion slots for disk and graphics controllers and extra memory. AT&T itself offers CGA and EGA adapters, but no VGA to date.

With only a 15-by-16-inch footprint, the 6300 WorkGroup System can squeeze into the same spot as the old PC 6300. But within that enclosure beats a fast new 8086 processor (10 MHz, zero wait state), and an equally formidable 182-watt power supply provides enough juice to drive a full complement of add-in boards and storage peripherals.

You can attach up to three storage devices to the system, including a 20MB hard disk drive. In a standard configuration you get one or two 5¼-inch 360K floppy drives, but you can opt for 5¼-inch 1.2MB drives or a 3½-inch 1.44MB format.

The 6300 WorkGroup System comes with a 101-key enhanced AT-style keyboard; MS-DOS 3.20, release 2.02; and 640K of RAM on the motherboard, expandable to 2MB. You also receive an 8087 math coprocessor socket.

The system costs \$1411 with one 360K floppy drive, \$1491 with two 360K floppies, and \$2091 with one 360K floppy and a 20MB hard disk. Add \$255 for a monochrome monitor, \$895 for a color monitor, \$199 for an AT&T CGA controller card, and \$499 for an AT&T EGA card. The Starlan card is \$420 with software, and the Fax board is \$995. AT&T, 1 Speedwell Ave., Morristown, NJ 07960; 800/247-1212.

Emerald Bay

Still Waters Run Deep

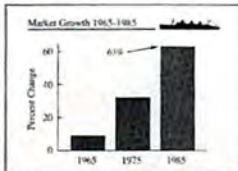
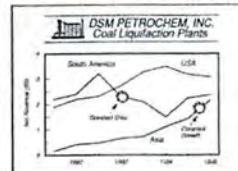
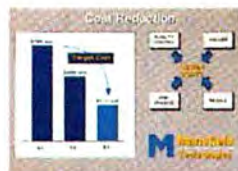
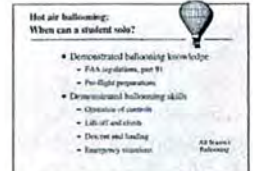
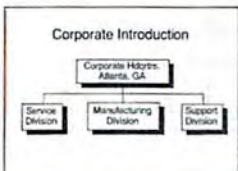
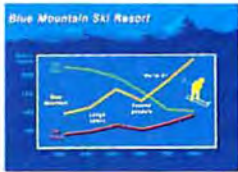
We're entering a new era in data base management—one in which you'll be able to reach out and pluck information from a company mainframe, a public information utility, or a work-group member's PC, across the office or across the country.

Migent wants you to do that from the smooth surface of *Emerald Bay*, a power-user product that puts a 32-bit data base server at the heart of the PC environment and lets you share information with your fellow work-group members, regardless of the operating systems or applications that each of you uses.

The *Emerald Bay Database Server* is a \$695 network product that acts as the central repository for a work group's data. Various users access the data via their favorite applications—what Migent calls surfaces. Primarily a development product, *Emerald Bay* was designed to bring mainframe data base features to a PC, particularly aiding the 600,000 *dBASE* and C developers, as well as power users interested in writing their own applications.

For those not so inclined, Migent provides off-the-shelf surfaces. *Summit* is a \$195 fully relational data base add-in for Lotus's 1-2-3 that lets you keep all your data in *Emerald Bay* and access it from your worksheets,

Of all the graphics you can create with Freelance Plus,



thereby saving memory space, recalculation time, and repeated data entry. *Summit* includes a personal data base engine, report writer, forms generator, data base administrator, and import/export facilities.

For those with some programming skills, Migent offers Eagle, a \$495 *dBASE*-like data base language that includes a personal data base engine, compiler, report writer, forms generator, data base administrator, and import/export capabilities. It is not *dBASE* compatible. Also available is a \$495 developer's toolkit for the C language that includes everything but a compiler. When linked to the *Emerald Bay Database Server*, all applications written in either language become multiuser programs.

Overall requirements for all four products include DOS 2.11 or a later version, 640K of memory, and a hard disk. *Emerald Bay Database Server* runs on all NETBIOS-compatible networks. Migent, 865 Tahoe Blvd., Incline Village, NV 89450-6062; 702/832-3700.

Felix

To the Point

You want to touch up a graphic image with your paint or draw program. But trying to freehand a fine detail with your mouse is like trying to sign a check with a bar of



Felix feels as natural as a pencil, giving you greater drawing precision than most pointing devices.

soap. Although trackballs, joysticks, and other devices have their advantages, when it comes to drawing, nothing feels as natural as a pencil. That's the feel you get with Felix, a new breed of pointing device from Lightgate.

The Felix "pencil" is embedded in a 1-inch-square action area in a 6-inch-square stationary pad. The action area is a proportionate map of the computer screen, so as you slide the pencil around, you are moving the cursor to a corresponding point on the screen with far greater precision than you could with a mouse or similar device. Because you are using your fingers rather than your arm and wrist, you can draw in much finer detail. Your pointer finger rests on a button that works like the button on a mouse.

Felix gives you the precision of 320 dots per inch, compared to the 200 dots per inch of most mice and the lower resolution of other devices. For even finer detail, you can downshift into precision mode, in which you can focus on

a window that is a half, a quarter, or an eighth the size of your screen, with appropriate adjustment in the action area.

Felix has 12 hot spots marked off on the frame around its active area. Scoot the pencil against the appropriate spot and click, and you can execute a menu sequence or a macro up to 255 characters long. You can shift through 5 levels for each of the 12 hot spots, using the click key in combination with keyboard control keys, to obtain a total of 60 macros or commands. Lightgate gives you sample hot-spot templates for *1-2-3* and *AutoCAD*, as well as a utility that lets you program your own hot spots.

Felix comes with a power supply and requires a serial port. Since its moving parts are on top of the unit, it doesn't share your mouse's tendency to roll the debris on your desktop into its innards.

Felix works with PCs and compatibles and with PS/2s; it has a suggested retail price of \$199. Lightgate, 6202 Christie Ave., Emeryville, CA 94608; 800/426-5324, 415/596-2350.

DeskScan 2000

Getting the Picture

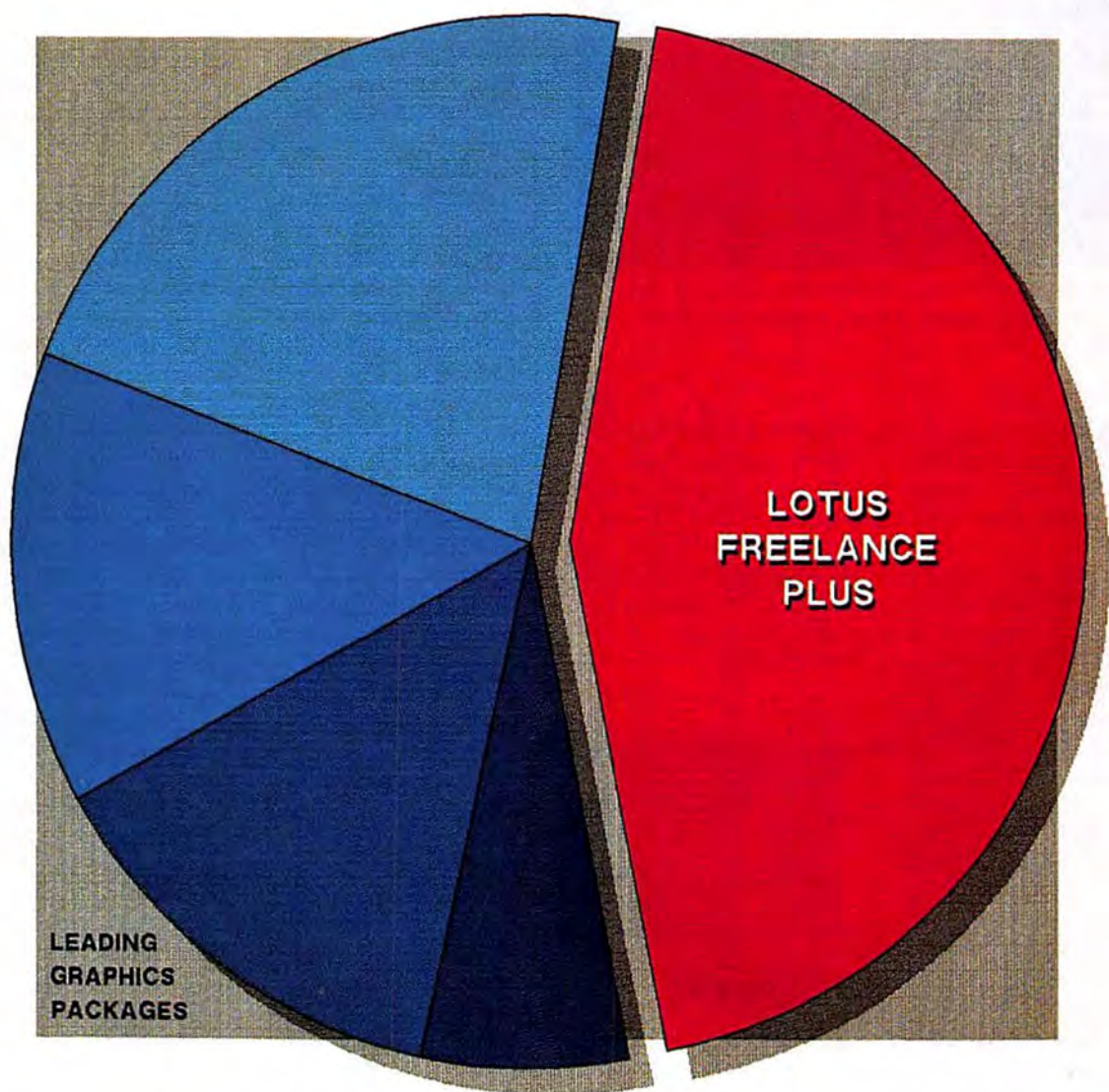
Scanning text or pictures into a computer has always been a relatively expensive proposition, but one more and more people are opting for as text- and image-hungry desktop publishing systems proliferate.

If you can tolerate a little lower resolution than the 300 dpi typical of most current desktop scanners, Chinon America makes a smaller, lighter alternative costing hundreds of dollars less.

DeskScan 2000 has an unusual design. A 6-pound scanner with a footprint just larger than a piece of letter-size paper, it most closely resembles an overhead projector. You place your document face up on the base and push a button; a moving lens mounted overhead scans it. What your computer gets, typically in 12 seconds, is a rasterized image at 200 dpi.

DeskScan 2000 handles volume document input and produces graphics that come out looking only slightly less sharp than the output of larger, 300-dpi models. Best suited for individuals or small work groups, DeskScan 2000 has drivers for *PageMaker*, *Ventura Publisher*, and most popular graphics packages. Since most facsimile machines transmit at 200 dpi, DeskScan 2000 also makes an ideal adjunct to PC fax boards.

This is the one we're particularly proud of.



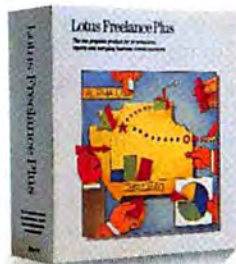
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If you can get by with a little lower resolution than the norm, the DeskScan 2000 costs hundreds of dollars less than most desktop scanners.

In fact, Chinon offers an optional fax configuration.

Unlike most scanners, which require their own light source, DeskScan 2000 isn't choosy about its environment: It needs only normal office light. It uses an RS-232C serial interface at up to 19,200 bps and supports a Centronics parallel interface.

DeskScan 2000 is usually sold bundled with different hardware and software combinations. The base price is \$695, and Chinon throws in a copy of Z-Soft's *PC Paintbrush Plus* for touching up scanned input. If your interest is desktop publishing, you can pay another \$100 and add Haba Systems' *Front Page* desktop publisher and *TopDOS* menuing software. If your principal interest is scanning text-only documents in volume into a word processing program, you might choose the \$895 bundle with *ReadRight* optical character recognition software from OCR Systems. Finally, Desk-

Scan 2000 comes with a facsimile add-in board, fax utility software, and a cable for \$995. Chinon America, Information Equipment Division, 6374 Arizona Circle, Los Angeles, CA 90045; 213/216-7611.



NETremote

Brightwork Software has a peer-to-peer program for sharing peripherals and files on Novell local area networks of 15 workstations or less. *NETremote* gives LAN users access to other PCs on a single-server network for the sharing of modems, printers, and files. *NETremote*, which is com-

patible with popular communications packages like *Crosstalk* and *Procomm*, lets you send or receive files using a modem attached to another PC on the network. If a printer is connected to an unused PC, you can print out a long report while you continue using another application on your own workstation.

NETremote requires DOS 3.10 or a later version, *Novell Netware 2.0A* or a later version, and a memory-resident module (17K for text only or 31K with graphics) on each PC to be contacted. You may contact any configured node by a preselected name entered at the command line. Once connected, both PCs display screen images that can be controlled from either keyboard. When used in conjunction with asynchronous remote calling packages such as *Carbon Copy*, *NETremote* will enable you to dial a node on a remote LAN, view the screen, and control the keyboard. Thus, network managers can support both on-site and remote users from their own workstations.

NETremote can be licensed for a single server for \$295. Brightwork Software, P.O. Box 8728, Red Bank, NJ 07701; 201/530-0440.

Star 2

Blaser Industries is offering a low-price laser printer that can maintain dozens of fonts in memory simultaneously. The Blaser Star 2 supports 27 internal font and symbol

set combinations as well as downloadable and cartridge fonts.

The Star 2 features proprietary memory management software with a compression algorithm in its disk controller, enabling you to maintain up to 128 fonts in memory simultaneously, using any or all on a single page prompted with escape sequences from your software. Similarly, you can speed the printing of forms by storing up to 128 forms as macros in Star 2's firmware after creating them with your software.

Priced at \$2195, the Star 2 comes with 1MB of memory capable of supporting a full page of 300-dpi graphics and eight levels of gray. Memory can be expanded to 5MB. The device emulates the Hewlett-Packard LaserJet Series II, the Epson FX-80, and the Diablo 630, but not PostScript printers.

Built around an 8-ppm print engine designed by Blaser and manufactured by Sanyo Electric, the printer has a small footprint (17 by 18 inches with no protrusions). It is equipped with a 250-sheet paper cassette tray and topped by a 100-sheet array of face-down output stacks for collating.

Finally, Star 2's consumables cost 2½ cents per page, considerably less than those of other laser printers. Blaser figures that the resulting savings could buy you another Star 2 after about



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Blaser Industries' inexpensive laser printer, the Star 2, maintains dozens of fonts in memory simultaneously and saves on supplies.

400,000 copies. Blaser Industries, 8300 East Rain-tree Dr., Scottsdale, AZ 86260; 602/998-0400.

NX-1000 Rainbow

No, not everyone needs a color printer. But with the proliferation of today's high-resolution color monitors, graphic user interfaces, and color-sensitive programs, printing your presentation graphics on a black-and-white printer is a little like watching your favorite TV program on a black-and-white set.

Now, Star Micronics is making color affordable with its NX-1000 Rainbow printer. The Rainbow is a \$379 dot matrix unit that produces seven colors—black, red, yellow, blue, orange, green, and violet—from a four-color ribbon. For that price, you can't expect blazing speed. But the Rainbow offers an acceptable 144 cps (draft) and 36 cps (near letter quality) at a

pitch of 12 characters per inch.

The print buffer isn't big—just 4K. But the Rainbow takes aim at another popular printing capability: multiple fonts. You get four resident fonts (Courier, Sans Serif, Orator I, and Orator II) that you can select from the printer's control panel.

The Rainbow has at least one more attractive feature usually found on much more expensive models: It automatically backs the pin-feed paper out of the way and feeds in single sheets. No need to back your tractor paper out, feed in single sheets, and then try to slide the rumpled tractor paper back through the platen.

The NX-1000 Rainbow comes with a parallel interface and incorporates Epson and IBM Proprinter II emulations. Star Micronics America, 200 Park Ave. #3510, New York, NY 10166; 212/986-6770.

RamQuest II, RamQuest Extra

Orchid Technologies is selling two new memory boards that let the IBM PS/2 line run OS/2 and LIM 4.0 applications more readily. RamQuest Extra provides Models 50, 60, and 80 with up to 8MB of additional memory beyond the 1MB on their system boards, as well as a second and third serial port.

RamQuest Extra, which takes up a single PS/2 expansion slot, ships with 1MB of memory for \$1199; it can be upgraded using 1MB or 256K modules without adding a daughterboard. Up to four boards can be added for an extra 32MB, so that you can take full advantage of EMS 4.0 or OS/2 multitasking applications.

RamQuest II, which ships with 1MB of memory for \$849, is designed for applications like word processing and large spreadsheets for the Models 50 and 60 only. It can hold up to 2MB using inexpensive 256K modules.

Both boards use the PS/2's configuration software but add routines from their on-board BIOS so that they can be installed in less than 5 minutes, using only four keystrokes and without changing DIP switch settings. Orchid has followed IBM's specifications so that installation does not modify IBM's reference disk, ensuring compatibility with future as well as existing hardware and software. Both also come with software for an EMS 4.0 driver, RAM disk, disk caching, and print spooling. Orchid Technol-

ogies, 45365 Northport Loop W, Fremont, CA 94538; 415/683-0300.

WYSIfonts

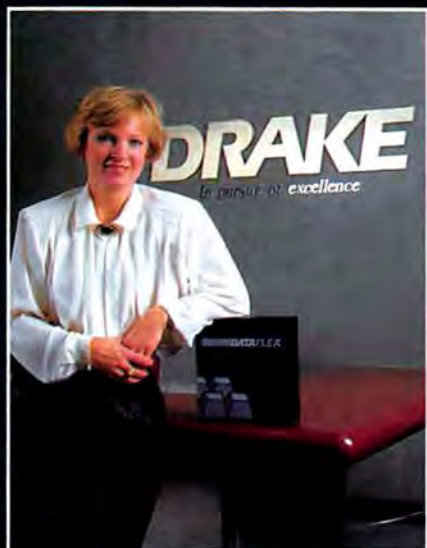
If you're running *Ventura Publisher* or a *Microsoft Windows* application and printing out on a Hewlett-Packard LaserJet or compatible, SoftCraft has software that will help satisfy your appetite for more fonts. *WYSIfonts* will install any font, logo, or symbol in HP soft font format or in SoftCraft's own format for ready access within your application.

While programs like *Ventura Publisher* require several steps to install a new font, *WYSIfonts* lets you simply pick the fonts you want from a menu and adds them to the menus in *Ventura Publisher*. With *WYSIfonts*, what you get in output from your printer is also what you see on your screen.

Although you can run *WYSIfonts* as a stand-alone font installer, it works especially well with SoftCraft's *Fontware* program, which gives you access to 30 typeface outlines licensed from Bitstream. The *Fontware* program can construct four variations—regular, bold, italic, and bold italic—from each outline, in sizes up to 120 points with corresponding screen quality.

WYSIfonts is compatible with *Windows 2.0* screen fonts and is priced at \$95. SoftCraft, 16 N. Carroll St. #500, Madison, WI 53703; 800/351-0500, 608/257-3300.

Case History #60302



"With branches in North America, England, Switzerland, Australia, New Zealand, and Hong Kong, we needed a database solution that could run on a world of different PCs, LANs and minicomputers," said Eva Nohra of Drake International, one of the world's most successful personnel service agencies. "We chose DataFlex for all our in-house programming because it gave us this needed capability while providing a standard interface that looks and performs the same on a stand alone PC as it does on a LAN or MicroVAX."

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1 on 1 = 3

A software start-up is offering a \$39 *dBASE*-compatible data base that supports multiple relations in the same data base and 48, rather than 16, open files.

1 on 1 = 3 is written and compiled in *For-Base+* and includes most *dBASE* commands (but not the *On* command), some *Set* commands, the passing of arguments to subroutines, create/modify screens, catalogs, and the ability to copy and append *DIF*, *SYLK*, and *.WKS* files. The package also adds one- and two-dimensional arrays, keyboard macros, and the

ability to run *DOS* commands from within the program. *1 on 1 = 3* lets you set up your own menu structure, command prompts, colors, and so on in a *dBASE*-like interface from control files.

I on I Computer Solutions claims that *1 on 1 = 3* executes from two to ten times faster than *dBASE* in its programming and assist modes but is slower in interpreting *dBASE* programs. *1 on 1 = 3* requires 512K of memory and at least 1.5MB on your hard disk. *I on I* Computer Solutions, 26 Finchwood Dr., Trumbull, CT 06611; 203/375-0914.

UPDATE

Lap-Link Plus, Desk-Link

Traveling Software has enhanced its laptop-to-PC file transfer utility so that your laptop can share disk drives and printers with any other IBM or compatible personal computer, including the PS/2. *Lap-Link Plus* not only performs high-speed serial transfers of data at a blistering 115,000 bps but also has a device driver mode that lets you print laptop files on a printer connected to it through your desktop.

Lap-Link Plus will also back up the files of your

laptop's hard disk on the 1.2MB floppies of your desktop or install many copy-protected software packages on your laptop's hard disk or 3½-inch floppies.

For those who want to transfer files between different-size media on an interoffice basis, the company has added *Desk-Link*, which substitutes 25 feet of RJ-11 telephone wire for serial cable and includes connectors for another 75 feet. *Desk-Link* also provides a limited E-mail capability for sending messages to the pop-up boxes on connected systems.

Lap-Link Plus retails for \$139.95, *Lap-Link* for \$129.95, and *Desk-Link*

for \$169.95. Traveling Software, North Creek Corporate Center, 19310 North Creek Pkwy., Bothell, WA 98011; 206/483-8088.

PopDrop 3.1

Now that the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 enables you to keep memory-resident programs in expanded memory with only a hot key kernel in conventional memory, InfoStructures has expanded its *PopDrop* memory-resident program manager to prevent loading-order and space conflicts among programs in both kinds of memory.

PopDrop version 3.1 lets you load your memory-resident programs in layers and deactivate them temporarily or remove them without rebooting. *PopDrop*'s View command shows you a layer-by-layer diagram of what has been loaded in both conventional and expanded memory, and its Hooks command shows which programs may be fighting over the same interrupt vectors. *PopDrop* frees memory by unloading memory-resident packages in the right order so that a hole in memory doesn't result.

PopDrop takes less than 5K of memory itself and includes a utility enabling you to create batch files that automatically load and unload certain software combinations associated with different applications.

The \$49.95 *PopDrop* runs on classic PCs and

PS/2s and requires *DOS* 2.00 or a later version. Upgrades from version 3.0 are \$10; from earlier versions, \$30. InfoStructures, P.O. Box 32617, Tucson, AZ 85751; 602/299-5962.

SuperProject Expert/2

Computer Associates has released a version of its *SuperProject Expert* package that taps up to 16MB of virtual memory under OS/2 Standard Edition 1.0, enabling you to perform a greater number of project tasks and to track larger projects than ever. By creating exclusive data areas, *SuperProject Expert/2* also provides a concurrent processing capability so that you can run tasks simultaneously. For example, you can enter data and update files in the foreground while other time-consuming functions such as printing a large file or creating a large graph go on in the background.

SuperProject Expert/2 sells for \$795 and requires 1MB of memory plus the 2MB of memory and 20MB hard disk required for OS/2 Standard Edition 1.0. Users of *SuperProject Expert*, which will continue to be sold for \$695, can upgrade for \$100. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95131; 408/432-1727.

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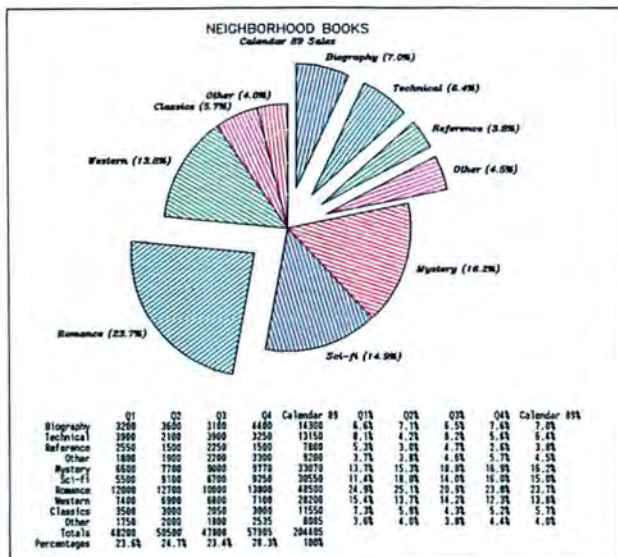
Powermate 1

NEC Information Systems' Powermate 1 portable has been enhanced to broaden your system configuration options. You can switch the 80286 CPU's clock speed from 8 MHz to 10 MHz, depending on the needs of your software and add-on boards, and expand the standard 640K of memory to 10.6MB. The standard configuration, which retails for \$1845, includes a hard disk controller and a 1.2MB/360K floppy drive. Also available are an optional 720K 3½-inch floppy drive and up to 80MB of 25ms hard disk storage.

The base unit comes with one 8-bit and five 8/16-bit full-size slots, one 16-bit half-size slot, a serial port, a parallel port, and a built-in clock/calendar. NEC Information Systems, 1414 Massachusetts Ave., Boxborough, MA 01719; 617/264-8000.

Publisher's Paintbrush OS/2

Z-Soft has developed a version of its popular graphics software, *Publisher's Paintbrush*, to run under OS/2 Standard Edition version 1.0. This multitasking version will enable you to scan, print, or resize graphic images while simultaneously working in your desktop publishing program. The OS/2 version of *Publisher's Paintbrush* will also free you from DOS memory limitations, en-



Toshiba's color upgrade kit for its 24-pin P351SX dot matrix printer uses a four-band ribbon to print seven colors plus black.

abling you to use larger graphics files by swapping portions of programs and files between disk storage and memory.

The RAM-resident program lets you zoom in for pixel-by-pixel editing of large images or zoom out to see an entire image and edit any portion. *Publisher's Paintbrush* also includes bit-mapped, stroke, and curvilinear fonts for enhanced headlining, captions, and notation. Z-Soft Corp., 450 Franklin Rd. #100, Marietta, GA 30067; 404/428-0008.

P351SX Upgrade Kit

Toshiba has introduced a color upgrade kit for its 24-pin P351SX dot matrix printer. The \$239 kit provides a four-band ribbon—yellow, cyan, magenta, and black—that can easily be alternated

with the standard black fabric or film ribbons.

In addition to its primary colors, the ribbon also prints orange, green, purple, and brown on regular stock or transparencies for high-impact graphics and charts. The ribbon has a life of 750,000 characters and costs \$20. It can be alternated with the P351SX black fabric ribbon, which has a life expectancy of 2 million characters, or the high-contrast black multi-strike film ribbon, which prints 40,000 characters between replacements.

The P351SX prints 360 cps in draft mode and 120 cps in letter quality mode, as well as 360-by-360-dpi graphics. It emulates Qume printers and IBM's Proprinter and Graphics Printer. The color kit emulates the IBM Color

Printer. Toshiba America, 9740 Irvine Blvd., Irvine, CA 92718; 714/583-3000

Brooklyn Bridge 1.5

Brooklyn Bridge version 1.5 includes four additional DOS utilities and one new *Bridge* utility to help speed file transfers among laptops and PS/2 desktops with 3½-inch drives and classic PCs with 5¼-inch drives.

Brooklyn Bridge version 1.5 includes the utilities Move, Remove, Copy, and Backup. It incorporates the new *Bridge* Run utility, which enables you to drive an application on a remote computer while simultaneously operating another on your principal computer. Moreover, version 1.5 of *Brooklyn Bridge* can transfer files larger than 32MB under Compaq MS-DOS 3.31.

Brooklyn Bridge 1.5 comes with software on both 5¼-inch and 3½-inch disks and a null modem serial cable with 9- and 25-pin connectors at both ends. It sells for \$129.95. Software upgrades cost \$10. White Crane Systems, 6889 Peachtree Industrial Blvd. #151, Norcross, GA 30092; 404/394-3119. ●

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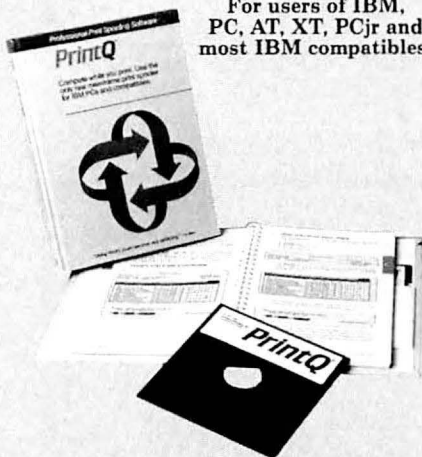
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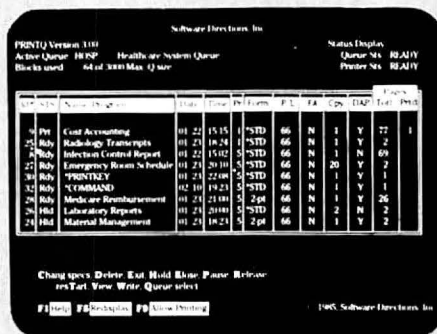
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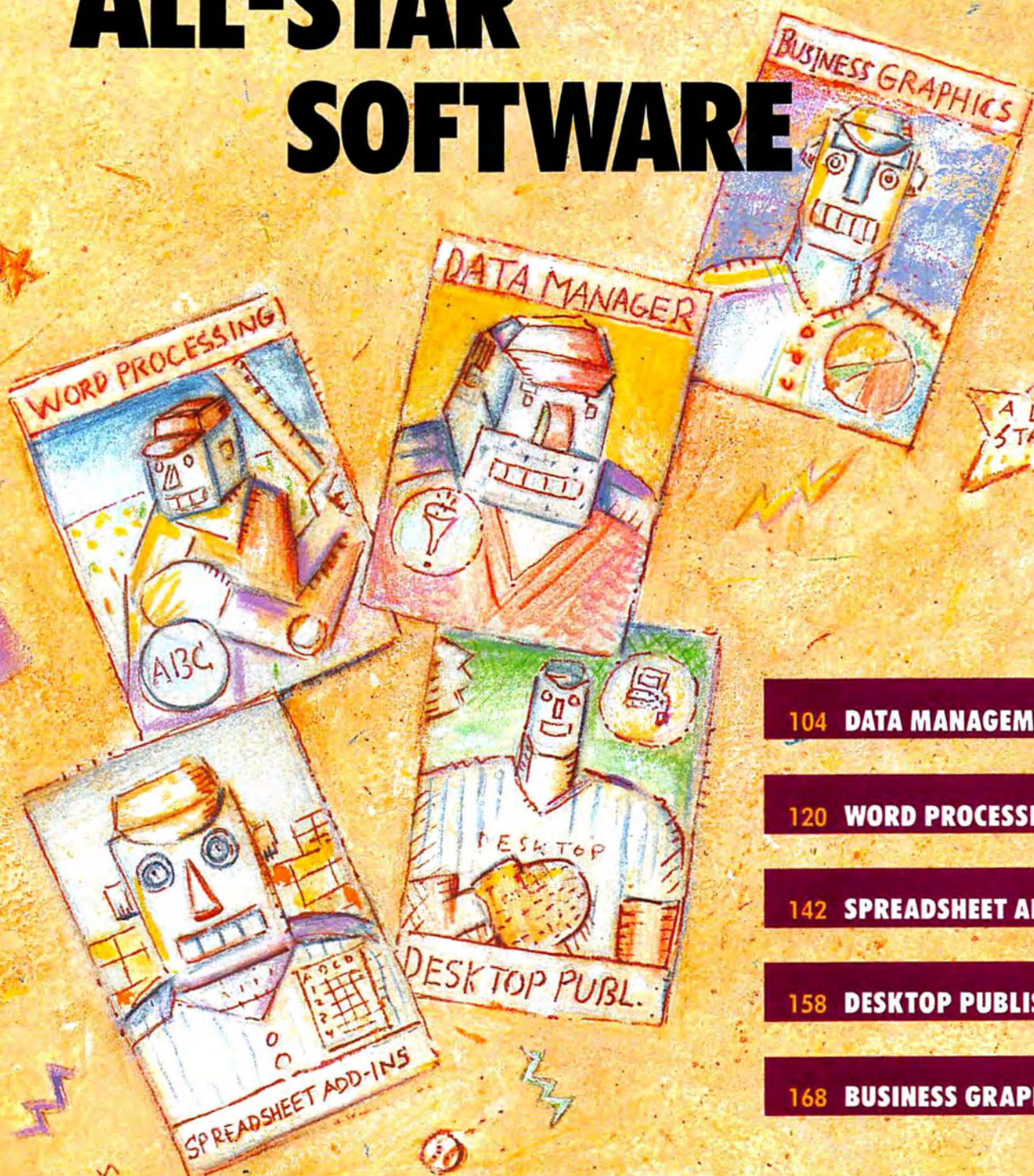
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DATA MANAGEMENT

105 **Omnis Quartz 1.13**

The first relational data manager for *Windows* is powerful and easy to use, but you'll need an 80386 machine to run it at a respectable speed.

107 **Q&A 3.0**

Better performance, overlapping windows, and an expanded lookup capability strengthen this program's dominance among upscale flat-file managers.

110 **DataEase 2.5 release 3**

A well-established relational data manager that uses forms and menus for everything, this program has its own command language and some new lookup capabilities.



ANDREW SCHACHT

112 **Paradox/386**

Offering all the features of *Paradox 2.0*, this relational data manager performs two to ten times faster by directly addressing 16MB of extended memory.

116 **FoxBase + /386**

It looks like *dBASE III Plus* without the Assistant, but it offers better indexing and larger procedure files for application developers—and it runs like blazes.

Omnis Quartz 1.13

Relational data manager

PROS: Macintosh-like user interface, robust relational capabilities, WYSIWYG reporting

CONS: Slow performance, poor documentation, no on-line help

Fashioned after the Macintosh product *Omnis 3 Plus*, *Omnis Quartz* is Blyth Software's bold attempt to change the face of data management on the PC. As the first heavy-duty relational data manager for *Microsoft Windows*, *Quartz* takes full advantage of the mouse-driven *Windows* interface, yet its relational capabilities compare well against those of *Advanced Revelation*, *Paradox*, and *dBASE III Plus*.

Although you can never get to a command prompt, *Quartz* enables you to point and click your way to complex queries, fully formatted reports, and even custom menu systems. Because you choose command options from a menu, you need concern yourself only with program logic—incorrect syntax and misspellings are things of the past. In addition, *Quartz's* large file and record capacities, excellent reporting facility, and wealth of screen design tools should attract a broad cross section of users.

Nonetheless, *Quartz* won't grab everyone. If you're not fond of mice or menus, or if you're an experienced developer who would rather bang out code, you're unlikely to warm up to *Quartz*. Moreover, *Quartz* needs at least 640K, a hard disk, and an AT compatible, but unless you enjoy watching your screen painted in slow motion, an 80386 machine is a necessity. You'll also need EGA or VGA graphics to reap the full benefit of the colorful, *Windows*-based user interface.

Installation is quick and simple; a single 1.2MB floppy contains the entire program.

Quartz requires *Windows 2.0* to operate, and Blyth provides a run-time version. If you are unfamiliar with *Windows*, however, don't expect help from the documentation. Overall, *Quartz's* tutorial and reference manuals are poorly organized and occasionally omit key information. Coupled with a lack of on-line help, the documentation could pose a stumbling block for beginners.

Developing an application in *Quartz* involves defining five application elements: file formats, layouts, menus, report formats, and search specifications. All these elements reside together in a single DOS file that can be as large as 2MB; all data and index files are similarly consolidated into a file that can grow to 2.5 gigabytes. A total of 180 sequential commands and 25 system functions enable developers to set up almost any process imaginable.

The application file containing the five elements maintains in one place all the connections among data and the processes designed to manipulate that data. This means that when you establish a relationship between, say, the vendor file and the purchase order file during the development stage, you'll never have to specify this relationship again. Compare this procedure with its *dBASE* and *R:base* equivalents, which not only demand that you maintain duplicate fields between related files but also require that you redefine relationships every time you run a new report.

As with several other easy-to-use data managers, such as *DataEase* or *Enrich*, structuring a *Quartz* data base begins when you design the data entry form. Specifying field types, lengths, and links between fields is an interactive, on-screen process. Files can have as many as 120 fields, with up to 12 different fields designated for indexing. And in addition to the usual assortment of date, time, numeric, and calculated fields, *Quartz* offers Boolean fields, and text fields up to 2400 characters long.

Quartz offers a complete set of data validation parameters along with display fields

FEATURES EVALUATION

Popular Data Base Managers Compared

Find the ease and power you need—from Q&A's Intelligent Assistant to Fox's 386 screamer.

	Q&A 3.0	Omni- Quartz 1.13	Database 3 2.5	Paradox 2.5	FoxBase+ 386
Data entry and validation					
Command driven	○	○	○	●	●
Menu driven	●	●	●	●	○
Forms per file	1	△	1	15	△
Screens per form	10	12 ¹	16	15	△
Validates via lookup table	●	●	●	●	● ²
Range checking	●	●	●	●	●
Checks duplicate index keys	●	●	●	●	● ²
Date checking	●	●	○ ³	●	●
Time checking	●	●	●	○	● ²

Development tools

Data dictionary	○	●	○	○	○
Application generator	○	●	○	●	○
Procedural language	○	●	○ ⁴	●	●
Subroutines	○	●	○	●	●
Macros	●	●	○	●	●
Variables	○	●	○	●	●
Run-time module	○	●	○	●	●

File handling and searching

Many to one	●	●	●	●	●
One to many	○	●	●	●	● ²
Many to many	○	●	●	●	● ²
Updates multiple files from one form	○	●	●	●	●
Bidirectional table links	○	● ⁵	●	●	● ²
Query by example or form	●	●	●	●	○
Wild-card searches	●	○	●	●	● ²
Conditional searches	●	●	●	●	●
Boolean searches	●	●	●	●	●
Compound Boolean searches	●	●	●	●	●
Global search and update	●	●	○ ⁶	●	●

	Q&A 3.0	Omni- Quartz 1.13	Database 3 2.5	Paradox 2.5	FoxBase+ 386
Reporting					
Multifile reports	●	●	●	●	●
Saves report formats	●	●	●	●	●
Sends reports to screen	●	●	●	●	●
Sends reports to disk	●	●	●	●	●
Date stamping	●	●	●	●	●
Mailing label format	●	●	●	●	●
Headers allowed	●	●	●	●	●
Footers allowed	●	●	●	●	○
Summary reports	●	●	●	●	●

Capacity

File size (in records)	16 million	△	65,535	2 billion	1 billion
Fields per record	2182	120	255	255	128
Characters per record	16,780	288,000	4000	4000	4000
Tables per data base	1	60	255	△	△
Indexes per file	115	12	255	256	7
Fields per index	1	120	1	255	100 chars.
Tables per join	n/a	12	△	△	10 ²
Maximum number of open data files	△ ⁷	60	32	△	10
Reads/writes DIF	●	●	●	●	○
Reads/writes ASCII	●	●	●	●	●
EMS support	○ ⁸	○	○	●	●
Variable-length fields	●	○	○	○	○ ⁹
Multivalued fields	○	○	●	○	○
Data encryption	○	○	○	●	○

● Yes ○ No ○ Deficient △ Unlimited

¹ In Windows-based Quartz, "layouts" are equivalent to forms, and "windows" are equivalent to screens.

² Requires command file to execute.

³ DataEase allows date checking only if field is defined as validated and the range is set; otherwise program permits invalid date.

⁴ You can access DataEase's command language only via the report module.

⁵ You can link in one direction without a common field, which other programs won't allow; you can link in both directions with a common field.

⁶ Updates allowed only via DataEase's report module.

⁷ When using flat-file Q&A's Xlookup function, an unlimited number of files can be open at once and linked.

⁸ Q&A offers caching only, not full EMS support.

⁹ Provides memo fields only.

that can summon lookup tables. Implementing powerful validation and error-handling procedures is not as easy as with *Advanced Revelation*, but *Quartz* easily beats the usability of *dBASE* or *Paradox*.

One of *Quartz*'s greatest strengths lies in the ease with which you can create attractive, useful data entry and query screens. You can create any number of screen layouts for a particular application, with each layout containing up to 12 different windows. The

front ends you design can be more inviting than *Quartz* itself—complete with icons, overlapping pulldown windows, and context-sensitive help—and may use information from up to 60 files at once.

Quartz's icons, which take three forms, are straight from the Mac's bag of tricks: check boxes, radio buttons, and push buttons. Check boxes and radio buttons are essentially yes/no fields; clicking on one enters into the data base whatever choice is described by the icons' associated text. Clicking on a push button activates either a standard command sequence or a sequence set up by a developer.

The ability to quickly create attractive, readable reports is another *Quartz* selling point. As with on-screen forms design, you use the mouse to position fields, pull down menus, and overlay windows. Each section can include different fonts, attributes, and character sizes—which *Quartz* displays on screen in true WYSIWYG fashion.

Reports can incorporate data from up to 12 files and may include calculated fields, rectangular borders, and automatic data translation from lookup tables. The ubiquitous check boxes enable you to easily define such attributes as justification and numeric format. Nine levels of sorts and subtotals are available, and up to 60 different fields can be totaled.

To help *Quartz* benefit from the competition, the program offers plenty of file portability, including import and export facilities for dBASE, DIF, SYLK, ASCII, .WK1, and .WKS files. True to its Macintosh origins, *Quartz* is also the first PC-based data manager to offer data exchange with a Mac program, Blyth's *Omnis 3 Plus*.

Thanks to both *Windows* and Blyth's adaptation of Mac conventions, *Quartz* represents the first successful attempt to port the Mac's ease of use over to data management on the PC—though with a high hardware tariff. Once accustomed to the user interface, developers should find that they can generate applications faster by pointing and clicking with *Quartz* than by using another



program's command line. And although data management neophytes will balk at the poor documentation, some assiduous mousing around should give them access to relational power that would require a longer learning curve elsewhere. —Hal Chapel ●

WHERE TO BUY

Omnis Quartz

Blyth Software
1065 E. Hillsdale Blvd. #300
Foster City, CA 94404
415/571-0222

List price: \$795

Requirements: 80286 or 80386 computer, 640K, hard disk drive, mouse

Technical support: 60 days free phone support, no toll-free number, M-F 9-5

Other support services: \$95 per year for extended phone support and newsletter

For more information, see Products Featured in This Issue.

Q&A 3.0

Flat-file manager

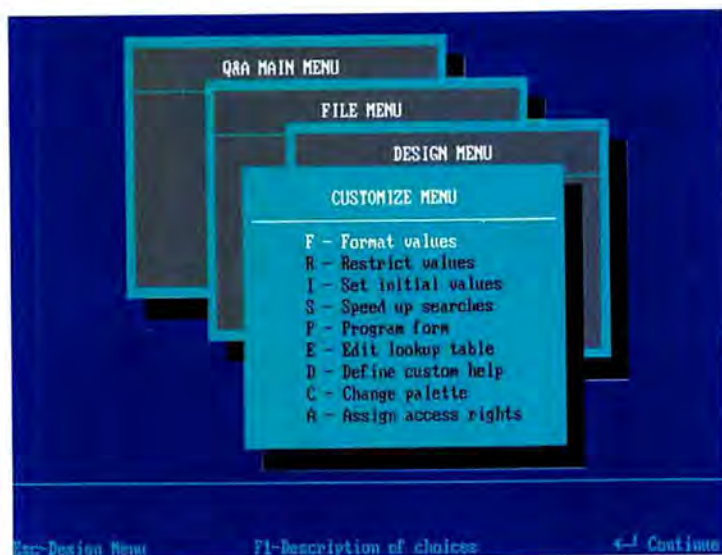


PROS: Expanded lookup functions, improved speed, natural-language front end, built-in word processor

CONS: Large memory requirements, minimal relational capabilities

What other program lets you converse with it in plain English? Symantec's Q&A is still the only data manager that responds to queries like "Give me Bob's personnel record" or

With *Quartz*'s windowing capability, you can create a report even while entering data in a layout. Notice the pop-up that lets you customize character styles and sizes.



Q&A's menus now overlap, making it easy to know where you are.

"List everybody who topped their sales quota last month." This feat of understanding is accomplished by the Intelligent Assistant, a natural-language front end that produces a formal version of your request, which—once you verify it—sends Q&A to fetch your stuff.

A year ago, *PC World* reviewed Q&A 2.0 (see "Snappy Answers," July 1987), which torqued up the Intelligent Assistant's response time and expanded the program's already powerful lookup and macro capabilities. Version 3.0, released late last February, adds important new features to an already fully featured product.

To begin with, the program's performance has improved again—this time by 30 percent—a boost that's especially noticeable during sort operations. Symantec has also spruced up Q&A's user interface. Attractive overlapping menus resembling those of *PFS: Professional File* help you remember where you are within the program.

The most important improvement is an expanded lookup capability. Previous versions of Q&A enabled you to set up an internal lookup table (up to 64,000 characters, or about 600 lines, per table) for each data file. For example, you could have Q&A fill in *MasterCard* or *Visa* when a user entered the two-character codes *mc* or *vi*. You could also have Q&A retrieve the next lower value in the lookup table when an exact match wasn't found. This feature would allow you to fetch such specifics as tax rates for particular

states, shipping costs based on weight, or item prices based on volume discounts.

Version 3.0 adds a new command, *Xlookup*, that enables you to link lookups to a second file. You still can't create heavy-duty relational applications in which several files must be open at once (you can relate only two files in a single *Xlookup* operation), but version 3.0 responds admirably to simpler challenges. For instance, you can easily create invoicing reports, monthly statements, and other two-file reports that reference the main data base for shared information like names and addresses.

Q&A was one of the first flat-file managers to include a real word processing program, a bonus that made the program ideal for mass mailings. Version 3.0 makes mail merge a much smoother process. Since the complete *Q&A Write* word processor is now available from the main menu, all you need to do is call it up, create the form letter you want, and then (using the <Alt> and <Enter> keys) identify which fields from the data base should be merged into the letter. Q&A pops the field data into the letter in proper merge-print format. The *Write* module also includes built-in support for printing file data on mailing labels.

Q&A benefits from a number of other improvements. The program can now drive Hewlett-Packard and PostScript laser printers and supports up to nine fonts per document, so you can practically desktop publish your next dun letter. In addition, Symantec bundles a nifty 100,000-word spelling checker that works very much like *WordPerfect's* highly rated speller. Microlytics' *Word Finder*, the thesaurus incorporated into *Microsoft Word*, is available for an additional \$49.95.

Version 3.0 also improves Q&A's LAN support with record locking and five-level password protection. Several copies of Q&A can access the same file simultaneously, and a Network Pack (list price \$299) gives four users simultaneous use of a single copy of version 3.0. Each additional Network Pack increases the number of users by three.

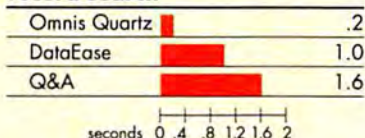
NSTL TEST REPORT

Data Management

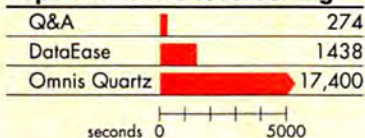
Q&A turns in a surprisingly brisk performance on several tests. But nothing compares with FoxBase+ or Paradox optimized and running on a 386.

286 system tests

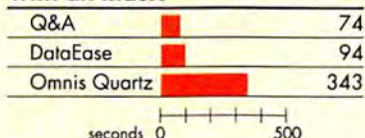
Average individual record search



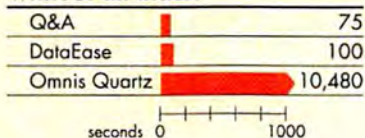
Report with two-level sorting



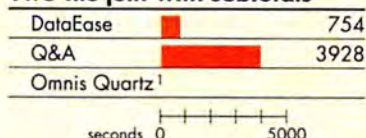
Group record search with an index



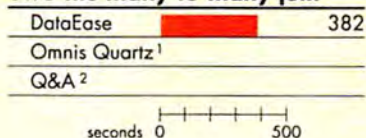
Group record search without an index



Two-file join with subtotals

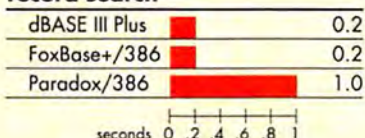


Two-file many-to-many join

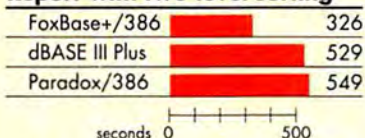


386 system tests

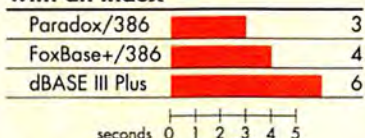
Average individual record search



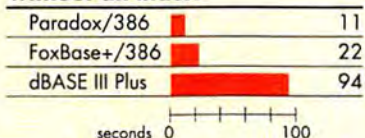
Report with two-level sorting



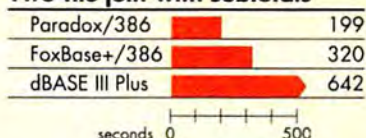
Group record search with an index



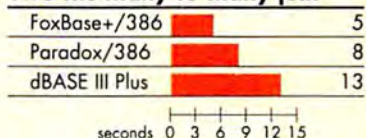
Group record search without an index



Two-file join with subtotals



Two-file many-to-many join



¹ Omnis Quartz, a hierarchical data base, cannot perform this task.

² The two-file many-to-many join is a function of a relational data base. Since Q&A 3.0 is not a relational data base, the program could not perform this test.

FoxBase+/386 and Paradox/386, both of which require a 386 system, were tested on a 16-MHz Compaq Deskpro 386 with a 40MB hard disk. Although it does not require a 386 system, dBASE III Plus was also tested on this machine for purposes of comparison. DataEase 2.5 release 3, Omnis Quartz 1.13, and Q&A 3.0, none of which requires a 386 system, were tested on an 8-MHz IBM AT Model 339 with a 30MB hard disk.

Average individual record search

Two records at different locations in two 10,000-record files were selected one at a time. The times for the two searches were then averaged.

Report with two-level sorting

Three fields were printed from all of the records in the 10,000-record file. The records were sorted with an indexed field as the primary key and a nonindexed field as the secondary key. The report was output to a null printer.

Group record search with an index

Groups of 100 records at different locations in two 10,000-record files were selected on the indexed field using relational operators to establish the selection limits. The selected records were sorted in ascending order, and a long (50-character) field was output to a null printer.

Group record search without an index

From different locations in two 10,000-record files, groups of 100 records were selected on a nonindexed field (using relational operators to establish the selection criteria). The records were sorted in ascending order, and a long field was output to a null printer.

Two-file join with subtotals

A 1000-record and a 10,000-record file were joined. A short text field from the 1000-record file and a numeric field from the 10,000-record file were joined using the indexes of the 10,000-record file. The text field was grouped and sorted in ascending order, the numeric field was subtotaled for each group, and the results were output to a null printer.

Two-file many-to-many join

Two 1000-record files were joined on an indexed field. Fields were selected on the basis of indexes and relational operators, and the resulting report was output to a null printer.

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

Last but not least, Symantec has improved on Q&A's chief claim to fame, the Intelligent Assistant. You still have to "teach" the Intelligent Assistant about your data base the first time you use it, but the process has been reorganized into basic and advanced lessons and is now much easier. In the basic lessons, Q&A asks you fundamental questions about field names and values so it can determine which fields contain locations, dollar amounts, addresses, and so on. Advanced lessons help you teach Q&A about units of measure, adjectives and verbs, and people's names (so that the Intelligent Assistant can answer "who" questions accurately).

Whether Q&A can be pushed still further without relinquishing its easy-filer status—or without running this RAM-hungry program up against the 640K barrier—remains to be seen. So far, in both design and documentation Symantec has done an admirable job of keeping powerful features efficiently accessible, yet out of the beginner's way. A promised OS/2 version, due out later this year, may balance this program's smarts with more substantial relational muscle.

—George Beinhorn ●

WHERE TO BUY

Q&A version 3.0

Symantec
Breakthrough Software Division
10201 Torre Ave.
Cupertino, CA 95014
408/253-9600

List price: \$349

Requirements: 512K (640K recommended), two disk drives or hard disk, DOS 2.00 or later version
Not copy protected

Technical support: unlimited phone support, no toll-free number, M–F 8–12, 1–5

Other support services: electronic bulletin board, 408/973-9598; Q&A package includes offers for PC World Communications video training guide, Quick Results With Q&A (\$29.95), and a Q&A keyboard command template (\$19.95)

For more information, see Products Featured in This Issue.

DataEase 2.5 Release 3

Relational data manager

PROS: Powerful menu-driven relational data manager, excellent security system and report generator

CONS: Slow at indexed operations, menus can't be turned off except in report generator

If it weren't so easy to use, boasts a *DataEase* ad, we'd have called it *DataHard*. Pretty smug—but *DataEase*'s braggadocio is largely justified. From data entry to queries to heavy-duty reports, the program offers easy, menu-driven access to plenty of relational data-handling power.

The latest version of *DataEase*, version 2.5 release 3, is a relatively minor upgrade. The biggest change is that now you can link as many as 60 files or fields per lookup or relation instead of 10—an enhancement that should provide enough relational muscle for the most demanding application developer.

DataEase generally insulates users from commands with a turnkey-like front end. Instead of having to learn a new syntax, you can do just about everything in *DataEase* using on-screen forms. To search for a record, for example, you type match criteria into the fields of an empty form. Throughout the program, pop-up and full-screen menus guide you through the process of filling in the blanks; you can even build a custom menu system using a menu.

DataEase also leads you by the hand through the reporting process. More versatile and certainly easier to deal with than *dBASE*'s Report Generator, *DataEase* reporting comes in two flavors: quick and full. Quick reports, which can be moderately sophisticated, use a form as a query screen. You can draw information from more than one file and use Boolean operators or conditionals to stipulate retrieval parameters.

With full reports, multiple-choice questions direct you through complex formats and take care of command language syntax for you. If you need to reference fields, the program lists those available. In addition, a brilliant run-time data entry option enables you

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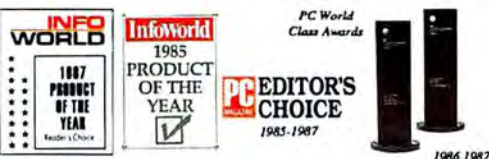


DacEasy™ Accounting. More Than 400,000 Growing Businesses Worldwide. DacEasy Accounting leads the industry as the number one selling, award-winning program. Two-time winner of *PC World's* World Class Award and *PC Magazine's* Editor's Choice, DacEasy Accounting recently was named *InfoWorld's* Product of the Year. Again and again, DacEasy proves that it makes a difference.

In fact, it provides you with more than 700 reports and "what if" forecasting scenarios based on three-year historical information — great for projecting expenditures and revenue. And, in addition to the program, you'll find the 460-page documentation is written for ease of understanding with helpful hints, screens and examples.

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Since its introduction in 1985, DacEasy Accounting, feature for feature, has won acclaim as the leader in accounting software. Now Version 3.0 features a new interface with transaction-oriented pull-down menus that makes it think like you think as a business person rather than an accountant. Readily installed with five quick questions, your business accounting is operating within 10 minutes! Choose the predefined Chart of Accounts that are tailored for service or inventory-based businesses, or modify. All seven modules (General Ledger, Accounts Receivable, Accounts Payable, Inventory, Billing, Purchase Order and Forecasting) are fully integrated. Data posted once is automatically posted to all other related modules saving you time and ensuring accuracy as well.

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Insilco

to create and save report templates that query the user for variable criteria before the report prints. It will also repeat that query so you can set up a batch report system.

DataEase's full report mode is also the only place where you can turn off the menus and settle in for a good messy coding session with the *DataEase Query Language (DQL)*. Though it lacks some of *dBASE*'s horsepower and *R:base for DOS*'s new SQL commands, DQL offers a potent set of relational data handlers. However, the manual poorly documents this language, so you may find yourself talking to tech support.

The full report mode gains from an interesting new capability with version 2.5 release 3. Previously available only in its menu creation facility, *DataEase*'s ability to call other programs now extends to the full report mode. Thus, you could embed a command to start up a telecommunications program at the end of a report and thereby transmit the report file automatically.

One of *DataEase*'s biggest drawbacks is its slow handling of indexed fields—a weakness that limits the program's usefulness for transactional applications. Indexed, forms-based, batch-updating operations are agonizingly slow, and *DataEase* won't let you close indexes temporarily to break the bottleneck. The only way to speed things up is to redefine the fields as unindexed—a task that's time-consuming and dangerous if you're relying on a data-entry clerk to do batch processing.

DataEase is inflexible in other ways, too. After you enter data into a form, saving the record brings up a new one—but the new fields are filled in with the same values as the previous record. This could be convenient in some instances, but with no way to disable it, you'll find yourself clearing a lot of fields.

DataEase has always provided a comprehensive system of password and access rights, making it an excellent choice when security is important or when several users will be performing quite different tasks with the same data. Curiously, though, *DataEase* has only recently spawned a LAN counter-

part. *DataEase LAN 1.1* provides, in combination with *LAN3 Workstation Pack 1.1*, the features of *DataEase* version 2.5 release 3, and it includes support for a server and four workstations.

Although *DataEase*'s turnkey and security features have earned it a substantial corporate following, the program's ease of use also makes it a natural for small businesses that need to develop applications but don't want to pay a programmer's salary. Moreover, *DataEase* requires only "starter" equipment: 384K of memory, floppies, and an 8088 machine. So if you're a nonprogrammer with a small hardware budget and complex relational needs, *DataEase* merits a long look.

—Ellen J. Sander ●

WHERE TO BUY

DataEase 2.5 release 3

DataEase Int'l
7 Cambridge Dr.
Trumbull, CT 06611
203/374-8000

List price: \$600

Requirements: 384K (512K recommended), two floppy drives, DOS 2.00 or later version

Not copy protected

Technical support: free phone support to all registered users, limited according to vendor discretion; no toll-free number; M–Th 9–8, F 9–6

Other support services: software package includes on-site and other training programs, priority phone support with toll-free number available for \$150

For more information, see Products Featured in This Issue.

Paradox/386

Relational data manager

PROS: Very fast performance in most operations, large record capacity, intuitive front end

CONS: Expensive, slow searching for single records

P*aradox 2.0*, Borland's nimble contender in the relational derby, has a new stablemate: *Paradox/386*. Specially engineered to exploit the 80386's 32-bit instruction set and extended memory potential, *Paradox/386* delivers more speed and capacity than most users will need. But for applications involving huge

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tables or based on intricate Paradox Application Language (PAL) scripts, *Paradox* on a 386 is a better combo than the daily double.

Nearly identical to each other in form and function, *Paradox 2.0* and *Paradox/386* deliver all the critical features of *dBASE III Plus* or *R:base System V*. But, except for single record searches, both *Paradoxes* are faster than their competitors for ad hoc querying and reporting.

While *Paradox 2.0* feeds its hunger for RAM with expanded memory, *Paradox/386* does its cousin one better by exploiting the 80386's unique extended memory capabilities. Like the 80286, the 80386 has both a real mode, which provides DOS access to 640K of user memory and 384K of system memory, and a protected mode, which opens the door to extended memory. In addition to offering a vastly bigger extended memory address space than the 80286, the 80386 can switch between real and protected modes without the user having to restart the system, which gives the chip the unique ability to run applications in extended memory under DOS.

Paradox/386 employs PharLap Software's 386/DOS extender routines, enabling the program to directly address 16MB of extended memory. One effect of all that RAM is that *Paradox/386*, unlike *Paradox 2.0*, has no need for overlays. Instead, all the program code has been compiled into a single executable file a little larger than 1MB, leaving almost 15MB of 32-bit RAM for data. This is only a fraction of the extended memory that the 80386 can address, but it's still enough to hold a pretty big data base. And

direct addressing of extended memory is far faster than the expanded memory scheme used by *Paradox 2.0*—in fact, *Paradox/386* runs two to ten times faster than its counterpart, depending on the operation.

Upgrading to *Paradox/386* can be an expensive proposition, in terms of both software and hardware. Although upgrading from *Paradox 2.0* costs only \$125, the package costs \$895 off the shelf. And if you plan to upgrade from version 1.1 or earlier, Borland will charge you \$325. As for hardware, assuming you already have an 80386 machine, you'll need to load it with at least 1.5MB of RAM. That sounds like par for the course until you discover that it takes at least 4MB to experience *Paradox/386*'s performance benefits.

If you're editing single records only, you won't notice a speed improvement (see NSTL benchmarks). In fact, don't expect a meaningful performance gain unless data files exceed 30,000 to 40,000 records or you routinely sort large tables, update indexes, and run complex reports.

Clearly, *Paradox/386* is a power user's product. A local area network implementation, for example, would require that all the workstations be 80386s—not the most cost-effective configuration. If maintaining a stand-alone, monster data base is your job, however, you can't get much faster than *Paradox/386*. —William Urschel ●

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WHERE TO BUY

Paradox/386

Borland Int'l
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
408/438-8400

List price: \$895

Requirements: 80386-based PC, 1.5MB RAM, DOS 3.00 or later version
Not copy protected

Technical support: unlimited phone support, no toll-free number, M–F 7:30–5

Other support services: Borland maintains an account on CompuServe, GOBOR; priority phone support services currently being revamped; check with vendor for pricing

For more information, see Products Featured in This Issue.

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Hardware requirements: Over 125 printers supported. Requires IBM PC, PS/2, or compatible with DOS 2.0 or higher. FormWorx—320 KB. FormWorx with Fill & File—512 KB. Works with or without a graphics board. Color is displayed on color systems. Available on 3.5" disks when specified. Not copy protected.

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FoxBase + /386

Relational data manager

PROS: Very fast and reliable, full dBASE III Plus compatibility, increased system limits, powerful command language extensions

CONS: Command-driven user interface, lackluster report writer, requires math coprocessor

All the heavy hitters, including Ashton-Tate, are incorporating Structured Query Language (SQL), but that doesn't mean dBASE will go away. Too many dBASE applications have been written, and too many developers are fluent in the dBASE language. Instead, many people are turning to dBASE-compatible packages that remedy the mediocre performance and awkward user interfaces of the dBASE family of products.

Fox Software's *FoxBase + /386* is fully compatible with the *dBASE III Plus* file format and command set, but runs between two and ten times faster than Ashton-Tate's flagship product. Like *Paradox/386*, *FoxBase + /386* achieves its speed by tapping the 80386's 32-bit instruction set and its ability to address huge amounts of extended memory, shoveling as much code and data as possible into RAM. This stripped-down compiler/interpreter does not currently offer a menu-driven front end like *dBASE III Plus*'s Assistant; instead, *FoxBase + /386* is aimed at application developers who want speed, dBASE compatibility, and programming flexibility.

Apart from its 80386-specific capabilities, *FoxBase + /386* is the same product as *FoxBase + 2.0*, Fox's latest upgrade (see "The Great Pretenders," *PCW*, August 1987, for an in-depth review of *FoxBase + 1.21*). Both offer important advantages over *dBASE III Plus*, including the ability to open more files at the same time (48 instead of 15); to work with up to 3600 memory variables; and to include 128 procedures in a given procedure file, compared with dBASE's paltry 32.

Like the rest of the Fox line, *FoxBase + /386* is part compiler, part interpreter. It starts off like a compiler by digesting command files (either developed with Fox Software or imported from dBASE) into machine-readable instructions. But instead of linking machine code into a single executable .EXE file the way *Clipper* and *QuickSilver* do, *FoxBase + /386* simply creates one .FOX file for each command file.

Working with command files in this intermediate state yields several benefits. First, because linking files into one .EXE file is not the speediest process, skipping that step saves development time. *FoxBase +* conserves RAM by reading portions of an application's unlinked command files from disk as needed. Best of all, users retain access to interpreted dBASE's interactive debugging features. Thus, you can test individual .FOX or .PRG files and suspend operations as needed to pinpoint and fix any errors in the code.

Both *FoxBase + /386* and *FoxBase + 2.0* improve on earlier versions. Powerful new functions increase validation options for data entry. Other new tools help you create snappy, descriptive 1-2-3-like menus. Moreover, *FoxBase + /386* and version 2.0 now automatically determine how much RAM is free and configure themselves accordingly for optimal performance. Perhaps most important, the programs' capacity for more open files now enables developers to use all ten work areas. dBASE's 15-file maximum effectively limits users to six work areas.

The one big advantage *FoxBase + /386* has over version 2.0 is speed. As with *Paradox/386*, access to 16MB of extended memory is the key to turbocharged performance. Instead of using *Paradox/386*'s PharLap routines, however, *FoxBase + /386* uses special 80386 assembly routines from Intelligent Graphics Corporation to break the 640K barrier and switch the program into protected mode. The main benefit of *FoxBase + /386*'s technique is that—unlike the PharLap method—it enables the program to deal with interrupts in protected mode, yielding better compatibility with memory-resident software.

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Although *FoxBase +/386* costs \$300 less than *Paradox/386*, Fox's contender still demands a substantial hardware investment. In addition to an 80386 machine, you'll need at least 2MB of RAM (512K more than *Paradox/386*'s minimum) plus an 80287 or 80387 math coprocessor (a requirement buried in the manual). *FoxBase +/386* can load with as little as 240K of DOS's 640K, leaving plenty of room for your favorite memory-resident utilities.

Running a *FoxBase +/386* application is a bit eerie. With almost everything happening in RAM, the familiar staccato rhythms of *dBASE* hard disk access are gone; complex relational processes take place in silence, like a giant spreadsheet recalculation. If you're used to taking a 10-minute coffee break while waiting for a complex report to run, forget it—the report prints out in 3.

Unfortunately, speed is the best thing about *FoxBase +/386*'s report writer. A precise replica of *dBASE III*'s, the Fox report writer offers a single, simpleminded default format for reports. Without menus, anything better must be the product of a tedious, command-driven exercise.

FoxBase +/386 may settle for poor reporting, but like its predecessors, it won't tolerate *dBASE III Plus*'s slow indexing. Instead, *FoxBase +/386* has its own .IDX index file format, which speeds indexing operations that bog down Ashton-Tate's product; *FoxBase +/386* also reads *dBASE III Plus*'s .NDX files and converts them to its own format on the fly. If you want to access indexed data under *dBASE* again, reindexing data files with *dBASE* is required.

The proprietary index file format and missing front end aren't the only differences between *FoxBase +/386* and *dBASE III Plus*. As clearly stated in Fox's manual, functions not supported by *FoxBase +/386* include the Catalog command (*dBASE*'s primitive data dictionary); the View command (Fox promises support for this in a later release); and *dBASE*'s clumsy Create/Modify screen. And although *FoxBase + 2.0* supports local area networks, the *FoxBase +/386* version does not.

If you've got substantial *dBASE* skills or data, or you face a mountain of data crunching, *FoxBase +/386* delivers excellent value. Its breakneck speed, efficient RAM management, and support for large procedure files make it a superior tool for building *dBASE* applications. Moreover, Fox has announced an upgrade—due out this summer—that will include a menu-driven Assist mode, as well as screen-painting and template-building tools designed to make the program somewhat more hospitable and improve its slim array of reporting tools. Until then, *FoxBase +/386* will remain a developer's tool kit—not a cozy den for the data management novice. —Alan Schwartz ●

WHERE TO BUY

FoxBase +/386

Fox Software
118 West South Boundary
Perrysburg, OH 43551
419/874-0162

List price: \$595

Requirements: 80386 computer, 2MB RAM, 80287 or 80387 math coprocessor, hard disk, DOS 3.10 or later version

Not copy protected

Technical support: no toll-free number, unlimited phone support, M–F 8:30–5:30

Other support services: none
For more information, see **Products Featured in This Issue**.

Hal Chapel is a Bay Area consultant specializing in data base development. George Beinhorn is a freelance writer based in Northern California and a frequent contributor to PC World. Ellen J. Sander is a Southern California consultant and trainer specializing in data base and word processing applications. William Urschel is president of Arc Tangent, a data-base-oriented software development firm in Santa Barbara, California. Alan Schwartz is a Northern California consultant specializing in data base development.

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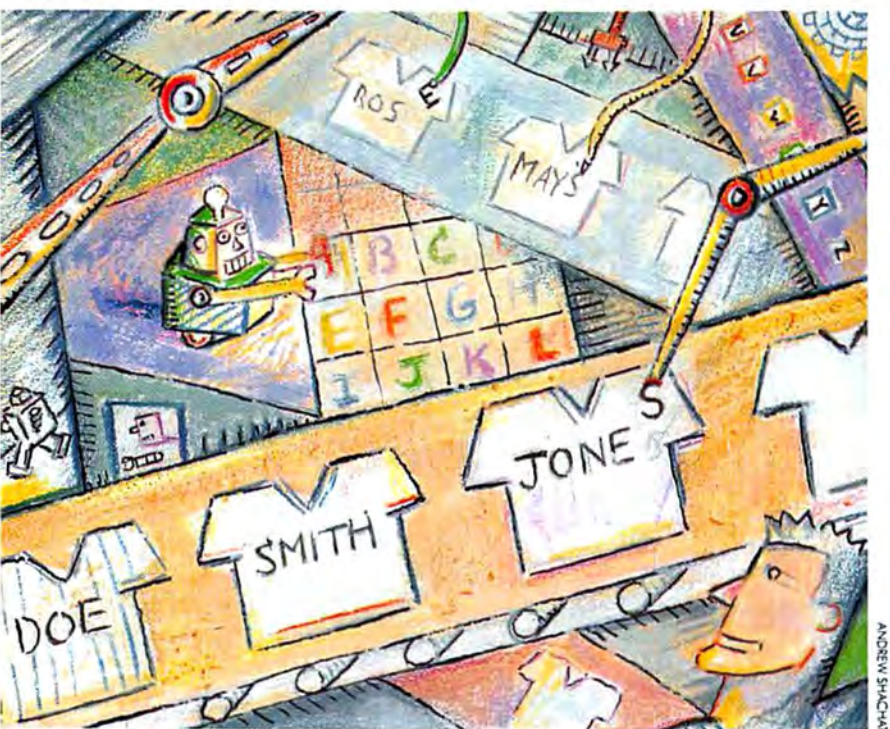
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WORD PROCESSING



121 **DisplayWrite 4/2**

Here's a first—an OS/2 word processor. But don't expect a world of difference: The new *DisplayWrite* merely fixes some shortcomings and adds a few enhancements.

122 **XyWrite III Plus 3.53**

This word processing speed demon has bulked up with desktop publishing-like capabilities, a thesaurus, and a long-awaited spelling checker, but *XyWrite* veterans will notice a few quirks in the interface.

125 **Nota Bene 3.0**

Formerly an academic mainstay, *Nota Bene* offers an abundance of sophisticated features, including fast text indexing and retrieval, a host of style and formatting commands, and foreign language processing.

126 **Q&A Write 1.03**

Q&A Write is the midlevel word processor's dream: inexpensive, easy to learn, and generous on features.

134 **Microsoft Pageview 1.0**

With this utility from Microsoft, *Word* users can import graphics and preview font styles and text columns, but the program isn't fully baked.

136 **ABC Word 1.0**

Although *ABC Word* packs more synonyms on a floppy disk than any other thesaurus, using it takes patience.

138 **Microsoft Bookshelf**

A reference library on disk? This CD ROM puts more than half a gigabyte of information within reach—if you can afford it.

DisplayWrite 4/2

Word processor

PROS: OS/2 application, increased printer support, addresses DisplayWrite 4 shortcomings

CONS: Expensive, lacks some basic features, some editing functions are cumbersome

Word processing is a charter PC application, so it's not surprising to find a word processor among the first OS/2 products. *DisplayWrite 4/2* is IBM's OS/2 upgrade to the venerable *DisplayWrite 4*.

Unfortunately, it's a disappointment. *DisplayWrite 4/2* is basically the same program running under a different operating system. True, it does offer a few enhanced features, and OS/2 allows you to run up to 12 OS/2 programs concurrently and provides automatic print spooling. However, using *DisplayWrite 4/2* certainly won't make you feel like you've entered a whole new world of computing. The program doesn't run significantly faster than previous versions, as NSTL benchmarks show. Equally important, *DisplayWrite 4/2* doesn't take advantage of OS/2's ability to allow a program to do more than one thing at a time. Finally, the hardware requirements are stiff: You need at least 1.5MB of RAM (conventional and extended memory—expanded won't work) and a hard disk. For users who don't already have a commitment to the IBM family, the program doesn't merit a second look.

Basically, what the upgrade from *DisplayWrite 4* to *4/2* offers is several new features and some enhancements to existing ones. The new features include support for multiple columns, a page format preview function, the abilities to copy a format from one document to another and to view one document from within another, and a text-sort feature. The most significant enhancements to existing features are the abilities to copy and move text between two open documents with the Notepad, and a number of

useful changes to the spelling checker. Unlike previous versions of *DisplayWrite*, *4/2* supports non-IBM printers, including the Diablo 630, the Epson LQ-1000, the HP LaserJet Plus, and the LaserJet Series II.

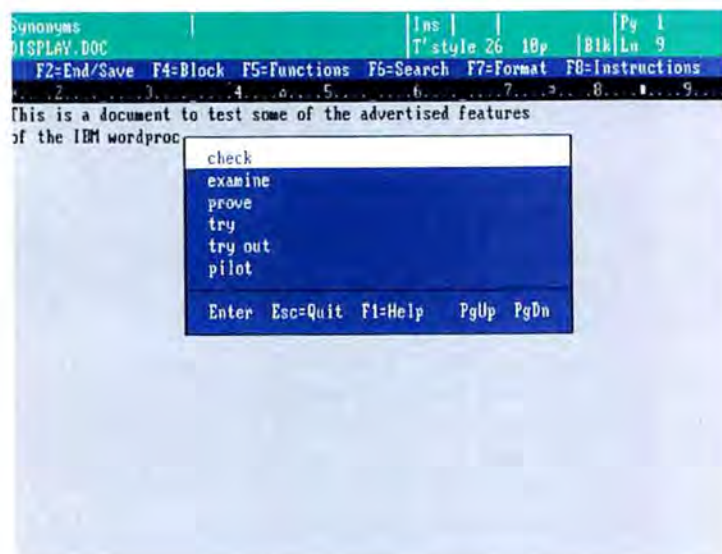
The multiple-column feature is functional but difficult to use. To reformat text into columns, you use a format menu to specify the number of columns and the spacing between them. But to see what the columns look like, you have to use the new page preview feature, which displays only one page at a time. You must preview each page separately—a real inconvenience.

DisplayWrite veterans will appreciate *4/2*'s ability to copy formats from one document to another. Now you can copy a format merely by typing in the name of an existing document at a prompt; previously you had to copy the document with the desired format and then erase all the unwanted text.

Similarly, in the old days to copy text between two documents you had to insert an entire document into another and delete all the text that didn't apply. With *4/2*'s new View Document option, you can open a second document, copy text to the Notepad, and insert it into the first document. Of course, with OS/2 you can do the same thing by simply starting another *DisplayWrite 4/2* session, saving text to the Notepad, and pasting it into the other document.

The ability to sort blocks of text is a nice extra. *4/2* can sort any list of names flush with the left margin in either ascending or descending order and on up to four separate fields. However, the program can't sort numerically. Lists that aren't flush left can be sorted, but it takes a little extra effort.

DisplayWrite 4/2's spelling checker now supports up to three 62K personal dictionaries and allows you to check a document against all three dictionaries at the same time. The new thesaurus, while sometimes slow, is nicely integrated into the spelling



Unlike DisplayWrite 4, 4/2 displays synonyms without exiting the document.

checker and requires only two keystrokes to display a synonym list.

DisplayWrite 4/2's documentation is thorough and easy to use. The help facility is context sensitive and exceptionally well organized, but the explanations are frequently too brief to be useful. To IBM's credit, help and documentation have improved with each release of DisplayWrite.

DisplayWrite's pluses have traditionally been its compatibility with other IBM products and its full complement of word processing features. However, it has always had a cumbersome interface and required extensive user training. And although it supports complex features—such as four user-definable keyboards—it lacks some of the basics. For example, there's no word- or line-delete function; it's still not possible to print from within a document; and creating a document and editing it remain separate functions.

Overall, DisplayWrite 4/2 is a solid, complex word processing program, but it serves some markets better than others. At \$495, the program is worthwhile for companies that have bought into the IBM system family and plan to switch to OS/2. On the other hand, companies with a small number of workstations may do better with a program that's easier to learn—especially since there aren't enough OS/2 applications available yet to make an OS/2 upgrade cost-effective. Also, IBM product support is notoriously

poor for users who don't have account-level relationships. Unless OS/2 and IBM are firmly part of your future, DisplayWrite 4/2 is probably better left alone. —David Freeland

WHERE TO BUY

DisplayWrite 4/2

IBM

Old Orchard Rd.

Armonk, NY 10504

800/444-4700 (IBM dealer information)

List price: \$495

Requirements: OS/2, OS/2-compatible PC, 1.5MB RAM, hard disk
Not copy protected

Technical support: available from authorized IBM dealers

Other support services: none

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

XyWrite III Plus 3.53

Word processor

PROS: Includes spelling checker and thesaurus, imports graphics, provides redlining

CONS: Command interface slightly slower than in previous versions

One of the saddest spectacles in sports is watching a champion grow old, heavy, and slow. The same is true for software. XyWrite's machine-gun-fast RAM-based processing freed users to concentrate on their work rather than on the program's machinations. XyWrite III Plus is still pretty quick, but it's losing a step or two.

In its efforts to remain a contender for word processing's top spot alongside feature-rich programs such as Microsoft Word and WordPerfect, XyWrite III Plus now sports a spelling checker, a thesaurus, and the ability to embed printer codes in documents and import graphics files into text. Other extras include a word-count feature, redlining, hidden notes, and the capability to search subdirectory files for a particular word.

XyQuest has addressed a glaring deficiency by adding a 100,000-word spelling checker to the program. As with most XyWrite features, it is versatile and can be customized for particular needs. With text on screen, you can quickly check a word, a block of text,

or an entire document with a few keystrokes. The program pops up a list of alternatives, and one keystroke substitutes the correct spelling. You can also check a single file or several files for misspellings. An auto-check feature beeps at typos as you make them, and you can program an auto-correct feature to automatically replace frequently misspelled words as you type.

The thesaurus, Microlytics' *Word Finder*, which contains 220,000 synonyms with 15,000 root words, is efficient and easy to use. Place the cursor on a word and press <Ctrl>-T, and up pops a list of synonyms, organized by parts of speech and by definition. Highlight the synonym you want and press <Enter> to replace the original word. You can also find synonyms for synonyms to give your prose just the right nuance.

Like *Word*, *WordPerfect*, and *WordStar*, *XyWrite III Plus* has added desktop publishing capabilities to its features repertoire. Printer control commands enable you to embed control codes in a document in order to access a printer's special graphics features or use internal fonts not included in *XyWrite III Plus*'s printer drivers. You can also use the command to switch paper bins for merging letterhead with plain paper. The graphics inclusion feature, similar to those in *WordPerfect 4.2* and *Word 4.0*, embeds a code in text that merges a graphics file into the document at print time. However, the feature can't handle Lotus .PIC files. This shortcoming aside, the new capabilities, combined with already excellent indexing, header and footer, and footnoting features and the ability to snake text, make *XyWrite III Plus* a formidable tool for document design and production.

The program supplements its text tools with a redlining feature that records additions and deletions made to a document. Changes appear on screen as you make them, with additions displayed in bold type and deletions in inverse video. You can print a revised document with redline markers in place, and you can add hidden notes that show up on screen but not in hard copy.

But bulking up with all these additional features has taken a toll on *XyWrite III Plus*.

FEATURES EVALUATION

Word Processors Compared

Feature for feature, Nota Bene, XyWrite III Plus, and DisplayWrite 4/2 are closely matched, but economical Q&A Write compares favorably.

	Q&A Write	Nota Bene	XyWrite III Plus	4/2 DisplayWrite
Screen display				
Column number	○	○	○	○
Line number	●	●	●	●
Page breaks	●	○	○	○
Boldface	●	●	●	●
Underlining	○	●	●	●
Italics	○	○ ¹	○ ¹	○
Formatting				
Conditional page breaks	●	●	●	○
Widow/orphan control	○	●	●	●
Automatic hyphenation	○ ²	●	●	●
Decimal tabs	●	●	●	●
Snaking/side-by-side columns	●	●	●	●
Both styles on same page	○	●	●	●
Search and replace				
Conditionally ignores case	●	●	●	●
Performs wild-card searches	●	●	●	○
Searches for control characters	●	●	●	○
Printing				
Proportional spacing	●	●	●	●
Document queuing	●	●	●	●
Background printing	○	●	●	●
Special features				
Macros/macro learn mode	●	●	●	●
Spelling checker/thesaurus	● ³	●	●	●
Line draw	●	●	○	○
Imports graphics files	●	●	●	○
Page preview	○	●	●	●
Outliner	○	●	●	●
Math functions	●	●	●	●
Numbers footnotes	○	●	●	●
Maximum header/footer lines	18	△	△	○ ⁴
Windows (maximum)	1	9	9	12
Mail merge	●	●	●	●
Creates index/table of contents	○	●	●	●
Telecommunications module	○ ⁵	○	○	○
Undo command	○	○	○	●
Undoes deletions	●	●	●	●

● Yes ○ No ○ Deficient △ Unlimited

¹ Requires Hercules Graphics Card Plus.

² Soft hyphen only.

³ Thesaurus optional.

⁴ 512 characters.

⁵ LAN support for 3Com 3+, Novell Netware, and IBM PC Network.

The program is the overall champ in NSTL's head-to-head speed tests, but unlike previous versions of *XyWrite*, *XyWrite III Plus* is noticeably slow at executing commands and updating screen displays. Sometimes when you type text, the cursor seems to run away from you; other times it lags behind. The program also takes twice as long to load as *XyWrite III*.

XyQuest knows it has a problem and has tried to address it structurally. *XyWrite III Plus* requires 384K RAM, but you can disengage the 108K spelling checker to free up some memory and reload it later without re-

booting. Obviously, having this extra RAM available quickens the pace—at least until you need the spelling checker.

Overall, *XyWrite III Plus* remains one of the most powerful word processors on the market. True, it's a little heavier and a little slower than before, but the spelling checker and thesaurus alone make a slight loss of speed palatable. Hard-core speed-oriented *XyWrite* fans may hope that XyQuest stops "improving" the program, but this latest upgrade should help the champ fend off challengers for now. —Stephen A. Blumenthal

NSTL TEST REPORT

Word Processors

XyWrite III Plus was the overall speed champion, winning three out of five tests. *DisplayWrite 4/2* finished a distant fifth.

Scroll by line



Reformat document



All tests were conducted using *Word 4.0*, *XyWrite III Plus 3.53*, *Nota Bene 3.0*, *Q&A Write 1.03*, and *DisplayWrite 4/2*.

All benchmarks were performed on an 8-MHz IBM AT with 640K and a 30MB hard disk running under DOS 3.20—except for the *DisplayWrite 4/2* tests, which were performed on the same machine upgraded to 2.5MB and run under OS/2 Standard Edition 1.0. 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. A carriage return and blank line 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 of the file back to the top. The two times were then averaged. A program was run to set the keyboard to generate 30 keystrokes per second. Without the use of such a program, all of the times would have been longer.

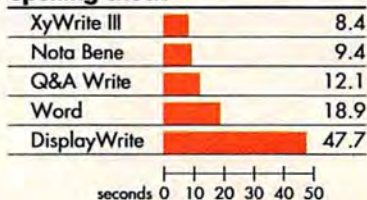
Reformat document

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

Print a file

This benchmark used a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement. The performance text file

Spelling check



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 (consisting of 30 paragraphs of 14 lines each) 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.

WHERE TO BUY

XyWrite III Plus 3.53

XyQuest, Inc.
44 Manning Rd.
Billerica, MA 01821
617/671-0888

List price: \$445, upgrade from XyWrite III \$50, upgrade from XyWrite II Plus \$150

Requirements: 384K, one disk drive (hard disk recommended), DOS 2.00 or later version

Not copy protected

Technical support: unlimited, no toll-free number, M-F 9-6

Other support services: training workshops \$245 per user

For more information, see Products Featured in This Issue.

Nota Bene 3.0

Word processor

PROS: Easily customized, fast text data base retrieval, powerful macros, foreign language modules available

CONS: Doesn't display page breaks while editing, conflicts with some RAM-resident programs

Nota Bene may have started life as a teacher's pet, but it's graduated with honors in business and government. Dragonfly Software originally designed this powerful word processor to handle the arcana of indexes, footnotes, and tables of contents in academic works. But *Nota Bene* is an intelligent choice for any text-intensive project such as research or consulting.

The \$495 program's avalanche of features includes fast searches of a vast disk-based text base, built-in macros, and enough style and formatting commands to satisfy the most demanding wordsmith. Version 3.0 adds automatic installation, a top-notch 100,000-word spelling checker, a 15,000-word thesaurus, and redlining. Among the program's few drawbacks are an inadequate tutorial and a tendency to clash with some RAM-resident utilities.

Nota Bene requires a hefty 512K of memory, though disabling the spelling checker

saves 100K. When you load the program, it runs an internal batch file (which you can edit) and separately loads the various components of the program into memory—printer tables, keyboard definition, hyphenation dictionary, default settings, help screens, and so forth. You can customize these modules, often just by calling them to the screen and editing them like any other text file. The key assignments, for instance, can be rewritten and then reloaded. For macro mavens, individual keys can also invoke external batch files written in *Nota Bene's* useful programming language.

In use, *Nota Bene* displays up to nine screens simultaneously. Page formatting and text entry are straightforward, and hyphenation is excellent except for one oddity: *Nota Bene* hyphenates proper nouns as a matter of course. One handy feature: You can embed short notes and memos in documents, where they remain hidden until called for.

Among high-end word processors, *Nota Bene* is probably best known for its ability to index and retrieve blocks of free-form or structured text. Most users type up their notes first and index them later, using one of three options: index every word, index all words except for a specified list, or index only tagged words. *Nota Bene* will batch-index files (once you type in the file numbers), and its appetite for text is positively Panagruelian: Dragonfly claims *Nota Bene* can index up to 50,000 pages in 1800 files in a matter of minutes and retrieve text nearly instantaneously, even across subdirectories.

Nota Bene supports a large variety of printers, including HP LaserJet-compatible and PostScript laser printers. On the Series II printer, however, only HP cartridges and Times Roman and Helvetica HP soft fonts are supported. (Dragonfly customizes font drivers free of charge if you provide a font width table.) Version 3.0 can merge graphics files into text at printout and has some handy envelope-printing tricks: It will automatically format and print envelopes from the inside address of a letter and can store your business and home addresses for automatic return-address printing.

Foreign language word processing is available with separate modules. *Nota Bene* supports Russian and Hebrew, for example (non-

Roman alphabets require a Hercules Graphics Card Plus for display), and Hebrew words automatically wrap on the left margin. The dozens of languages supported include such exotics as transliterated Urdu.

In NSTL tests *Nota Bene* was amazingly fast in some editing functions but very slow in others—notably scrolling, and printing from within a long document. Dragonfly reports that *Nota Bene* conflicts with *NoBlink*, *Software Carousel*, *Keywords*, and some early versions of *SideKick*. The program has so much macro power, however, few regular users will need outside utilities. The encyclopedic manual is clear and well written and covers customization and programming. The tutorial lacks some obvious information, though (such as how to use the spelling checker).

Using *Nota Bene* is like having dinner with Thomas Jefferson: It seems to know something about everything. The program's intelligent design extends to such touches as a very fast 1-2-3-type menu line and unique fill-in-the-blank help screens that remind you of commands after you back out of the context-sensitive help. Its completeness is evidenced by the capability to number notes with Arabic or Roman characters, daggers, or asterisks and to format text to meet the rigorous stylistic demands of, for example, either the Modern Language Association or the American Psychological Association. For writing projects that involve heavy research, long documents, and strict style requirements, features like these are anything but academic. —Kathleen Creighton ●

WHERE TO BUY

Nota Bene 3.0

Dragonfly Software
285 W. Broadway #500
New York, NY 10013
212/334-0445

List price: \$495

Requirements: 512K, two disk drives (hard disk recommended), DOS 2.00 or later version

Not copy protected

Technical support: unlimited free support, no toll-free number, M-F 9-5

Other support services: free biennial newsletter for registered users

For more information, see Products Featured in This Issue.

Q&A Write 1.03

Word processor

PROS: Easy to learn and use, excellent printer support, moderately priced

CONS: Doesn't support background printing, can't display text attributes, file conversion utility and thesaurus cost extra

When you're pressed to finish a project, you don't have time to wade through a verbose manual or wrestle with a complex interface just to get words onto paper. A simple, easy-to-use word processor is what you need to get the job done, but such programs often trade features and power for ease of use. Symantec has a solution to this dilemma—*Q&A Write*.

Q&A Write is the stand-alone version of the word processing module in Symantec's *Q&A* data base manager. A versatile, \$199 word processor that's easy to learn, it offers enough features to satisfy most business uses. Although not a high-end product like *WordPerfect* or *Microsoft Word*, *Q&A Write* matches up well against a midlevel word processor such as *PFS: Professional Write*. Among the program's assets are a macro function, extensive printer support, the ability to merge graphics files into a document, and an excellent 100,000-word spelling checker from Microlytics. Moreover, a straightforward menu-driven interface, prolific help screens, and a cookbook-style manual can make even a computer neophyte productive in less than 30 minutes.

Menus guide you through every *Q&A Write* function. You whip through the menus by pressing either the function keys or a function key in conjunction with <Shift>, <Ctrl>, or <Alt>. To select a command, simply highlight it with the cursor keys or type the first letter of the command and press <Enter>. *WordStar* users will be pleased to know that *Q&A Write* duplicates 16 *WordStar* commands—such as <Ctrl>-Y to delete a line—that bypass the menus altogether.

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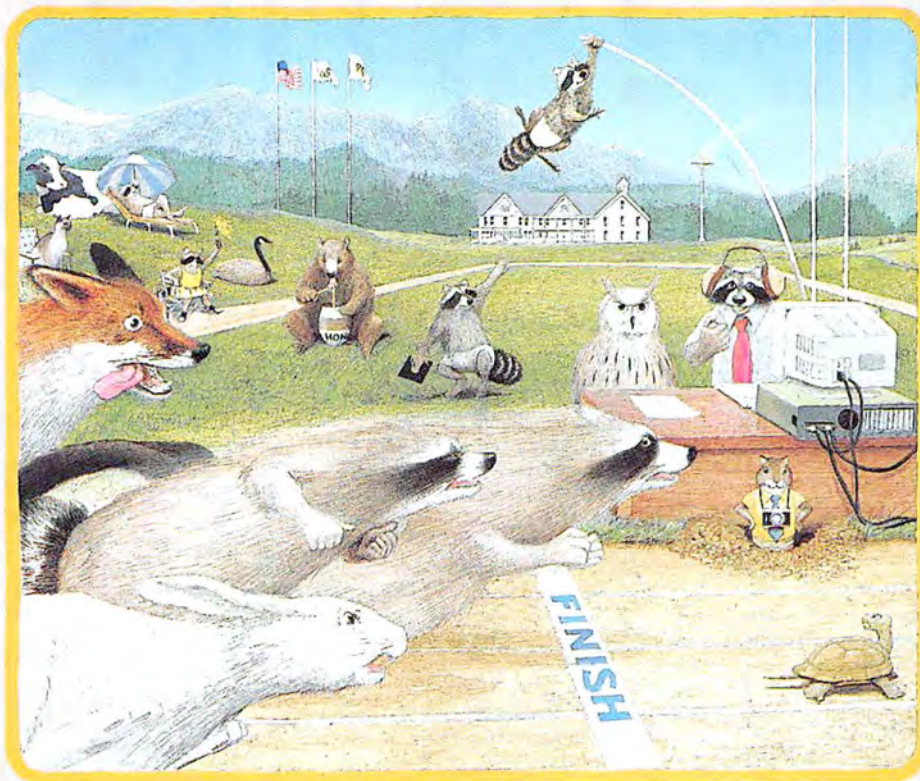
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- SoftBytes 386^{MAX} 2.36 ... 49.

WordPerfect Corp. ... NCP

- WordPerfect Library 1.1 ... 59.
- WordPerfect 5.0 ... 255.
- DataTech 2.0 ... 299.

WordTech Systems ... NCP

- dBXL 1.2 ... 119.
- Xerox ... NCP**
- Ventura Publisher 1.1 ... 549.

EDUCATIONAL

Barron's ... CP

- Computer SAT ... 35.
- Stone & Assoc. ... NCP (reqs. graph. brd.)**
- My Letters, Numbers, Words (ages 2 to 6) ... 27.
- Kids Stuff (ages 2 to 6) ... 27.

True BASIC, Inc. ... NCP

- Trigonometry ... 32.
- Algebra ... 32.

RECREATIONAL

Accolade ... CP (reqs. graphics brd.)

- Hardball (baseball simulation) ... 11.
- Testdrive (driving simulation) ... 11.
- Electronic Arts ... CP (reqs. graphics brd.)**
- Chessmaster 2000 ... 32.

PC Connection Hardware Special

through July 31, 1988

Practical Peripherals ... 5 years 2400 Baud Internal & External Modems

The Practical Peripherals 2400 SA has been a best-seller with us for some time now. The reason? It delivers high quality data transmission, Hayes compatibility, and made-in-the-U.S.A. quality. All at a terrific price.

- Hayes asynchronous compatible
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- Full 5 year warranty
- 2400 SA (external modem) ... \$181.
- PM2400 (internal modem w/ProComm) 151.

- Chuck Yeager's Flight Simulator ... 32.
- Grand Slam Bridge ... 45.

Infocom ... NCP

- Hitchhiker's Guide ... 12.
- Leather Goddesses of Phobos ... 25.
- Zork Trilogy ... 33.

Microprose ... CP

- F-15 Strike Eagle (requires CGA) ... 22.
- Gunship (requires CGA or EGA) ... 32.

Microsoft ... CP

- Flight Simulator 2.13 (reqs. graphics brd.) ... 35.

Mindscape ... CP

- Balance of Power (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 (requires CGA or EGA) ... 33.
- 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 ... 69.

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500W

HARDWARE

Manufacturer's standard limited warranty period for items shown is listed after each company name. Some products in their line may have different warranty periods.

AST Research ... 2 years

I/O Mini 2 C/S/P ... \$89.

SixPakPlus 64k C/S/P

(now upgrades to 576k) ... call

SixPakPremium 256k C/S/P

(upgrades to 1 Meg or 2 Meg w/Piggyback) call

Advantage Premium 512k S/P

(upgrades to 1 Meg or 2 Meg w/Piggyback) call

Advantage 2 512k (for PS/2) ... call

RAMpage! 286 512k (upgrades to 2 Meg) call

Hot Shot 286 (10 MHz) ... 399.

Amdek ... 1 year

410A (amber monochrome monitor) ... 159.

LaserDrive-1 (CD-ROM Drive; 90-day wrty.) 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 ... 18.

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-86e printer (80 column, 240 cps) ... call

FX-286e (136 column, 240 cps) ... call

LQ-500 (80 column, 180 cps) ... call

LQ-850 printer (80 column, 264 cps) ... call

LQ-1050 printer (136 column, 264 cps) ... call

LQ-2500 printer (136 column, 324 cps) ... call

LX-800 printer (80 column, 180 cps) ... call

Printer-to-IBM cable (6 feet) ... 15.

Everex ... 1 year

1200 Baud Internal Modem ... 99.

2400 Baud Internal Modem ... 199.

5th Generation ... 6 months

Logical Connection 256k ... 349.

Logical Connection 512k ... 409.

Hayes ... 2 years

Smartmodem 1200 ... 299.

Smartmodem 1200B (with Smartcom II) ... 299.

Smartmodem 1200B (no software) ... 265.

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ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

1-800-243-8088.

Smartmodem 2400	\$449.
Smartmodem 2400B (with Smartcom II)	449.
Hercules ... 2 years	
Graphics Card Plus	189.
Network Card Plus (with TOPS DOS)	349.
Intel ... 5 years	
2400B Modem 2 (internal modem for PS/2 Models 50/60/80)	279.
Inboard 386/PC w/1 Meg	725.
Inboard 386/AT (req. installation kit)	949.
Inboard Installation Kit (specify computer)	139.
Aboveboard 286 512k	389.
Aboveboard PS/286 512k S/P	419.
AboveBoard 20k (for MicroChannel)	279.
8087 (for IBM-PC & XT)	114.
8087-2 (for PS/2 Models 25 & 30)	159.
80287 (for AT & XT286)	195.
80287-8 (for 8 MHz 80286 machines)	249.
80287-10 (for PS/2 Models 50 & 60)	319.
80387 (for 16 MHz PS/2 Model 80)	499.
80387-20 (for 20 MHz PS/2 Model 80)	749.
Kensington Microware ... 1 year	
Masterpiece	94.
Masterpiece Plus	109.
key tronic ... 3 years	
101 Keyboard (enhanced layout)	99.
Kraft ... 1 year	
Three-button Joystick	33.
KYE International ... 1 year	
Genius Mouse Model GM-6 Plus	59.
Microsoft ... lifetime	
SPECIFY BUS OR SERIAL VERSION	
Mouse with Paintbrush	109.
Mouse with Easy CAD	125.
Mouse with Windows and Paintbrush	145.
Migent ... 1 year	
Pocket Modem (1200 baud, incl. software)	119.
MSC Technologies ... lifetime	
SPECIFY BUS OR SERIAL VERSION	
PC Mouse w/PC Paint+	89.
PC Mouse w/Autosketch	105.
NEC ... 2 years	
Multisync II (800 x 560 max. resolution)	call
NSI Logic ... 3 years	
Epic 480 (extended EGA)	135.
Smart EGA Plus (supports 800x600 res.)	169.
Orchid Technologies ... 2 years	
Tiny Turbo 286	289.
Designer VGA	349.
PC Cooling Systems ... 1 year	
REPLACEMENT POWER SUPPLIES	
Turbo Cool 150 (run 25° - 40° cooler)	129.
Turbo Cool 200 (run 30° - 45° cooler)	169.
Silencer 200 (69% noise reduction)	149.
Practical Peripherals ... 5 years	
Microbuffer Inline (par. print buffer w/32k)	129.
1200 Baud Internal Modem (w/ProComm)	69.
1200 Baud External Modem	109.
2400 Baud Internal Modem	special
2400 Baud External Modem	special
Princeton Graphics ... 1 year	
MAX-12E (amber monochrome monitor)	139.

Ultrasync (supports CGA, EGA, VGA)	\$549.
Quadram ... 2 years	
ProSync (with mouse)	259.
Microfazer II Print Buffer 64k	249.
Quad386XT	859.
Toshiba ... 1 year	
P321SL printer (80 col., 216 cps, w/tractor)	529.
P351SX printer (136 column, 216 cps)	999.
T1000 Laptop (80C88, 6.4 lbs., 5 hr. battery)	call
T1200 Laptop (80C86, 10 MHz, 20 Meg)	call
T3100/20 Laptop (80286, 8 MHz, 20 Meg)	call
T3200 Laptop (80286, 12 MHz, 40 Meg)	call
T5100 (80386, 16 MHz, 40 Meg)	call
768k Ram Card for T1000	299.
Video 7 ... 2 years	
VEGA Deluxe (supports 640x480)	209.
VEGA VGA (supports full VGA specs)	287.

DRIVES

IOMEGA ... 1 year	
Bernoulli II Single 20 Meg Internal (5 1/4")	779.
Bernoulli II Dual 20 Meg External (5 1/4")	1679.
20 Meg cartridge (5 1/4")	59.
Bernoulli Box 40 Meg	1679.
20 Meg cartridge (8")	82.
PC2 Card	169.
PC2B Card (bootable card)	229.
PC4 Card (for PS/2 Model 50/60/80)	299.
Mountain Computer ... 1 year	
40 Meg Internal Tape Drive (XT, AT or PS/2)	379.
40 Meg External Tape Drive (XT, AT or PS/2)	479.
40 Meg External Tape Drive w/Power Supply (XT, AT or PS/2)	569.
Plus Development ... 1 year	
Hardcard 20 Meg (49 ms)	569.
Hardcard 40 Meg (39 ms)	725.
Seagate ... 1 year	
FREE PCTV® Hard Drive Installation Tape with the purchase of 20 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.
TEAC ... 1 year	
PC, XT 360k Drive (5 1/4" half-height)	99.
720k Drive (3 1/2" half-height, specify XT or AT)	99.
Toshiba ... 1 year	
AT 360k Drive (5 1/4" half-height)	99.

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DISKS

All disks have a lifetime warranty.

5 1/4" DS/DD Disks for PC & XT (360k)	
Fuji MD2D (10 disks per box)	\$12.
Sony (10 disks per box)	12.
Maxell MD2-D (10 disks per box)	13.
Verbatim Datalife (10 disks per box)	13.
5 1/4" DS/High Density Disks for AT (1.2 Meg)	
Fuji MD2HD (10 disks per box)	22.
Sony (10 disks per box)	23.
Maxell MD2-DD (10 disks per box)	23.
Verbatim Datalife (10 disks per box)	22.
3 1/2" DS/DD Diskettes (720k)	
Sony (10 disks per box)	18.
Fuji (10 disks per box)	19.
Maxell (10 disks per box)	20.
3 1/2" DS/High-Density Diskettes (1.44 Meg)	
Fuji (10 disks per box)	55.
Maxell (10 disks per box)	59.

MISCELLANEOUS

CompuServe

CompuServe Information Service	24.
Grolier's OnLine Encyclopedia	32.

Cables ... lifetime

Smartmodem-to-AT cable (9 feet)	15.
Parallel Printer cable (15 feet)	19.

PC Connection Computer Toolkit	22.
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- We accept VISA and MASTERCARD.
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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail, charged by weight.
- Allow 1 week for personal and company checks to clear.
- COD max. \$1000. Cash, cashier's check, or money order.
- 120 day limited warranty on all products.*
- To order, call us anytime Monday thru 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, and computers, 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:

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Q&A Write's
easy-to-use
spelling checker
examines indi-
vidual words,
blocks of text,
or an entire
document.

function key, and any combination of <Shift>, <Alt>, or <Ctrl> with a character key can be used to store a macro. You can program macros to pause for keyboard input; you can also nest macros. Q&A Write creates macros in ASCII format so you can edit them like text.

Q&A Write's printer support is impressive. The program works with 147 printers and has drivers for all HP LaserJet cartridge and soft fonts as well as for PostScript. If your printer isn't on the list, Symantec will write a driver for it at no charge. All text enhancements, including fonts, bold-face, underlining, and italics, appear on the same menu. It takes only two keystrokes to change fonts, and you can mix up to eight font styles in a document. Unfortunately, Q&A Write can't display fonts or text enhancements (even underlining); instead it highlights modified text.

Overall, the program's output scheme is efficient, but it does have a few annoying gaps. For example, at print time you can separate text into as many as eight newspaper-style columns per page, but you can't preview the layout. And although Q&A Write supports print queuing, it offers no support for background printing.

The program does provide you with a variety of ways to spiff up your output. A line-draw feature creates horizontal, vertical, and diagonal single and double lines. For more complex graphics, you can merge *1-2-3* and

Symphony .PIC files or *pfs:graph* picture files with text: You embed a command in your document, and Q&A Write will then automatically create space for the graphic in the document when it's printed.

When you need to mix math with your metaphors, Q&A Write's calculator is ready. The program adds, multiplies, divides, and averages both rows and columns of numbers. Curiously, Q&A Write doesn't have a subtract function but adds negative numbers instead; for example, in order to subtract 50 from 100, you must add -50 to 100. You can place the results of a math calculation anywhere in a document.

As a vestige of its data base lineage, Q&A Write has a card file that holds up to 1000 records, with 180 fields per record. You can sort records on any field in alphabetical order or in ascending or descending numeric order. You can also search within a range, use wild-card characters, or search on more than one field at a time. The card file can import delimited ASCII text, and its fields can be used for mail merge projects.

When it's time to import files from other applications, Q&A Write gets a little finicky. The program can read only *pfs:write*, *PFS: Professional Write*, or *IBM Writing Assistant* files directly. A built-in utility converts *WordStar*, *1-2-3*, and *Symphony* files as well as ASCII text. Symantec offers an optional \$29.95 document conversion utility, which converts 13 other popular word processing formats—including *Word*, *WordPerfect*, and *MultiMate*—into Q&A Write format. The conversion utility really should be part of the program.

Although Q&A Write lacks some of the extras found in top-of-the-line word processors—such as automatic indexing, an outliner, or a built-in thesaurus—it has enough functions to satisfy all but the most demanding. So if you're looking for a word processor that's easy to use but powerful enough for the office, Q&A Write is right for you. —TJ Byers ●

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**Editor's Choice
PC Magazine, 12/8/87**

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InfoWorld, 5/25/87

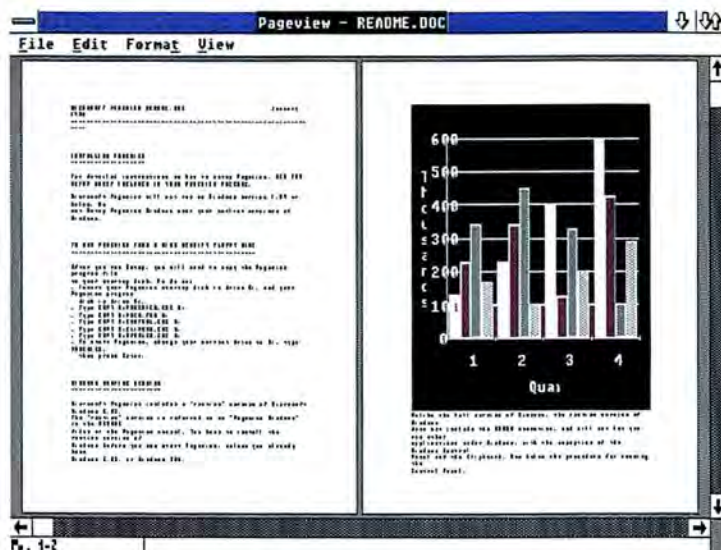
"The consummate dBASE report writer."
PC World, 3/87

"... run, don't walk ... and place your order ..."
PC Week, 11/11/86

Statements

Software & Services, Inc.
1328 Canterbury Avenue
Westborough, IL 60092

DATE	TYPE	REF NO.	CHARGE	CREDIT	BALANCE
07/01/88					1297.56
07/06/88	S	33791	311.24		598.80
				110.00	488.80
				177.56	311.24
					133.68
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Manager Rogers					
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Microsoft Pageview displays Word text with graphics imported from programs such as Excel. Note how the labels of the Excel chart run over the axes of the chart.

WHERE TO BUY

Q&A Write 1.03

Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014
408/253-9600

List price: \$199

Requirements: 384K, one disk drive (two disk drives recommended), DOS 2.00 or later version
Not copy protected

Accessories: document conversion utility \$29.95, Microlytics' Word Finder thesaurus \$49.95

Technical support: unlimited, not toll-free, M-F 8-5

Other support services: 24-hour BBS, 408/973-9598

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

Microsoft Pageview 1.0

Page preview and graphics import utility for Microsoft Word

PROS: Easy to use

CONS: Importing graphics requires Windows 2.0 or Windows/386; limited formatting options; buggy paste command; no text editing capabilities

If you're tired of making test printouts to see what your *Microsoft Word* documents really look like, a \$50 *Windows* utility called *Microsoft Pageview* can bring relief. And if you want to quickly spruce up those docu-

ments with logos or charts from programs like *Microsoft Excel*, *Chart*, *Paintbrush*, *Paint*, and *Lotus's 1-2-3*, the same utility can do the job. *Pageview* is easy to use, but it requires 512K, and its cut-and-paste features are somewhat buggy.

Pageview's on-screen virtues are simple but admirable. It displays different-size fonts, proportionally spaced type, and side-by-side columns; it also shows running heads and footnotes exactly as they will print. The program has a number of convenient formatting features: You can move margins, headers, and footers right on the screen, and if you insert or move a page break, *Pageview* will automatically repaginate the document. Reload the document into *Word*, and all the changes will be preserved. Another nice feature: The standard *Pageview* view is two pages at a time, but you can zoom in for a closer look.

Pageview comes with a run-time version of *Windows*, but you need *Windows 2.0* or *Windows/386* to import graphics. It's a multistep process but not a difficult one. To add a chart from *Excel* to a memo created in *Microsoft Word*, simply load *Excel* from *Windows*, create the chart, and save it to the *Windows* Clipboard. Then load the memo in *Pageview*, create a picture frame to hold the chart, and paste the chart into the frame. Then you can stretch the frame to any size and crop unwanted portions of the chart.

Alas, a bug crawled into view when I tried *Pageview's* graphics insertion feature. Labels that were correctly positioned in an original *Excel* graph lost their bearings and ran over the axes of the chart in *Pageview*. When I contacted Microsoft about the problem with the *Excel* graphic, the company blamed it on *Excel's* design—which is a bit ironic, since Microsoft makes both applications.

Bugs aside, *Pageview* lacks some useful capabilities. What do you do, for example, if you're reformatting the margins of a document with *Pageview* and notice that a word is missing? Try inserting the word, and you discover that *Pageview* provides no text editing capabilities whatsoever. To fix the word you have to save your document, go back into

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Word, type the missing word, then go back into *Pageview* to resume formatting.

With its format- and graphics-import talents, *Pageview* can give *Word* users a relatively painless introduction to desktop publishing. —*Ted Nace* ●

WHERE TO BUY

Pageview 1.0

Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
206/882-8080

List price: \$49.95

Requirements: 512K (640K recommended), two disk drives, DOS 3.00 or later version, Windows 2.0 or Windows/386

Not copy protected

Technical support: unlimited technical support, no toll-free number, M–F 8–5

Other support services: CompuServe forum (Go Msapp), quarterly newsletter on Microsoft products

For more information, see Products Featured in This Issue.

ABC Word 1.0

On-line thesaurus and dictionary

PROS: Huge synonym list, true dictionary, supports personal dictionaries

CONS: Won't replace target text, RAM hungry

ABC Word, a \$150 disk-based reference library, tries to close the gap between software and books. Using the *Proximity/Merriam-Webster Dictionary* as its source, ABC Word contains a whopping 470,000 synonyms and an 80,000-entry dictionary. The program also supports a broad assortment of word processors, including *Microsoft Word*, *WordPerfect*, *WordStar*, *MultiMate*, and *DisplayWrite 4*. ABC Word's promise is exceptional, but a tedious pasting procedure—not to mention the program's 512K RAM requirement—tarnishes the effectiveness of this massive on-line reference work.

Unlike Microlytics' *Word Finder*, ABC Word displays brief definitions for the target word, grouped by parts of speech. You use

the cursor keys to select the desired meaning and press <Enter> to display synonyms with that definition. Although the program's 470,000-word synonym file is larger than any other disk-based thesaurus, ABC Word often failed to locate root forms of words. For example, it recognizes *anemic* but not *anemia* and *parsimonious* but not *parsimony*.

Inserting synonyms with ABC Word is laborious compared to using a stand-alone program such as *Word Finder* or *WordPerfect's* built-in thesaurus. You must move the cursor to a synonym, press a highlight toggle, highlight the synonym with a cursor key, and finally tap another key to insert the new term into the document. Furthermore, the target word remains in text for you to delete. ABC Word also won't capitalize, create plurals, or check for article agreement. And to find the synonym of a synonym, you must exit the displayed synonym list and type in a new target word.

These drawbacks in its interface notwithstanding, ABC Word offers an excellent 80,000-entry English dictionary, which supplies not only complete definitions but also parts of speech, plurals, and hyphenation. If you misspell an entry, the dictionary displays an alphabetized list of similarly spelled words and identifies root words the thesaurus misses.

ABC Word also translates words in foreign languages. For \$50 each, you can purchase Collins English-to-French, -German, -Spanish, -Portuguese, and -Italian translation modules, as well as versions for French and Spanish to English. In addition to translations, each dictionary provides parts of speech, gender, and alternatives for different connotations.

Unfortunately, ABC Word's pedestrian pasting technique, failure to uncover some root words, and demand for RAM diminish its word-finding prowess. Bilingual authors and on-line dictionary aficionados may find the present program worthy, but most writers should wait until a future version with a streamlined interface unleashes ABC Word's true power. —*Art Wilcox* ●

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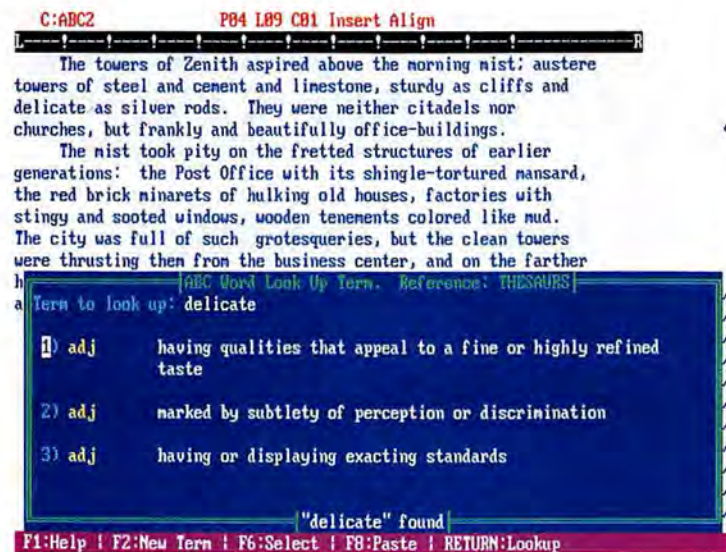
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295 Chipeta Way

P.O. Box 8719

Salt Lake City, UT 84108

800/354-5656, 801/584-3000

List price: \$150, each additional Collins dictionary \$50

Requirements: 512K, hard disk,

DOS 3.10 or later version

Not copy protected

Technical support: unlimited, no toll-free number, M-F 9-5

Other support services: none

For more information, see **Products**

Featured in This Issue.

Microsoft Bookshelf

CD ROM reference data base

PROS: Instant access to ten unabridged reference works

CONS: Expensive, very slow on floppy systems

Next to my computer I keep seven reference works, among them a compact encyclopedia, a dictionary, a thesaurus, and *The Chicago Manual of Style*. This wealth of information is within arm's reach, but I'm usually reluctant to pry my fingers from the keyboard long enough to plod through one of these tomes.

People like me, who want to produce letter-perfect documents without interrupting work flow, can now turn to *Microsoft Bookshelf*, a compact disk (CD) crammed with general-purpose reference works. Included are *The American Heritage Dictionary*, *The World Almanac and Book of Facts*, *The Chicago Manual of Style*, *Roget's II: Electronic Thesaurus*, and *Bartlett's Familiar Quotations*, as well as Houghton Mifflin's grammar checker *Usage Alert* and *Spelling Verifier and Corrector*. For business users the disk also contains the U.S. Postal Service's *U.S. ZIP Code Directory*; the University of California Press's *Business Information Sources*, an all-around reference that lists hundreds of companies, publications, and government offices; and a collection of business document templates called *Forms and Letters*.

A compact disk's 660MB capacity (the equivalent of more than 1500 360K floppy disks) opens frontiers unimaginable in the realm of disk-based reference software. These are not shrink-to-fit versions of their printed counterparts; *Bookshelf's* reference works are complete and unabridged.

Installing *Bookshelf* is simple even for CD neophytes: You simply fit an interface card into an available slot, plug it into a compact disk drive, and install Microsoft MS-DOS CD ROM Extensions—software that enables the PC to access the CD ROM drive. *Bookshelf's* own installation software lives on the compact disk. You simply switch to drive D: (or whatever designator the drive has been assigned) and type Setup. The installation software transfers *Bookshelf's* control program files to your hard disk or to a floppy disk. *Bookshelf's* data banks can then be called up at any time by simultaneously pressing <Alt> and <Shift>; or you can re-define the hot key as <Ctrl> paired with either the left or the right <Shift> key.

Bookshelf requires 256K and works either as a stand-alone program or as a TSR. If you run it as a TSR, you need enough RAM both

Y

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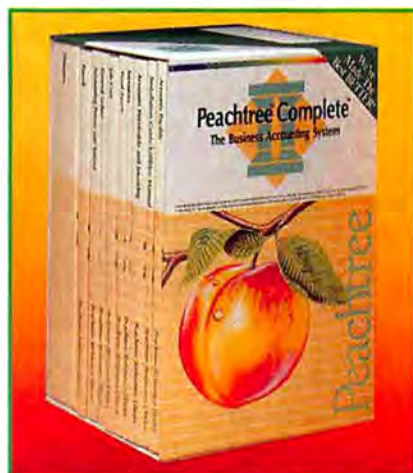
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*InfoWorld, December 1987.

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Bookshelf's search function can locate facts based on a single word or group of words.

for *Bookshelf* and for the application you're using. Microsoft suggests 512K for hard disks and 640K for floppy-based systems. But running *Bookshelf* on a floppy system is no picnic: The program uses a virtual memory scheme that requires users to keep a copy of the control program in drive A: or B: during searches, and disk access is agonizingly slow.

Bookshelf works hand in hand with 12 common word processors, including *WordPerfect 4.2*, *WordStar 4.0*, *DisplayWrite 3*, and *Microsoft Word*, as well as with *Multipan* and *1-2-3*. *Bookshelf*'s user interface, consisting of drop-down menus and dialog boxes, is as seamless as the best *Windows* or *Macintosh* programs. Two command lines at the top of your display provide access to *Bookshelf*'s reference works. From the top line you can select any of the ten reference works, use the on-line help command, or go to an options menu, where you can place "bookmarks" in frequently used text or view cross-references.

The second command line, called the Browser bar, contains commands for searching, scrolling, and cutting and pasting data into your application. You can use Browser bar commands to search each reference work with AND/OR operators, or page leisurely through tables of contents, indexes, or text. You can also search for more than one term in the same chapter, article, subsection, or paragraph.

But tapping *Bookshelf*'s power is expensive. *Bookshelf*'s disk alone costs \$295; getting the disk packaged with Amdek's Laserdrive 1 compact disk drive, an interface board, cable, and MS-DOS CD ROM Extensions software costs \$1099. Unless you already own a CD ROM drive, investing in *Bookshelf* will cost considerably more than buying a whole library of reference books.

—Reed McManus

WHERE TO BUY

Bookshelf

Microsoft Corp.
16011 N.E. 36th Way,
Box 97017
Redmond, WA 98073-9717
800/426-9400, 206/882-8080

List price: \$295

Requirements: 640K with two disk drives, 512K with a hard disk (hard disk recommended); CD ROM drive with MS-DOS CD ROM Extensions; DOS 3.10 or later version

Accessories: Amdek Laserdrive 1 \$1099

Technical support: unlimited, no toll-free number, M-F 9-5

Other support services: none
For more information, see **Products Featured in This Issue**.

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SPREADSHEET ADD-INS

143 **Lucid 3-D 1.0**

A host of innovations, including file linking and sophisticated auditing, make this new pop-up spreadsheet worth a look. But will it deliver under everyday pressures?

145 **SQZ Plus**

This update to *SQZ*—the perennial favorite for saving disk space—adds features that help secure your data.

146 **3-2-1 Blastoff 1.0**

If you're tired of waiting around while *1-2-3* recalculates your worksheet, *Blastoff* can kick *1-2-3* into high gear.



148 **4Views 1.0**

So you want better sorting, easier data entry, and sophisticated reporting—within *1-2-3*? *4Views* comes to the rescue.

150 **The Worksheet Utilities**

This potpourri of handy programs—from autosave utilities to file managers—speeds mundane spreadsheet chores.

152 **Cambridge Spreadsheet Analyst 2.0**

Here's a powerful program that can help you track down errors in *1-2-3* worksheets and understand the structure of macros.

156 **101 Macros for Lotus 1-2-3**

Pick and choose among dozens of handy macros that boost *1-2-3*'s capabilities, even for macro novices.

ANDREW SHAWART

Lucid 3-D 1.0

Memory-resident spreadsheet

PROS: Advanced file linking and macro features, on-screen data transfer capability, low price

CONS: Difficult transition from 1-2-3, no graphics or data manager, mediocre documentation

Among new spreadsheet vendors, the latest fashion is to meet or exceed 1-2-3. At first glance, *Lucid 3-D* from Personal Computer Support Group (PCSG) appears to buck the trend. At \$149 it's a pure spreadsheet, devoid of graphics and most of 1-2-3's data management capabilities.

On closer examination, *Lucid 3-D*'s mouse and window support, ability to transfer data between applications, advanced file linking, and powerful macro and auditing features seem to promise better management of large, complex worksheets. Moreover, a host of handy features—search and replace, auto-save, data recovery, cell noting, excellent auditing, and a pop-up calculator—are built right in. Yes, there's gold at the end of this rainbow, but getting there isn't always fun.

Lucid 3-D is memory resident, popping up within any character-based application at the touch of two keys. 1-2-3-type commands have been streamlined, which makes them just different enough to be confusing to 1-2-3 veterans. A point-and-shoot selection mode and dialog boxes are welcome parts of the interface; however, you'll also find such peculiarities as a disabled <Ctrl>-<Break> key (you use <F10> instead).

Lucid 3-D's Clipboard command actually allows you to transfer ASCII characters between applications. Say you want to insert text from *Microsoft Word* into *Lucid 3-D*. With *Word* in the foreground, you simply toggle out of *Lucid 3-D* and highlight the desired *Word* data; then you return to *Lucid 3-D* and paste the data in the worksheet.

Though straightforward, the process is imperfect. A column of data was transferred

properly from *Word*, except for intentionally blank entries: *Lucid 3-D* overwrote each blank with data from one column to the right. And though *Lucid 3-D* easily imports a simple text column, pulling in entire paragraphs from *Microsoft Word* produced garbled text. That problem occurred because *Lucid 3-D* separates text containing two blank spaces (or tabs) into individual cells—a boon with numbers but a problem with text. Finally, toggling from *Word* to *Lucid 3-D* and back again froze the mouse pointer.

Lucid 3-D's utility for converting 1-2-3 data files worked without a hitch, and *Lucid 3-D* files converted from .WKS or .WK1 format took up about 15 percent less disk space. Note, however, that *Lucid 3-D* files are limited to 64K, so 1-2-3 applications larger than about 75K must be broken up before conversion.

That limitation would be an intolerable nuisance if not for *Lucid 3-D*'s file-linking capability. PCSG reasons that most users switching to *Lucid 3-D* want to modularize large 1-2-3 applications anyway. Still, the 64K limit is a sobering reminder of the soft costs involved in switching applications.

Despite its 3-D handle, *Lucid 3-D* is not overtly multidimensional (like *BoeingCalc*) but rather a linkable spreadsheet (like *Multiplan* and *Surpass*). With one keystroke you can step out of your current worksheet and create a supporting worksheet at any point. Then you can set up a link by moving the cursor to a cell in the supporting worksheet and hitting a key to link it to the first one. Only single cells can be linked, not entire ranges, but you can create an unlimited number of linked worksheets this way. At press time PCSG said range linking was in the works.

Using external cell references to tunnel between files is ingenious, but there's a downside: *Lucid 3-D*'s external cell references can't be incorporated into formulas. If you so much as place a plus sign in front of

FEATURES EVALUATION

Lucid 3-D Squares Off Against 1-2-3

Lucid 3-D doesn't offer data management or graphics, but it meets or beats 1-2-3 on most other points.

	Lucid 3-D version 1.0	1-2-3 release 2.01
Data entry and editing		
Reads/writes ASCII	● ¹	●
Reads/writes .WKS, .WK1	● ²	●
Reads/writes .DBF	○	●
Undo command	● ³	○
Global search and replace	●	○
Cell noting/auditing	●	○
Invisible/hide command	○	●
Supports linked files	●	○
Supports mouse	●	○
Password protection	○	●

Capacity

Maximum number of rows	9999	8192
Maximum number of columns	254	256
Maximum number of windows per screen	9	2
Maximum number of keys sorted concurrently	2	2
Supports expanded memory	○	●
Supports math coprocessor	●	●
Background recalculation	●	○
Minimal recalculation	●	● ⁴

Reporting and graphs

	Lucid 3-D version 1.0	1-2-3 release 2.01
Maximum report width (characters per line)	255	240
Automatic page numbering	●	●
Number of graph types	0	6
Number of font styles per printed worksheet	1	1
Free text on graphs	n/a	○
Prints sideways	○	○
Spooler	○	○

Macro/programming

	Lucid 3-D version 1.0	1-2-3 release 2.01
Macro learn mode	●	○
IF...THEN...ELSE statements	●	●
Step mode	●	●
Trace cells option	○	●
DOS access from macro procedure	●	○
Access to other applications	●	●
Reads/writes 1-2-3 macros	○	●

● Yes ○ No ● Deficient

¹ With Clipboard commands.

² Requires special conversion utility; Lucid 3-D can't write .WK1 files.

³ Recover function can recover only data lost since the last file save.

⁴ With Lotus's Speedup.

an external cell reference, *Lucid 3-D* reads it as a label. This severely hampers *Lucid 3-D*'s usefulness as a consolidation tool. The program deserves kudos, however, for including superior auditing tools, two of which help you understand and monitor the relationships between linked files.

Lucid 3-D's macro facility abounds with clever innovations. If you want to create a branching macro, for example, a pop-up form guides you through the IF...THEN...ELSE process. Macros that contain Clipboard commands can even access DOS or other applications.

Note, however, that if your macro moves the cursor around (as most do), the macro will appear to malfunction because *Lucid 3-D* turns off screen refresh to banish distracting cursor movements. You can easily

rectify this by turning screen refresh back on, but the documentation is unclear on this point. In fact, because *Lucid 3-D*'s reference guide is organized like a dictionary, it's useful only if you know exactly what you're looking for. At press time, PCSG reported that a user guide was under development.

Despite a valiant effort, PCSG has delivered a somewhat incomplete package. For 1-2-3 users, *Lucid 3-D* is muscular but requires too much retraining. As a mainline productivity tool, the gaps are too numerous: no graphics, virtually no data management capability, and no direct importing or exporting of .WK1 files. As a pseudo-operating environment, *Lucid 3-D* requires far too many workarounds to function effectively.

Lucid 3-D may work well for you, however, if you use small spreadsheet files and want a handy pop-up accessory. Otherwise, instead of spending \$149 on *Lucid 3-D*, you may want to consider buying *VP-Planner Plus* for \$174.95 or *Quattro* for \$249. —*Ralph Soucie* ●

WHERE TO BUY

Lucid 3-D 1.0

Personal Computer Support Group
11035 Harry Hines Blvd. #206
Dallas, TX 75229
214/351-0564

List price: \$149

Requirements: 160K, two disk drives, DOS 2.00 or later version
Not copy protected

Technical support: unlimited, no toll-free number, M-F 8-7, S 9-1

Other support services: 60-day money-back guarantee

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

SQZ Plus

1-2-3 add-in utility



PROS: Excellent new backup and keystroke-recorder utilities, speedy batch operations, ability to recover corrupted files

CONS: File compression is sometimes less efficient than with the original SQZ

With *SQZ*, the best-selling utility that compresses spreadsheet files to a fraction of their original size, Turner Hall proved that small is beautiful. The new version of the product, *SQZ Plus*, is a \$99.95 add-in that offers a full complement of data security features, making it a bargain even if you're not short on disk space.

Take the program's new keystroke recorder. If you ever fear for the integrity of your data, *SQZ Plus* can maintain a log of keystrokes entered since the worksheet was last saved. With the resulting transcript you can recover work lost due to mistakes, power failures, or an inadvertent /Quit Yes. You can also use sections of the log to create macros.

The recorder, however, should not be confused with an undo command. To salvage a tainted worksheet, you must first retrieve the last saved version of the file and then re-

READY 55K

12 41am Mar 29, 1988 F1 for help or F10 for menu

	A	B		A	B	C	D
1	PERSONNEL	348,888	1	REVENUES	1,288,888		
2	FACILITIES	258,286	2	EXPENSES	(1,828,695)		
3	SELLING	126,888	3				
4	ADMINISTRATIVE	96,864	4	NET	179,385		
5	INTEREST	87,885	5				
6	TAXES	112,548	6				
7			7		1,828,695		
8		1,828,695	8				
9			9				
10			10				
11			11				
12			12	RENT	99,788		
13			13	DEPRECIATION	56,888		
14			14	MAINTENANCE	182,586		
15			15				
16			16		258,286		
17			17				
18			18				
19			19				
20			20				
21			21				

11 C:\LUCID\EXPENSES.LCD 11 C:\LUCID\FACIL.LCD

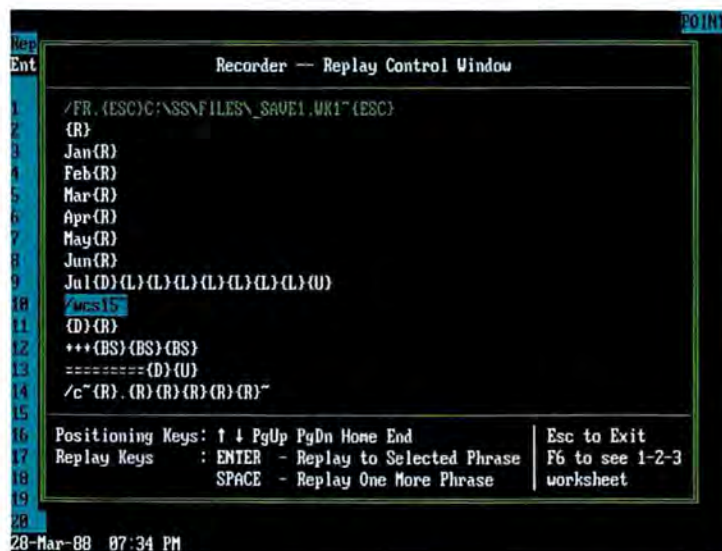
play the keystrokes up to the point where the problem occurred.

Additional data security is offered by a backup module that allows you to back up single files or an entire hard disk without ever exiting *1-2-3*. An auto-save function will save your worksheet automatically every 10 minutes or at the intervals you specify.

SQZ Plus can also maintain an audit log of file saves and user comments. To view the log, you have to run *SQZ Tools*, a stand-alone module that allows batches of worksheets to be squeezed or unsqueezed easily. The squeezing algorithms now include an error-correction protocol as added insurance against data corruption. Although *1-2-3* alone balks at damaged files, the Recover command helps restore files garbled during a telecommunications session or damaged on a disk. Unrecoverable portions of a worksheet are clearly labeled as such.

There is, of course, a price to be paid for these extras. The auditing feature adds a few bytes to each file, and the error-correction protocol adds a few more for each line of the worksheet. So, while *SQZ Plus* boasts several improved compression techniques, it's possible that some squeezed files will be the same size or even a bit larger than those compressed with the original version of *SQZ*. Turner Hall claims that *SQZ Plus* reduces file size by up to 95 percent, but as they say on TV, the mileage you get may vary.

Linking worksheets is easy, but you can link only individual cells. Cell B2 in the worksheet on the left is linked to cell B5 in the lower right worksheet.



SQZ Plus's recorder keeps a transcript file of all your key-strokes. You can use it to recover information or as the basis of a macro.

SQZ Plus is less efficient than *SQZ* with small files and with long, skinny worksheets that include more text than numbers, like data base files. In my tests, the original *SQZ* reduced a 122K data base file to 91K; *SQZ Plus* could only pack it into 99K. On ordinary files, however, *SQZ Plus* really lives up to its name. Given a 152K worksheet consisting entirely of numbers and formulas, *SQZ Plus* produced a 40K file, compared to *SQZ's* 72K.

If you really need to conserve disk space, or if you want to run the program with 1-2-3 release 1.x or with *Symphony*, you can use *SQZ Plus* as a TSR, but then the recorder and backup features are unavailable.

Another welcome addition is *Un-SQZ*, a program included with *SQZ Plus* and also available separately for free. With *Un-SQZ*, recipients of your squeezed files can un-squeeze them even if they don't own a copy of *SQZ Plus*.

To those few *SQZ* users who are primarily concerned about saving space on their hard disks, *SQZ Plus* may not be worth the \$30 upgrade. For the rest of us, though, *SQZ Plus* is well on its way to being an essential 1-2-3 tool. —Daniel Brogan ●

WHERE TO BUY

SQZ Plus 1.1
 Turner Hall Publishing
 10201 Torre Ave.
 Cupertino, CA 95014
 408/253-9600

List price: \$99.95, upgrade from *SQZ* \$30

Requirements: 50K, DOS 2.00 or later version, *Symphony* or 1-2-3 (release 2.x required for certain features)
 Not copy protected

Technical support: unlimited, user pays for call, M-F 8-5

Other support services: user BBS (direct), 30-day money-back guarantee
 For more information, see **Products Featured in This Issue**.

3-2-1 Blastoff 1.0

1-2-3 add-in utility



PROS: Faster recalculation, minimal recalc capability, "secure" worksheet option

CONS: Numeric coprocessor required

Anyone who uses large or complex 1-2-3 worksheets frequently faces the flashing WAIT sign—especially during recalculation. Lotus's add-in *Speedup* can save time by intelligently recalculating only those cells that need it. However, recalc time may actually increase in some cases, since *Speedup* must first determine which cells need recalculating.

Now a speedier alternative is available. 3-2-1 *Blastoff* can reduce recalc times dramatically—on average, by a factor of five, according to the manufacturer. The product, which costs \$124.95 and requires a math coprocessor, consists of two parts: *Blastoff*, a DOS-level compiler, and *Booster*, a 1-2-3 add-in that requires a meager 45K of RAM.

The product is based on a simple premise: 1-2-3 is an interpreter and must create machine language instructions for each formula every time the spreadsheet is recalculated. *Blastoff* makes 1-2-3 run faster by compiling the formulas into machine-executable code and storing the code in memory for quick execution. And *Blastoff* has an additional trick up its sleeve: It brings along its own library of rewritten @ functions, which perform faster than Lotus's versions.

Using one simple command, you compile your worksheets at the DOS prompt, either

in groups, by using wild cards, or one at a time. For each compiled worksheet you get a new file with a .BST extension. If the *Booster* add-in is attached when you load your worksheet, the compiled code is fetched automatically.

Blastoff is best used with worksheets whose formulas will not change. If you add new formulas to your worksheet, you must recompile it to take advantage of *Blastoff*'s speed gains. New or modified formulas are interpreted by 1-2-3 until you recompile—a nice touch.

How well does 3-2-1 *Blastoff* work? Benchmark tests performed by the National Software Testing Laboratories show that *Blastoff* improved performance about one-and-a-half to three-and-a-half times over 1-2-3 with *Speedup*. However, 3-2-1 *Blastoff* may

speed up recalc times even more if your worksheets are very large or full of complex formulas or @ functions.

3-2-1 *Blastoff* has a few additional features worth noting. It provides its own version of Lotus's *Speedup*, giving you the option of minimal recalculation. *Booster* also lets you disable 1-2-3's use of expanded memory—which in itself may speed up your spreadsheet, since 1-2-3 attempts to use the slower EMS whenever possible, even if conventional RAM is not full.

You can also produce what are known as "secure" worksheets. These are compiled versions that retain all the functionality of the original but none of the formulas. Secure

NSTL TEST REPORT

3-2-1 Blastoff

In these tests, 3-2-1 *Blastoff* improved 1-2-3 recalculation speed by two to three times. Speed gains will vary with different types of worksheets.

Multiplication with coprocessor

75 x 75 cells

3-2-1 (full recalculation) ¹		1.3
3-2-1 (minimal recalculation)		1.9
1-2-3 with Speedup		4.7

25 x 75 cells

3-2-1 (full recalculation)		1.3
3-2-1 (minimal recalculation)		1.4
1-2-3 with Speedup		2.5

seconds 0 1 2 3 4 5

¹ Full recalculation calculates all cells in the worksheet; minimal recalculation involves only those cells in which changes have occurred. Because minimal recalculation requires more overhead, its speed advantages become evident only when using complex formulas or during exponentiation.

Benchmarks were performed on an 8-MHz IBM AT Model 339 equipped with a 30MB hard disk and a 2MB AST RAMpage 286 memory expansion board. 3-2-1 *Blastoff* was tested with 1-2-3. All tests were conducted with a coprocessor installed. All cells were given a starting value of 0 and formatted to display fixed numerics with 2 decimal places. Column width was set globally at 5. For all tests, all cells except A1 contained similar formulas. For example, in the multiplication test, B1 contained the formula A1*1.01, C1 contained B1*1.01, and so on. Time was measured until control was returned to the user.

Exponentiation with coprocessor

75 x 75 cells

3-2-1 (full recalculation)		4.4
3-2-1 (minimal recalculation)		5.0
1-2-3 with Speedup		8.4

25 x 75 cells

3-2-1 (minimal recalculation)		2.5
1-2-3 with Speedup		3.8
3-2-1 (full recalculation)		4.4

seconds 0 2 4 6 8 10

75-by-75-cell matrix

For these tests, the value in cell A1 was changed to 1, except for the exponentiation benchmarks, where it was changed to 2.

25-by-75-cell matrix

After the 75-by-75-cell benchmark was performed, the cursor was moved to cell A51. The formula in that cell was replaced with 0. Next, the numeral 1 was entered into cell A51, except for exponentiation tests, where 2 was entered.

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

worksheets are much smaller than their formula-ridden counterparts and are ideal for untrained users because there's no possibility of tampering with formulas. Unlike *The Baler* and *@Liberty*, two other spreadsheet compilers (see "Worksheets Without 1-2-3," *PCW*, March 1988), you need a copy of 1-2-3 to run *Blastoff*-compiled worksheets.

Perhaps as a way of tooting its own horn, *Booster* even performs its own timing and compatibility tests. You can request recalc times for unadorned 1-2-3 and for *Blastoff*-assisted recalculations so you can gauge the improvement. Similarly, you can verify the numeric results before and after compilation. In some situations, *Blastoff* may produce slightly different results than 1-2-3 due to its methods of evaluating the @ROUND and @INT functions.

3-2-1 *Blastoff* comes with an installation program and even adds the 1-2-3 add-in manager to your driver set. The program's 140-page manual is extremely well written and easy to read, but there is no on-line help for the *Booster* add-in.

Obviously, 3-2-1 *Blastoff* is not for every 1-2-3 user. But if you work with big worksheets, a combined investment in 3-2-1 *Blastoff* and a math coprocessor could well pay substantial dividends in terms of time saved.

—John Walkenbach ●

WHERE TO BUY

3-2-1 Blastoff 1.0

Frontline Systems
140 University Ave. #100
Palo Alto, CA 94301
415/327-7296

List price: \$124.95

Requirements: 45K, DOS 2.00 or later version, 1-2-3 release 2.x, numeric coprocessor

Not copy protected

Technical support: free for 90 days, then \$1.25 per minute, no toll-free number; at press time, premium service aimed at corporate support specialists was in the works

Other support services: 30-day money-back guarantee, user BBS

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

4Views 1.0

1-2-3 add-in utility



PROS: Makes 1-2-3 data bases more versatile, adds strong reporting features

CONS: Not for novice data base users, doesn't work with 1-2-3 release 1.x or Symphony

Rather than master a new product, many 1-2-3 users have stretched 1-2-3's data base manager to its limits, using roundabout methods to get the results they need. Now spreadsheet users who know there must be a better way can turn to Turner Hall's *4Views*. This \$149.95 add-in simplifies data entry and extraction, vastly improves report generation, and even provides better sorting and limited relational capabilities.

After loading your 1-2-3 file, you simply call up *4Views* and select a data range; the data automatically displays in bright, readable text neatly separated by lines that don't take up extra worksheet columns. In this Table view, you can edit data quickly; as you enter new records, *4Views* automatically adds new rows to the input area. Entering dates, a tedious task with 1-2-3's @Date function, is simple because *4Views* converts text such as 15-Feb-88 into a format the spreadsheet understands.

Pressing a function key shifts you from Table view to Form view. As in *Symphony*, each record appears as a form that you can view and edit on a single screen. After each form is filled in or edited, *4Views* automatically brings up a new one.

At any point in Table view or Form view you can exit to *4Views*' main menu. There you can sort data using five keys (compared with two in 1-2-3), quickly set up extraction routines complete with the proper column heads, or access *4Views*' added statistical or print functions. Conveniently, all the manipulation done in *4Views*, except for adding or editing records, has no effect on your original 1-2-3 worksheet; *4Views* carefully keeps its own files.

Cross Tab view, which lets you consolidate information from one or more data bases, is sure to find favor among marketing and management types. Say you have a three-column

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For 386 PC, IBM PS/2 model 80 and 80386 add-in board users, QEMM/386:

- Fully supports the Lotus-Intel-Microsoft Expanded Memory Specification (EMS) version 4.0
- Enables the 80386 user to configure the 80386's memory beyond the first megabyte as expanded memory or as a combination of both expanded and extended memory.
- Fills out missing DOS memory to 640K and beyond by mapping into unused video memory. When used with a VGA graphics adapter this can give you 736K instead of the standard 640K for DOS.
- Automatically detects the speed of the memory in your PC and uses fast memory whenever possible.
- Increases system performance by remapping slow ROM into the 386's fast RAM memory.
- Frees up DOS conventional memory by loading memory-resident programs above video buffers.
- Supports 386 protected-mode programs, such as Ansa's Paradox 386, that use Phar Lap Software's 386 DOS Extender.
- Turns DESQview into a 80386 control program, using the 80386's 8086 machine architecture to run multiple large programs concurrently.
- Takes approximately 1.5K of overhead from the PC's conventional memory used to run DOS programs.

System Requirements: 80386 PC, IBM PS/2 Model 80, or standard 8088, 8086, 80286 with 80386 add-in board.

For IBM PS/2 model 50 and 60 users, QEMM-50/60:

- Fully supports the Lotus-Intel-Microsoft Expanded Memory Specification (EMS) version 4.0.
- Takes advantage of the hardware capabilities of the IBM PS/2 80286 Memory Expansion Option to transform its "extended" memory into "expanded" memory.
- On PS/2 Model 50 and 60's with 1.5 MB or more of the IBM Memory Expansion Option memory, enables DESQview to run multiple large programs concurrently.

System Requirements: IBM PS/2 model 50 or 60 with IBM PS/2 80286 Memory Expansion Option board or compatible. Note: IBM PS/2 architecture requires disabling motherboard memory and backfilling conventional memory to 1 MB in order for any multitasking environment to work, including Microsoft Windows 2.0, IBM's 3270 workstation program, or DESQview. QEMM will not run on 80286 computers with extended memory.

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[L1] CLIENT:(85) 'MG' TABLE
 F1:Help F2:Edit F5:Goto F6:Report F8:Form F9:Update /:Menu Alt-F7:123

	CLIENT	DATE	TIME	COSTS	DESCRIPTION
73	ATT	18-Feb-88	0.9		Sales mtg prep
74	MBI	18-Feb-88			Prep Z-Score graphs for OMB; .6
75	SAM	18-Feb-88	0.3		Review tax returns; discuss w/ C
76	TT	18-Feb-88	0.8		Review financial statements
77	ATT	19-Feb-88	3.0		Half day on site
78	TT	19-Feb-88	2.3		Review financials; prepare exhib
79	ATT	20-Feb-88	6.8		Create customer service log mode
80	TAL	21-Feb-88	1.8		Conf w/ CI re acct sys and other
81	ATT	21-Feb-88	6.8		Develop printing estimating mode
82	MG	22-Feb-88	1.5		Mtg w/ RH re XXX/XXXX data
83	ATT	22-Feb-88	1.9		Mtg at ATT re print estimating m
84	TT	22-Feb-88	0.6		Information review; tele conf w/
85	MG	22-Feb-88	1.7		Revise and review budget project
86	MG	22-Feb-88		6.60	Photocopies of budget projection
87	MG	23-Feb-88	3.1		Analyze, update XXX/XXXX data; p
88	ATT	23-Feb-88	3.0		Mtgs to review/plan cash flow, p
89	MG	24-Feb-88	1.0		Analyze, prep exhibits re XXXX s
90	CGW	24-Feb-88	0.5		Document review
91	TT	24-Feb-88	0.6		Document review
92	MG	24-Feb-88	1.4		Conf w/ NP, conf w/ NDM re XXXX

26-Mar-88 07:34 PM CAPS

Editing fields, entering new records, and creating reports are much easier with 4Views than with 1-2-3 alone.

data base that lists last year's customers and sales and the date of each sale. With the Cross Tab function you could summarize, by month, how much each customer purchased. In one neat table, you'd have the sales trends for every customer as well as for the entire company—a difficult trick with 1-2-3 alone.

4Views also has a limited relational capability that lets you join and select records from up to four data bases on the same worksheet. But if you need sophisticated relational features, seek out a dedicated product like *Informix Datasheet*.

4Views' key strength is report writing. Once you learn some new @ functions, you can create sophisticated reports with subtotals, derived statistics, multiple header and footer lines, and diverse formatting. Turner Hall provides two useful sample report formats: one for mailing labels (a bear to create with 1-2-3) and one for standard subtotal summaries. These samples can be modified to fit your needs, or you can create custom reports from scratch.

If you use 4Views to generate reports, be aware that all data in a given column must be the same type—numbers, formulas, or labels. Note, too, that 4Views' sample report-writing template is completely different from the tutorial's examples and screen shots. One final caution: Remember to attach 4Views to 1-2-3 before loading your worksheet file; otherwise you may receive unwelcome error messages.

Despite minor gaffes, 4Views is a feature-rich product well worth its \$149.95 asking price. For best results, you'll need some expertise with 1-2-3 functions and data base logic. As an experienced 1-2-3 user, I quickly produced a report for my monthly client billings that was far superior to one that had required several hours' work on a macro. It sold me! —Charles R. Ryan ●

WHERE TO BUY

4Views 1.0

Turner Hall Publishing
 10201 Torre Ave.
 Cupertino, CA 95014
 408/253-9600

List price: \$149.95

Requirements: 90K, DOS 2.00 or later version, 1-2-3 release 2.x

Not copy protected

Technical support: unlimited, no toll-free number, M-F 8-5

Other support services: BBS (direct), 30-day money-back guarantee

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

The Worksheet Utilities

1-2-3 add-in utility

PROS: Feature-packed file management, convenient formula editor

CONS: No memory-resident option, so file manager can be used with 1-2-3 only

The *Worksheet Utilities* may not be as vital to 1-2-3 users as Funk Software's premier product, *Sideways*, but it helps overcome some of 1-2-3's other shortcomings. The \$99.95 package comes in two modules: *CellWorks*, which adds features such as AutoSave and search and replace; and *FileWorks*, a full-featured file manager that inspires proper care and annotation of files.

Formula Editor is the best idea in *CellWorks*. Instead of using 1-2-3's scrolling command line to write a formula, you can use Formula Editor's pop-up window, plucking

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Webster Spell Checker	32	Logimouse w/paint	87	Quick C	57	Nutshell	75
Webster Thesaurus	37	Microsoft Buss Mouse 1.0	92	Quick Basic 4.0	57	Paradox 2.0	415
Word Perfect	Call	Microsoft Chart 3.0	229	Turbo C	58	PFS: Professional File	119
Word Perfect Executive	Call	Microsoft Serial Mouse 1.0	92	Turbo Pascal 4.0	58	Q & A	185
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Wordstar Pro Pack 4.0	Call	News Room Professional	42			Quick Report	129
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MS Works	113	Signmaster	132				
PFS: 1st Choice	76	Turbo Graphix Tool Box	58				
Smart Software System	Best Price	Windows Draw!! w/clip art	159				
Symphony	435						
DESKTOP PUBLISHING		ACCESSORIES					
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PFS: First Publisher	52	Masterpiece Plus	92				
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Other Models	Call	1.2 MEG AT	89				
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Password 1200	149	3.5" XT 720K	95				
Courier 2400	299	3.5 1.4 MB	115				

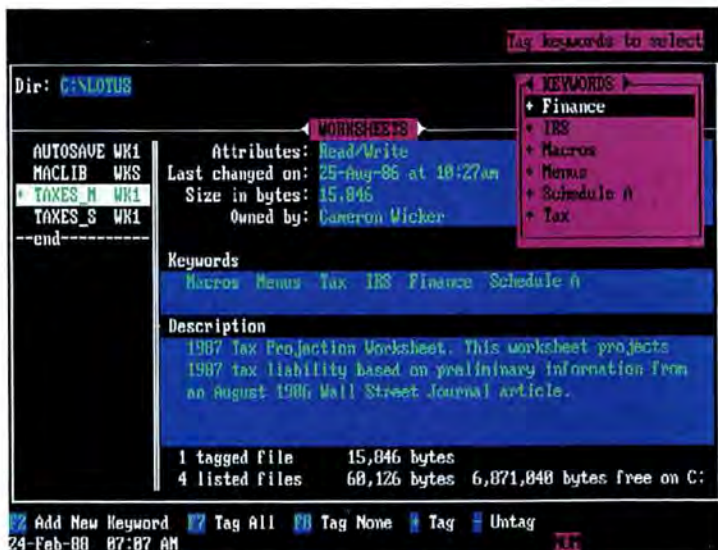


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File management is this program's forte. You can find files fast using keywords and view file status in a pop-up window.

@ functions from a menu and debugging formulas when the program identifies syntax errors. A cut-and-paste option lets you reuse sections of one formula in another.

Most of *CellWorks* is self-explanatory. AutoSave does what it says it will at user-specified intervals, and the search-and-replace feature is case sensitive and can search by row or by column, or reverse the direction of a search. Another *CellWorks* utility lets you resize columns by range instead of using 1-2-3's one-column-at-a-time approach. Finally, the PrintSet option concisely displays existing print settings on one screen, stores setup strings tailored to your printer, and switches easily between printer types.

FileWorks is such a well-conceived file management program, Funk Software should have made it into a TSR capable of operating outside 1-2-3. It acts as a DOS shell and lets you copy, move, delete, sort, and search files in different directories. What's more, it can tag files with their owner's name, keywords identifying the contents, and a short description.

Information about the file you select pops up in a window. Ironically, considering the program's emphasis on ease of use, you have to resort to the scrolling command line to edit a file description instead of entering data into the window directly.

FileWorks also includes a file compression toggle, which can automatically reduce the

size of a worksheet as it is saved to disk, and an archive feature that saves successive versions of a worksheet.

While the *The Worksheet Utilities* may not be as earthshaking as *Sideways*, it does make 1-2-3 more robust. Combine it with *HAL*, *SeeMore*, *Speedup*, and other utilities, and you'll successfully transport 1-2-3 out of the Dark Ages. —Alan Southerton ●

WHERE TO BUY

The Worksheet Utilities

Funk Software
222 Third St.
Cambridge, MA 02142
617/497-6339

List price: \$99.95

Requirements: 128K, DOS 2.00 or later version, 1-2-3 release 2 or later version

Not copy protected

Technical support: unlimited, no toll-free number, M-F 9-5:30

Other support services: 30-day money-back guarantee

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

Cambridge Spreadsheet Analyst 2.0

Spreadsheet-auditing utility

PROS: Helps identify common spreadsheet errors

CONS: Sifting through false alarms is tedious, not for 1-2-3 novices

If you've ever tried to understand someone else's 1-2-3 or *Symphony* worksheet or hunted through your own for errors or circular references, you know how frustrating those tasks can be. *Cambridge Spreadsheet Analyst*'s powerful tools for tracing cell references make it indispensable for information center specialists charged with monitoring accuracy and standards within an organization and for advanced 1-2-3 and *Symphony* users who develop complex models. But it's not for novices: Using the product effectively requires practice and a thorough familiarity with those Lotus programs.

Cambridge Spreadsheet Analyst performs its basic task very well. You begin by loading

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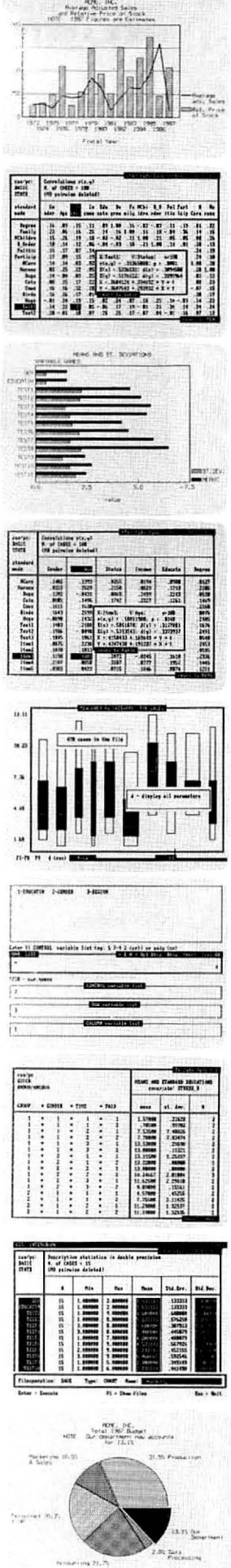
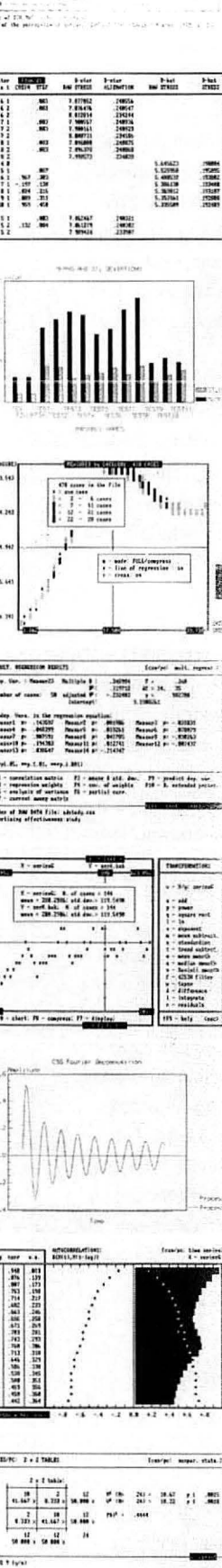
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- The flexibility of the CSS input/output is practically unlimited: CSS offers an intelligent interface (read/write) to all common file formats (Lotus, Symphony, dBase, dBase+, dIF, SYLK,...) and special utilities to easily access data from incompatible programs; graphics can be saved in files compatible with desktop publishing programs (Aldus, Ventura).
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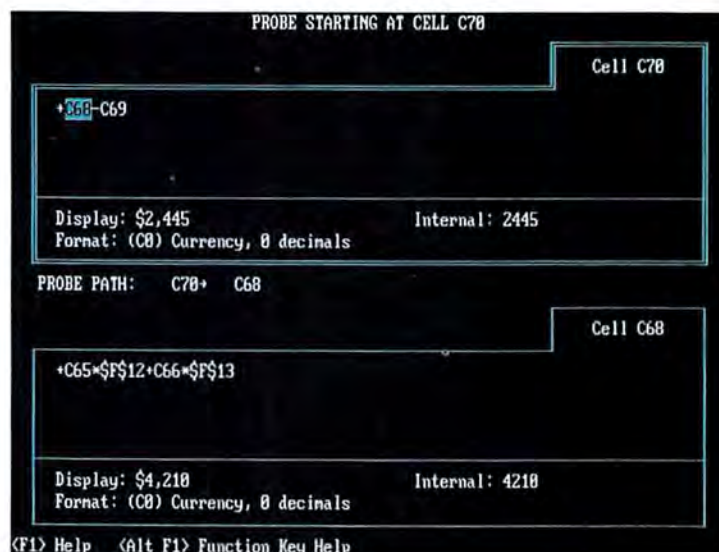
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The Probe command makes it easy to examine cells and their referents. At top, cell C70 is shown to contain the formula +C68-C69; at bottom, cell C68's formula, current value, and format are displayed.

the worksheet into the program and, if it's unfamiliar, using the Map command to get an overview. This command provides four different views of the worksheet—everything from a bird's-eye view on a single screen to a detailed display where labels, formulas, numbers, and macros are represented by different letters of the alphabet. You can move around the map using cursor keys. At any time, <F10> switches you into standard Lotus worksheet view.

When you find a formula that displays a suspect result, pressing <F6> lets you probe its formula's referents. The top half of the screen shows the current formula with one of its cells or range referents highlighted; the bottom half shows the contents of the reference cell. At this point you can select and examine related reference cells. An indicator will display the chain of cells in the current search. Pressing <F3> alternately displays the range name and the range address, and <F10> displays the current formula in worksheet context. Changing perspective like this lets you quickly build a mental map of the worksheet and trace the interrelationships of its formulas.

You can also work forward in the formula chain. Simply highlight a cell in worksheet view and press <F4>; the program lists the cells containing formulas that refer to that cell. Thus *Cambridge Spreadsheet Analyst* allows you to trace a formula chain forward

or backward beginning at any point, checking worksheet locations and range names along the way.

The program can also trace circular references, either directly or through a chain of intermediate referents. A single command examines the worksheet, identifies all circular reference chains, and then displays the sequence of cells that compose the loop. Conveniently, the results of all analyses can be printed in report form.

Cambridge Spreadsheet Analyst's Scan command is a built-in diagnostic that may alert you to error conditions. Its only drawback is that you must sift through many false alarms to find them. The "questionable" conditions it pinpoints are often superficial, arising from empty data cells or the inconsistent use of /Range Unprotect.

Cambridge Spreadsheet Analyst 2.0 also features two useful companion programs. The Macro module analyzes the structure of your macros, listing their commands, providing a treelike reference diagram of their relationships, and documenting calls from one to another. The Comparator program allows an auditor to compare two worksheets and identify differences in formulas and values; its only drawback is an inability to satisfactorily accommodate worksheets with newly inserted rows of data. The program's reporting function can recognize the inserted rows, but when you generate a more detailed report, it persists in displaying all the changed cells.

Spreadsheet errors are a serious and often neglected hazard, and *Cambridge Spreadsheet Analyst* can help pinpoint them. But it's no substitute for good worksheet design. Many of the errors the program detects can be averted by using a modular worksheet layout and systematic range names. —Richard Scoville ●

WHERE TO BUY

Cambridge Spreadsheet Analyst 2.0

Turner Hall Publishing
10201 Torre Ave.
Cupertino, CA 95014
408/253-9600

List price: \$149.95

Requirements: 256K, DOS 2.00 or later version, 1-2-3 release 2.x or Symphony
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For more information, see Products Featured in This Issue.

101 Macros for Lotus 1-2-3

Spreadsheet utility

PROS: Saves keystrokes and adds useful utilities such as a pop-up notepad and calculator

CONS: Some macros are trivial

Although 1-2-3's macro language is fairly easy to learn, most PC users barely tap its power. With *101 Macros for Lotus 1-2-3*, a grab bag of mini-programs, you can take advantage of macro power—even if you don't want to learn how macros work. The macros are easy to install, function flawlessly, and will perform yeoman work with any version of 1-2-3. And they don't require time-consuming testing and debugging.

Getting started with *101 Macros* takes little effort. The macros are contained in four worksheets; simply load the appropriate file into 1-2-3 and select the macros you want to use. There's also a teaching file with 22 additional macros and tips on how they work.

Some of the macros are so elementary that they seem obvious, such as the one that activates 1-2-3's \0 (autoexec) function. But for new 1-2-3 users and those who don't want to bother learning about macro programming, even these simple macros can save time. Other, more complex macros compensate for some of 1-2-3's deficiencies. There's a goto key, for example, that remembers which cell you started from; a search and replace function; as well as macros that automatically insert the months of the year and hide notes next to data cells.

The print macros are especially powerful. You can print a spreadsheet double-spaced, in tiny type, or with other print codes; specify the number of copies to be printed; or automatically print out two copies: one as displayed, the other complete with formulas.

Moving on to more complex macros, you can add a pop-up notepad, calendar, and cal-

culator and a menu for certain financial functions; address form letters and print labels from a data base file; and convert today's date from serial format to word format.

Even if you don't find many of the macros suitable for your own work, examining their logic is very instructive. Once you understand how the macros operate, it's easy to modify them for your own needs.

All in all, there's very little to fault in *101 Macros*. My only quibble is that some of the macros are rather specialized and seem to have little general utility. Perhaps the programmer was hard-pressed to design enough macros to live up to the software's ambitious title. Even so, *101 Macros* is a worthy value for \$69.95. —Richard E. Ozaroff ●

WHERE TO BUY

101 Macros for Lotus 1-2-3

Macropac Int'l
19855 Stevens Creek Blvd. #168
Cupertino, CA 95014
800/624-0077 (outside California),
408/996-8143

List price: \$69.95

Requirements: DOS 2.00 or later version

Not copy protected

Technical support: 24-hour free technical support, toll-free outside California

Other support services: 30-day money-back guarantee

For more information, see Products Featured in This Issue.

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

Daniel Brogan writes a weekly column on personal computing for the Chicago Tribune.

John Walkenbach is manager of consumer research for a large savings and loan in Southern California. Charles R. Ryan is a financial consultant in Seattle. Alan Southerton is a technical writer at Imaging Technology in Woburn, Massachusetts. Richard Scoville is director of training for the Computer Gallery in Research Triangle Park, North Carolina. Richard E. Ozaroff is vice president of a national investment advisory service.

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10420 Miller Road, Dallas, Texas 75238 *In Illinois, Indiana, Michigan and Wisconsin call 1-800-445-6454.

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†Upgrade offer valid February 17, 1988-July 31, 1988. Proof of purchase required.

Circle 192 on reader service card

DESKTOP PUBLISHING



ANDREW STACHURSKI

159 **PagePerfect**

Is it a word processor or a page-layout program? *PagePerfect* tries to straddle the fence, and many users may find it lacking in both departments.

161 **Publisher's Type Foundry 1.02**

Both LaserJet and PostScript literate, this font editor will wow fanatical publishers, but its features may overwhelm casual users.

163 **Corel Tabin 1.0, Table Manners 2.2, VP/Tabs 1.0**

Three programs make importing 1-2-3 worksheets into *Ventura Publisher* a breeze.

164 **Corel Ventura Utilities**

You can't send your copy of *Ventura* to obedience school, but Corel's tools help the program behave better when you shuffle files, create macros, and run laser printers.

PagePerfect

Desktop publishing program

PROS: Incorporates fully featured word processor, uses style sheets, includes draw/paint program and Fontware, has excellent on-line help

CONS: Convoluted menu system, poor mouse implementation, lacks essential layout tools, style sheets difficult to use, limited file import, no PostScript output, inaccurate documentation

A program that tightly integrates professional word processing and sophisticated page composition—and comes with a capable graphics program—would be a desktop publisher's dream come true. IMSI's ambitious but oft-postponed *PagePerfect* attempts to fill this big bill, and its spec sheet might lure some buyers away from major-league publishing packages. But with its clumsy interface, severely limited graphic import features, and sluggish performance, *PagePerfect* is a poor choice for either writers coveting classy formatting or serious desktop publishers.

To its credit, *PagePerfect* manages to integrate word processing and desktop publishing functions fairly well. You do most of your work in text mode, moving to layout mode when you want to manipulate the elements on a page. The word processor can search for and replace text, create headers and footers, check spelling, and call on a built-in thesaurus and macro processor. The program automatically recognizes *WordStar* commands for moving the cursor, deleting text, specifying effects (such as boldface and underline), and marking blocks of text; you can also configure *PagePerfect* to act like *MultiMate*.

When it's time to set the text you've entered (or imported), you position the cursor and select a paragraph style from a list in the pop-up dialog box. *PagePerfect* relies on *Ventura*-like style sheets, uses master

pages, and automatically flows text around graphics, so you can create long documents and make global format changes. The program also includes another nifty layout mode that lets you connect columnar text on different pages. As you might expect, this what-you-see program reproduces fonts, images, and spacing on screen, and offers a number of page view options. To sweeten the deal, IMSI throws in a copy of *Desktop Publisher's Graphics*, a well-equipped draw and paint program sold separately for \$195, and Bitstream's *Fontware*, which allows you to install additional downloadable fonts from Bitstream's sizable library.

Sounds good, doesn't it? But venture beyond *PagePerfect*'s colorful opening DOS shell, and you'll discover what IMSI means when it boasts you can "start creating page-perfect documents" in 30 minutes. The first obstacle is *PagePerfect*'s interface: You don't run the program from an orderly set of mouse-driven pulldown menus. Instead, you access its multilevel pop-up menus (copy, create, undo, and so on) with the function keys, and trigger a variety of other commands with a hodge-podge of <Alt>-, <Shift>-, and <Alt>-<Shift>-function key combinations. As a result, performing simple operations can take minutes instead of seconds. For example, pulling in a picture created with *Desktop Publisher's Graphics* means switching *PagePerfect* into layout mode, entering a four-key sequence, using the cursor keys to size the picture, then tapping out another four keystrokes.

The second big obstacle: *PagePerfect*'s use of style sheets. You can't, for example, change a particular paragraph style from within a document. Instead, you must save the document, exit to the main menu and select the new style, rename the changed style sheet, attach it to a new (and empty) document, and pour the original document into the new one. It's a needlessly complicated process.

Other limitations further diminish *PagePerfect*'s appeal. Publishers of all stripes will

chafe when they discover that *PagePerfect* lacks basic layout tools (such as on-screen rulers and a variety of measurement units) and useful advanced features (such as column balancing, widow and orphan control, and automatic table of contents/index generation). Just as galling, the functions that are included aren't particularly precise. Word spacing, for example, is controlled using Very Tight, Tight, Normal, Loose, and Very Loose settings.

Experienced users will wonder why *PagePerfect* will directly import almost as many native text formats as *Ventura*, but can only recognize the *Desktop Publisher's Graphics* file format and scanned images in the tagged image file format (TIFF). To capture a 1-2-3 .PIC file, a *PC Paintbrush* drawing, or an image digitized with the popular HP ScanJet, you must either buy IMSI's *Reflection* file-conversion utility for \$59 or funnel images through *Desktop Publisher's Graphics*. This first release of *PagePerfect* also lacks PostScript printer support, although IMSI claims a free upgrade supporting such printers will be available to all registered users before the end of 1988.

If anything deserves a thumbs-up, it's IMSI's *Desktop Publisher's Graphics*. Like Z-Soft's *PC Paintbrush*, this icon-oriented program offers a respectable selection of paint and draw tools, including brushes, fill patterns, and a pixel editor; plus line, curve, box, and circle generators. It can support a number of scanners, and offers 21 different graphics fonts that can be stretched, rotated, or combined to make logos and headlines. Given *PagePerfect*'s limitations, however, the program's biggest advantage is its ability to import a variety of graphics files and pass them on to *PagePerfect*.

Don't rush out and pick up a copy of *PagePerfect* just yet. Consider first *PagePerfect*'s rapacious appetite for processing and work space. It needs an 80286, 640K of RAM, and as much as 9.4MB of hard disk space, much of it occupied by Bitstream's downloadable fonts. Other caveats: The program permits no RAM-resident programs, sometimes fails

to refresh the screen, and sometimes freezes the system when the window feature is used. PC and PS/2 users should also note that the program is shipped on 1.2MB floppies only. If your computer uses a different format, you must send IMSI \$10 and wait for the appropriate disks.

If all of the above doesn't put you off, *PagePerfect*'s user manuals will. The three slim volumes are maddeningly inaccurate, omit essential details, and are poorly indexed and organized. IMSI does include a 42-page book of corrections, but the company should have gotten the manuals right the first time. Without the program's excellent context-sensitive help, even experienced desktop publishers would have a tough time running *PagePerfect*.

If IMSI ever provides *PagePerfect* with a streamlined interface, lucid manuals, and complete layout tools—and allows it to directly use popular graphics and scanner formats—the program might successfully compete. But until the company irons out *PagePerfect*'s considerable wrinkles, your \$495 is better spent elsewhere. —George Sheldon ●

WHERE TO BUY

PagePerfect

IMSI
1299 Fourth St.
San Rafael, CA 94901
415/454-7101

List price: \$495, additional Bitstream fonts \$195 each

Requirements: 640K, hard disk drive, 1.2MB floppy disk drive; IBM EGA, VGA, or compatible video setup; DOS 3.00 or later version; 80286-based computer

Technical support: free for 6 months or 45 days after first call received, whichever occurs first; no toll-free number; M-F 8-5

Extended support: \$95 per year, toll-free number

Other support services: free copy of *PagePerfect* applications journal, 50 percent discount on *PagePerfect* Communications Design Guide, discounts on upgrades of *PagePerfect* and other IMSI products

For more information, see Products Featured in This Issue.

Publisher's Type Foundry 1.02

Font editing program

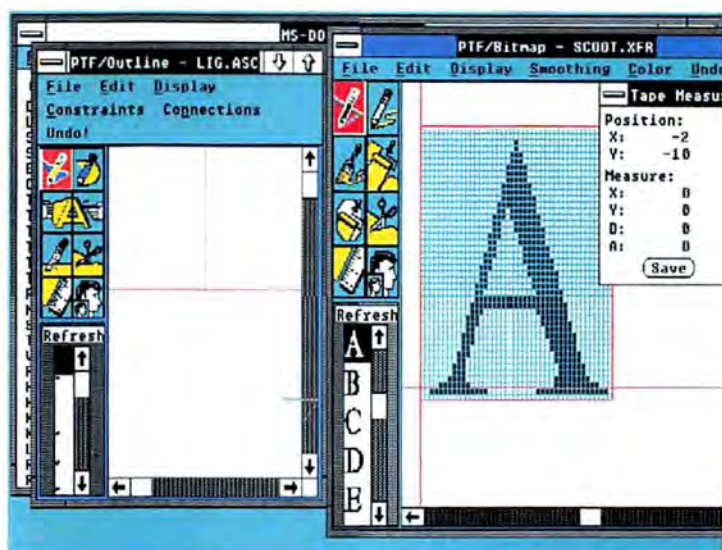
PROS: Wide variety of tools for creating and editing both PostScript and LaserJet fonts, converts fonts from one format to the other, accepts scanned input

CONS: Buggy, lacks circle drawing function, can't create screen fonts for PageMaker

Type is at the heart of any desktop publishing system, and a good library of downloadable fonts for your laser printer can cost a bundle. But because the number of characters in a given font is limited by the ASCII standard itself, chances are you won't get all the characters you need for every application, such as copyright and trademark symbols, bullets, or true open and close quotes. One way to add missing characters is to buy additional fonts with different symbol sets, then change fonts within a document when you need a special character. Though fine for more casual desktop publishers, this solution becomes a costly and frustrating fix for professionals who regularly use a variety of fonts or need custom symbols for technical or foreign language documents.

Depending on your needs, Z-Soft's *Publisher's Type Foundry* could prove a more economical alternative to mixing and matching fonts. With it, you not only can fine-tune existing characters in a PostScript or LaserJet font but also create new characters either drawn from scratch or based on images imported from a paint program or scanner.

Of course, such power doesn't come cheaply or easily: \$495 is the going rate, and if you plan to create characters from the ground up, you'll need considerable typographic know-how as well. *Type Foundry* is also a little erratic in its operations, but it shows more potential than any competitor. One key reason: It includes two editors, one for designing the scalable typeface outlines PostScript printers use, and the second for developing fixed bit-mapped fonts used by LaserJet and compatible printers. These editors aren't mutually exclusive—in fact, most users will rough out a character with the



outline editor's curve-fitting and scaling functions and then sharpen the result with the bit-map editor's pixel editing tools. Since *Type Foundry* runs under *Microsoft Windows*, you can display both editors in adjacent windows and shuttle your handiwork back and forth using the *Windows* clipboard.

In addition to *Windows*' pulldown menu interface, both editors feature a *PC Paintbrush*-like work space lined with icons representing line-draw, cut-and-paste, and zoom functions; a handy on-screen tape for measuring a character's pixel height; and an ingenious device called the gadget box that lets you rotate, scale, flip, slant, and stretch characters. To capture a character, you typically load a disk font file from within either editor, scroll the character set through a special window until the desired character appears, and click it; the character then pops into the work area. The bit-map editor puts paintbrush and fill tools at your disposal; the outline editor features tools for drawing and shaping bezier curves. Oddly, there is no tool for drawing circles, a basic typeface shape. Z-Soft does allow tentative type designers to untangle their messes, though: The Undo command reverses the latest action taken with a selected tool; Refresh returns an edited character to the condition it was in when last saved.

Type Foundry may attract you to font design, but the program's tools are aimed at the initiated or the very patient.

FEATURES EVALUATION

Worksheet Print-File
Conversion Utilities

On a feature and function basis, *Corel Tabin* is head and shoulders above its competitors.

Features			
	VP/Tabs 1.0	Table Manners 2.2	Corel Tabin 1.00
Shows dollar signs in first line only	☐	☐	☒
Aligns dollar signs outside brackets	☐	☐	☒
Aligns dollar signs outside brackets in first line only	☐	☐	☒
Adds tabs after dollar signs	☐	☒	☐
Aligns dollar signs without tabs	☐	☐	☒
Performs above functions with foreign currency symbols	☐	☐	☒
Strips out percentage signs	☐	☒	☐
Adds tabs before all percentage signs	☐	☒	☐
Adds tabs after all dollar signs and percentage signs	☐	☒	☐
Suggests tab settings	☐	☒	☒
Converts .PRN files for PageMaker	☐	☒	☒
Number of tag names program can assign	5	1	127

Type Foundry may indeed be the "Infinite Font Cartridge" Z-Soft claims it is, but keep in mind that even a simple job involves a number of steps. A typical session means obtaining a font or image file, isolating characters to be modified, shifting them between the two editors, and classifying and formatting the altered characters so the target laser printer can use them. Since *Type Foundry* can't print a job in progress, the refining process can take some time.

Once you've designed the printer characters, generating accompanying screen fonts is short work. But crafting those characters takes more than patience—it requires an artist's aesthetic sense and a typographer's knowledge. Although *Type Foundry* forces newly minted characters to be stylistically consistent with the active font, the program doesn't offer much help along the way as you

grapple with all the variables that define a character's nature.

In the Font Parameters option, for example, you must specify a character's pixel height, a font's numerical encoding, the vertical space to be stored with the font, the font's maximum pixel width, and other essential minutiae. With the Global Changes option you scale, slant, and rotate all of a font's characters uniformly—the quickest way to create oblique and landscape fonts. But the program doesn't suggest any default values, and the user manual is mum as to required settings.

In short, *Type Foundry* offers desktop publishers unprecedented power—and, until you learn the ropes, unprecedented headaches. Mastering *Type Foundry*, much less designing typographically pleasing characters, is not for the fainthearted. Potential customers should note that *Type Foundry* can't alter Adobe's encrypted PostScript fonts or generate matching screen fonts for *PageMaker*. Still, *Publisher's Type Foundry* is a significant milestone in the push to raise PC-based publishing tools to the level of their Macintosh counterparts. Used in a professional desktop publishing environment, *Type Foundry* could easily pay for itself. —Ted Nace ●

WHERE TO BUY

Publisher's Type Foundry 1.02

Z-Soft Corp.
450 Franklin Rd. #100
Marietta, GA 30067
404/428-0008

List price: \$495

Requirements: 640K (512K of expanded memory recommended), hard disk, DOS 2.00 or later version, Microsoft Windows 2.03 or Windows/386, 80286 computer, pointing device, color monitor

Not copy protected

Technical support: unlimited, no toll-free number, M-F 10-6

Extended support: user BBS, quarterly newsletter, technical bulletins

For more information, see Products Featured in This Issue.

Corel Tabin 1.00

Worksheet print-file conversion utility

PROS: Creates a table of recommended Ventura tab settings and tab types, can detect and separately tag up to 127 format variations within a worksheet

CONS: No menu interface, can't convert binary worksheets

Table Manners 2.2

Worksheet print-file conversion utility

PROS: Recommends Ventura tab settings, aligns special characters

CONS: Confusing menu, can't assign different tags to labels and numeric data

VP/Tabs 1.0

Worksheet print-file conversion utility

PROS: Creates separate tags for labels and numeric data

CONS: Doesn't recommend Ventura tab settings, requires substantial preparation of worksheets before conversion, can't convert files into PageMaker format

Ask Ventura Publisher and PageMaker veterans what really drives them nuts, and you'll likely hear about the horrors of importing and formatting 1-2-3 and Symphony worksheets. For starters, neither program can read .WKS, .WK1, .WRK, or .WR1 files, so you must "print" worksheets to disk as ASCII .PRN files. Unfortunately, .PRN files use space characters instead of tab characters to separate data into columns. Bring a .PRN file into a Ventura document and set it with a monospaced typewriter font such as Courier, and it looks fine. But use a proportional font such as Times Roman, where characters and blank spaces have differing widths, and the columns will zigzag like O. J. Simpson.

Until relatively recently, the only way to realign the tortured columns was to tediously replace the spaces with tabs in Ventura. With the release of VP/Tabs from The Laser Edge, The Desktop Publishing Group's Table Manners, and Corel's Tabin,

those alignment blues are a thing of the past. At the very least, all three utilities replace spaces with tabs in Ventura-bound .PRN files; Table Manners and Tabin also provide this service for PageMaker. To a greater or lesser extent, each of the utilities will also examine a worksheet and assign different generic Ventura tag names (without any attributes) to unique elements such as labels and data, which makes setting and formatting the worksheet in Ventura that much quicker.

The three programs operate essentially the same way: You type the utility name at the DOS prompt, followed by the name of the .PRN file to convert. Table Manners' minimal menu lists available .PRN files and formatting options (such as aligned dollar and percent signs), but it's no great improvement over the others and can even be a bit confusing. Note, too, that these utilities can't process multiple files—you must reload a utility before converting each new .PRN file.

However, don't get the idea that these utilities are peas from the same pod. As the accompanying table shows, they vary widely in their ability to handle unaltered .PRN files, assign tag names to different worksheet elements, align special characters, and provide help along the way. VP/Tabs, for example, automatically assigns different generic Ventura tag names to the labels, data, and blank rows in a converted worksheet—but only if columns of data are separated by two or more blank spaces, and labels and data types are confined to single columns. Table Manners, on the other hand, not only converts any .PRN file but automatically prints out recommended Ventura tab settings for type sizes ranging from 2 to 16 points. Unfortunately, Table Manners isn't discriminating—it assigns one tag to the entire worksheet.

Tabin does almost everything VP/Tabs and Table Manners do, and then some. It not only suggests tab settings, it also notes which tabs should be left, right, decimal, or centered. For Ventura and PageMaker, Tabin specifies tab locations in inches or centimeters; for word processors, it specifies them

by column number. The program automatically saves its recommendations to disk, allowing you to load them into *Ventura* for reference. *Tabin* is also better at adhering to basic accounting presentation rules and properly aligning dollar signs, parentheses, and other symbols. And *Tabin* is the only program reviewed here that lets you create a simple command file specifying exactly how a .PRN file should be formatted, from the placement of foreign currency symbols to tab settings to point size. Best of all, *Tabin* is smart enough to identify and tag 127 unique rows in a worksheet.

Like most single-purpose utilities, these products are installed by just copying a file, are simple to use, and are accompanied by terse but usable documentation. Perhaps some day these programs will directly convert native worksheet files, run from the *Ventura* desktop, and allow you to easily assign existing tags (with attributes) to any worksheet element. In the meantime, if you already have *VP/Tabs* or *Table Manners*, hang onto them—they work fine. Otherwise, make a beeline for *Tabin*. —Richard Jantz ●

WHERE TO BUY

Corel Tabin 1.00

Corel Systems Corp.
1600 Carling Ave.
Ottawa, Ontario
K1Z 7M4 Canada
613/728-8200

List price: \$99

Requirements: 256K, one disk drive,
DOS 2.00 or later version
Not copy protected

Technical support: unlimited, no toll-free number, M–F 8:30–5

Other support services: none

Table Manners 2.2

The Desktop Publishing Group
978 Douglas Ave. #104
Altamonte Springs, FL 32714
800/257-8087, 305/682-4050

List price: \$95

Requirements: 256K, one disk drive,
DOS 2.00 or later version
Copy protected

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

Other support services: none

VP/Tabs 1.0

The Laser Edge
360 17th St. #203
Oakland, CA 94612
415/835-1581

List price: \$89

Requirements: 256K, one disk drive,
DOS 2.00 or later version
Not copy protected

Technical support: unlimited, M–F
9–5, no toll-free number, prefers queries in writing or via fax

Other support services: none

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

Corel Ventura Utilities

Style sheet and file management utilities

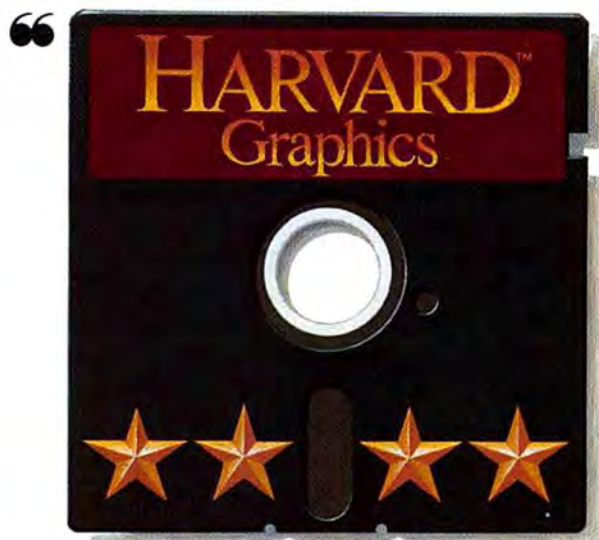


PROS: Prints style sheet and tag reports, allows easy copying and deletion of chapter and publication files

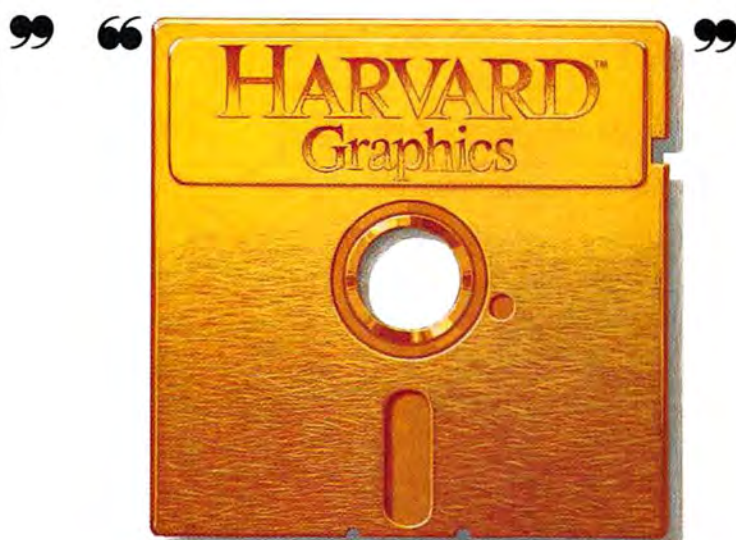
CONS: Not RAM resident

In its brief history, *Ventura Publisher* has inspired numerous books of advice on how to master the program's idiosyncrasies. However, a few renegade flaws remain that only programming can cure. Most of these are tolerable to the casual user, but they can drive frequent publishers to wring their toner-stained hands.

Into this breach rides *Corel Ventura Utilities*, a posse of seven tidy programs that make life a bit easier for *Ventura* users. The head honcho is *Styler*, a menu-driven program that generates style-sheet and tag listings—a boon for publishing departments and others who produce multiple documents. Instead of digging through *Ventura*'s menus and writing and updating style-sheet listings by hand, you merely pick a style sheet from an on-screen list, and its tag and tab settings are laid bare. Select a tag, and its major attributes are displayed; you can easily print more exhaustive tag reports detailing everything from fonts to kerning, along with your comments.



Rated #1 business graphics package second consecutive year. —Software Digest

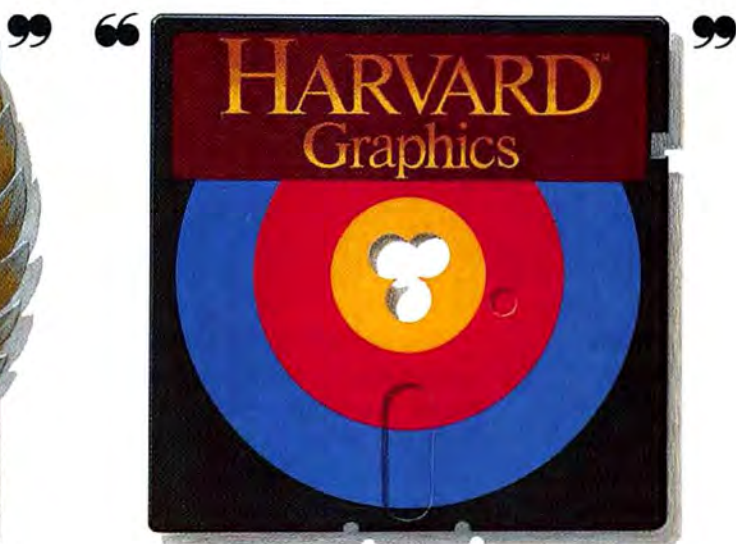


"They (Harvard Graphics)...made the best even better."

—Jim Seymour, "Best of '87" PC Magazine



"Positively Best In Show"—Infoworld 1987



Winner 1987 National Computer Graphics Association Shoot-Out.

Award Winning Performance.

There are a number of prestigious honors in the graphics business. But only one program has captured them all. Harvard Graphics.

Harvard's flexibility, ease of use, and high quality output make it the unanimous choice of the nation's leading software evaluators.

We couldn't be more honored. But Harvard isn't resting on its laurels. New Harvard Graphics 2.1 adds a unique spelling checker, over 200 new symbols, improved editing capabilities and more.

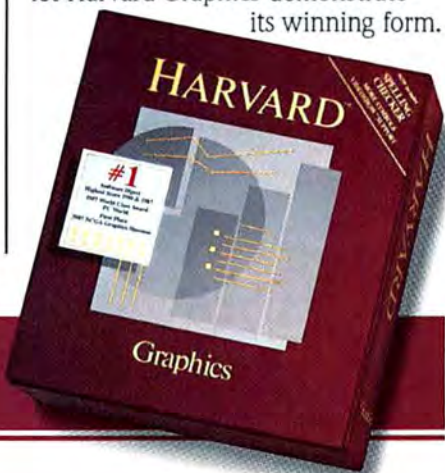
There's one more recommendation we'd like to have. Yours.

Call for a free trial disk and

let Harvard Graphics demonstrate its winning form.

Graduate to New Harvard Graphics 2.1 with Spelling Checker.

For a free trial disk call 1-408-848-4391, Operator 53.
For upgrade information call 1-800-255-5550.



Notes: Tag Name: Body Text Unit: Inches

----- FONT -----

Font: Times Page Break: No
 Style: Normal Column Break: No
 Size: 10 Line Break: Before
 Color: Black Next Y Pos: Normal
 Allow Within: Yes
 Keep With Next: No

----- ALIGNMENT -----

Alignment: Justified Above: 0.00 Inter-Line: 0.16
 Hyphenation: ON1 Below: 0.00 Inter-Para: 0.08
 Succ. Hyphens: Unlimited Add in Above: Always
 Overall Width: Column-Wide Left Page Right Page
 First Line: Indent 0.30 In-From-Left: 0.00 0.03
 In/Outdent Height: 1 In-From-Right: 0.00 0.00
 Relevant Indent: None

----- SPACING -----

None

----- SPECIAL EFFECTS -----

-- RULING LINE ABOVE OR AROUND -- RULING LINE BELOW --
 None None

----- TYPOGRAPHIC CONTROLS -----

Automatic Kerning: Off Tracking: 0.000 Em
 Letter Spacing: On Up to: 0.100 Em
 Space Width Minimum: 0.600 Normal: 1.000 Maximum: 2.000
 Overscore Height: 0.008 Shift Up By: 0.142
 Strike-Thru Height: 0.008 0.044
 Underline 1 Height: 0.008 Shift Down By: 0.008
 Underline 2 Height: 0.008 0.025

----- TAB SETTINGS -----

Tab#	Type	Display	Location
1	Left	Open Space	1.00
2	Left	Open Space	2.00
3	Left	Open Space	3.00
4	Left	Open Space	4.00
5	Left	Open Space	5.00
6	Left	Open Space	6.00
7	Left	Open Space	7.00
8	Left	Open Space	8.00

Leader Char: Spaces Leader Spacing: 0

Corel Ventura Utilities produces assorted style-sheet and tag reports. Printed reports like this are the most detailed.

Corel also tackles file management. Lassoing *Ventura* files is a pain because a publication (or chapter) is just a collection of pointers to text, graphics, and image files. True, you can use DOS to copy the files individually, but the location pointers remain behind, causing *Ventura* to stubbornly search for the files in the wrong place. You can copy the whole kit and caboodle of associated files with *Ventura*'s Multi-Chapter option, but you can't list or delete them. In contrast, Corel's three DOS-like utilities—Vpshow, Vpcopy, and Vpdelete—let you view, copy, and delete associated files with single commands. Vpcopy moves *Ventura*'s pointers and asks for confirmation when copying over identically named files. A single RAM-resident program combining all three utilities would be preferable, but the package is still a help.

The other utilities consist of a small RAM-resident program called IK that saves you a few keystrokes when you enter upper-ASCII

characters in *Ventura*, and two PostScript utilities that don't require *Ventura*. Psprint lets you output text from non-PostScript programs such as 1-2-3 or dBASE on a PostScript printer. Better still, you can specify the font, point size, margins, and other attributes by selecting options from Psprint's sole menu. Finally, Timeout prevents DOS from aborting a print job too soon, making it easier to print large PostScript files.

Ventura Utilities is so easy to use, you'll seldom refer to its lucid documentation. Some might prefer the graphic interface of SNA's identically priced *VPToolbox*, but this competitor lacks PostScript utilities. Until it acquires them—or its price drops—*Ventura Utilities* is your best bet. —Eric Brown ●

WHERE TO BUY

Corel Ventura Utilities

Corel Systems Corp.
 1600 Carling Ave. #190
 Ottawa, Ontario
 K1Z 7M4 Canada
 613/728-8200

List price: \$99

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, see **Products Featured in This Issue**.

George Sheldon is a freelance writer based in Mount Joy, Pennsylvania, and the author of Advanced Ventura (MIS:Press, Portland, Oregon, 1988). Ted Nace is a contributing editor for PC World and Publish! and coauthor of LaserJet Unlimited, Edition II (Peachpit Press, Berkeley, California, 1988). Richard Jantz is a contributing editor for PC World and the author of Ventura Publisher for the IBM PC: Mastering Desktop Publishing (John Wiley & Sons, New York, 1987). Eric Brown is a contributing editor for PC World.

SHARP'S NEW PORTABLE PC-7221 IS SMALLER THAN COMPACT.

80286 with 10 MHz clock speed ensures extremely fast computations and graphics generations. Processor speed also switches to 6 or 8 MHz.

MS/DOS and GW-BASIC included. Some computer makers charge you extra for this software.

640KB of RAM, expandable to 1.6 MB internally. The new Sharp PC-7221 accepts PC/XT and AT compatible software.

Backlit, supertwist LCD display has 4 gray scale levels and tilts for easy viewing.

Built-in 20 MB hard disk drive gives you fast access to data-bases and large spread sheets. Also has 1.2 MB 5 1/4" floppy disk drive.

Standard Internal Expansion Slot lets you customize with full size PC/AT compatible expansion cards.

Small footprint takes up about a third of the space of a desktop PC/AT.

Standard color/monochrome CRT port. There's also a dedicated slot for an internal 1200 baud modem.

Detachable PC/AT-style keyboard features separate cursor and numeric keypads. For further ease, keyboard angle is adjustable.

Sharp quality, from our Memphis, Tennessee facility.

© 1988 Sharp Electronics Corp.



Optional external expansion unit gives you 4 additional slots. It mounts underneath main unit without enlarging the computer's small footprint.

Of the leading names in compact portable PC's, Sharp's new PC-7221 has the smallest footprint. And it's loaded with features the others don't have. Or charge extra for. The PC-7221 with 20 MB hard disk has a suggested retail price of \$3995. In addition, there's the very

affordable PC-7202 with twin 5 1/4" floppy disk drives. It's an ideal workstation for networking and retails for \$2995. For more details, see a Sharp dealer or call 1-800-BE-SHARP.

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BUSINESS GRAPHICS ROUNDUP

Where words fail, graphs and charts often succeed. Six popular graphics packages help you sell your point visually.



ANDREW SHACHAI

Richard
Jantz

169 **Freelance Plus 2.0**

A 1-2-3-style interface and the ability to import .PIC files make *Freelance Plus* the logical choice for 1-2-3 and *Symphony* users.

171 **GEM Presentation Team 1.0**

The multimodule *GEM Presentation Team* is fast, easy to use, and capable of producing eye-catching charts that you can dress up using excellent editing tools.

172 **Harvard Graphics 2.1**

Strong charting capabilities, good enhancement features, and generous device support make *Harvard Graphics* the best all-around business graphics program reviewed here.

172 **Microsoft Chart 3.0**

Powerful analytical functions give *Microsoft Chart* more charting muscle than the rest, but a mazelike interface can hinder the deadline-driven.

174 **35mm Express 4.1**

35mm Express offers slide makers gorgeous colors and versatile drawing capabilities, plus the ability to telecommunicate the results to an overnight slide service.

175 **Windows Graph 1.0**

Soon to be upgraded to *Graph Plus*, Micrografx's *Windows Graph* has power charting, an interactive interface, and loads of device support.

Some people never need graphics software for anything more than a quickie bar chart; others would lose their jobs if a batch of Kodachrome slides fell short of professional quality. Reaching for the broadest possible audience, the six best-selling graphics packages reviewed here try to serve both the high and low ends—and everyone in between.

Freelance Plus, GEM Presentation Team, Harvard Graphics, Microsoft Chart, 35mm Express, and Windows Graph can each produce a chart in minutes, and most create output that even graphic artists will find acceptable. The trick is finding the one that best puts your ideas across.

For users in graphics departments and audiovisual firms, selecting a graphics package is often a matter of choosing the one with the widest assortment of high-end features—especially font libraries, freehand drawing tools, and drivers for high-resolution film recorders. For the rest of us, however, the issue isn't so much the breadth of features but how easy those features are to exploit.

If you plan to produce 35mm slides with the new Polaroid Palette Plus, for instance, note that at press time only two products—Harvard Graphics and 35mm Express—provided the necessary driver. However, if such advanced charting options as regression analysis, logarithmic scaling, and data manipulation functions matter, Microsoft Chart takes the lead, followed by Harvard Graphics and Windows Graph, both of which are easier to learn and use. For spiffing up business graphics with logos, clip-art images, and customized drawings, Freelance Plus and GEM Presentation Team lead the pack.

Finally, for a good selection of charting and drawing features plus a slide show capability, Freelance Plus and Harvard Graphics win the prize. Of the two, Harvard Graphics claims top honors: It integrates strong charting features with a variety of enhancement options, supports a thorough selection of output devices, and offers excellent value.

Freelance Plus 2.0

PROS: Familiar 1-2-3-style interface, first-rate editing and enhancement tools

CONS: Standard charts only

If you want to create high-quality graphs from 1-2-3 or Symphony spreadsheets, the package to beat is Lotus's own *Freelance Plus*. Not only does this \$495 program import .WKS and .WK1 files, but it's also the only package reviewed that handles 1-2-3 .PIC (graphics) files. And because the user interface is similar to 1-2-3's, *Freelance Plus* is a breeze for 1-2-3 users to learn.

Freelance Plus produces fine standard charts, but you'll need the program's drawing tools to create overlapped bars, 3-D effects, area graphs, combination graphs, organization charts, and additional graphs that other programs provide as preformatted options. However, because *Freelance Plus* lets you do drawing and charting operations on a single screen that displays both menus and the plotted graph, the program is one of the easiest to use.

Freelance Plus's enhancement features are clearly superior. You can draw and connect lines, arcs, circles, and rectangles to add simple or complex objects to charts. The program includes a clip art library of over 500 symbols. For precision drawing you'll find such helpful aids as ruler, grid, and cursor coordinates. A number of sophisticated CAD-like features let you zoom, rotate objects, select similar objects (all polygons, for instance), join individual objects together as one symbol, and "lock" objects to keep them from inadvertently being edited or moved.

Freelance Plus doesn't have the charting power or data manipulation features of *Harvard Graphics*, *Microsoft Chart*, or *Windows Graph*, nor can it produce slides as sharp and colorful as *35mm Express*'s. Nevertheless, the strong link to other Lotus products

FEATURES EVALUATION

Business Graphics Packages Compared

Harvard Graphics offers a good selection of enhancement features and output devices.

- Yes
○ No
◐ Deficient
△ Unlimited

Bar graphs

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Vertical/horizontal bars	●	●	●	●	●	●
Maximum data sets per clustered bar graph	8	12	8	8000	60	△
Overlapped bars	○	○	●	●	○	●
3-D bars	○	●	●	●	●	●
Pictographs	○	●	○	○	○	○
Bar/line graphs	○	●	●	●	○	●
Step graphs	○	○	●	●	●	●
Change bar width/spacing	○	○	●	●	○	●

Pie charts

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Maximum slices per pie	16	20	12	16	12	△
Maximum exploded slices	16	20	12	16	12	○
Two- or four-pie charts	●	○	●	●	○	○
Proportional pie charts	○	○	●	○	○	●
3-D pie charts	○	●	●	●	●	●
Pie/bar charts	○	○	●	○	○	●

Line graphs

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Scatter plots	●	●	●	●	○	●
Maximum line types	8	1	4	6	1	5
Maximum line markers	9	5	13	9	0	10
Maximum data points per line	120	101	240	32,000	60	△
Maximum data sets per line graph	8	12	8	8000	12	△
Area graphs	○	●	●	●	●	●

Other graph types

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
High/low/close	○	○	●	●	○	●
Bubble charts	○	○	○	○	○	○
Gantt charts	○	○	○	○	○	●
Word graphs	●	●	●	●	●	●

Free-form graphics

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Free-form lines/shapes	●	◐ ²	◐ ²	○	●	○
Maximum selectable patterns	15	60	12	16	64	37
Ellipses and arcs	●	●	●	○	●	●
Straight/rounded rectangles	●	●	●	○	◐ ³	●
Other geometric elements	◐ ⁴	○	●	○	●	○
Select all elements	●	●	○	◐ ⁵	●	○
Copy/move elements between files	●	●	◐ ⁶	◐ ⁷	●	●

Free-form graphics

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Flip/rotate objects	●	●	○	◐ ⁸	●	○
Undo command	●	●	●	○	●	●
Zoom feature	●	●	○	○	○	●
Rulers/grids	●	●	●	○	○	●

Data import

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Reads ASCII	●	●	●	●	○	●
Reads .WKS, .WK1	●	●	●	●	●	●
Reads .PIC	●	○	○	○	○	○
Reads dBASE	●	●	●	●	○	○
Reads Metafile	●	○	○	○	○	○
Reads DIF	●	○	○	●	○	●

Miscellaneous

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Multiple typefaces and sizes	●	●	●	●	●	●
Slide-show feature	●	●	●	●	●	○
Borders or frames	●	●	●	●	●	●
Macro capabilities	○	○	●	○	○	○

Device support

	Freelance Plus 2.0	GEM Presentation Team 1.0	Harvard Graphics 2.1	Microsoft Chart 3.0	35mm Express 4.1	Windows Graph 1.0
Mouse	●	●	●	●	●	●
PostScript driver	◐ ⁹	●	●	◐ ⁹	●	●
HP LaserJet Plus	●	●	●	●	●	●
HP HPGL-compatible plotters	●	●	●	●	●	●
Xerox 4020 color printer	●	●	●	●	●	●
Polaroid Palette	●	◐ ⁹	●	●	●	●
Polaroid Palette Plus	○	○	●	○	●	●
Epson dot matrix printers						
EX	○	○	●	○	●	○
FX	●	●	●	●	●	●
JX	○	●	○	●	●	○
LQ	○	●	●	●	●	●
LX	○	●	●	○	●	○
MX	●	●	●	○	●	●
RX	●	○	●	●	●	○

¹ Spacing only.

² Lines only.

³ Straight rectangles only.

⁴ Available with clip art library.

⁵ Only text and lines can be moved interactively on screen.

⁶ User must merge saved images on screen.

⁷ No copying between files, but entire charts or labels can be merged.

⁸ Rotate only.

⁹ Available at extra cost.

and the stumble-free interface make *Freelance Plus* the program of choice for business users who want to work from 1-2-3 spreadsheets or spruce up 1-2-3 graphs.

WHERE TO BUY

Freelance Plus 2.0

Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/253-9150, 617/623-6572
List price: \$495

Requirements: 384K, two disk drives, DOS 2.10 or later version
Not copy protected

Technical support: unlimited free support, no toll-free number; extended support, including quarterly newsletter, guide, and toll-free number, \$150 and up; M-F 8:30-8

Other support services: 30-day money-back guarantee, free newsletter to registered users

For more information, see Products Featured in This Issue.

GEM Presentation Team 1.0

PROS: Fast and easy to use, excellent drawing tools

CONS: Limited selection of drivers, others cost extra

GEM Presentation Team from Digital Research bundles separate charting, drawing, and word graph programs: *GEM Graph*, *GEM Draw Plus*, and *GEM WordChart*. All three run under the GEM graphics environment, which spares you some of the pain of switching between them. Together the modules cost the same as *Freelance Plus*—\$495—but they offer more charts and drawing functions.

GEM Graph one-ups most of the competition by providing preformatted 3-D charts, maps, and pictographs. Although other programs provide similar 3-D effects for bar, pie, and area graphs, *GEM Graph* and

Harvard Graphics are the only products reviewed that can plot 3-D clustered bar graphs in true perspective. You can also use the supplied maps of the United States and Europe or create your own statistical and regional map charts.

GEM WordChart provides several templates for columnar, outline, and free-form word graphs. To change text attributes (such as style, size, or alignment) or add bullets, numbers, or letters to highlight text, simply select the text and choose the appropriate icon from an on-screen toolbox. It's hard to find a program that makes it easier to produce word graphs.

You can use *GEM Draw Plus* for further embellishments, such as placing two or more charts in one picture. The package also includes a 130-symbol clip art library and *GEM/3 Desktop*, an enhanced version of the GEM operating system. However, *GEM/3's* basic selection of device drivers is limited to laser, dot matrix, and color ink jet printers. Drivers for plotters, film recorders, and other printers cost extra.

For a reasonably priced business graphics tool with versatile charting styles and powerful drawing capabilities, consider *GEM Presentation Team*. If your business already uses a GEM-based desktop publishing program such as *Ventura Publisher* or *GEM Desktop Publisher*, you'll get a familiar interface and compatible graphics that don't have to be converted.

WHERE TO BUY

GEM Presentation Team 1.0

Digital Research
P.O. Box DRI
Monterey, CA 93942
408/649-3896, 408/646-6464

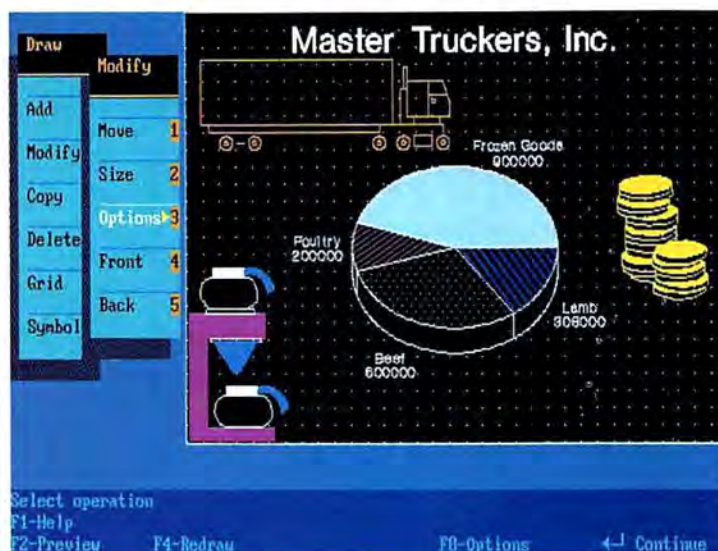
List price: \$495

Requirements: 384K, hard disk, DOS 2.00 or later version
Not copy protected

Technical support: first 90 days free, no toll-free number; extended support, including mailings and upgrade discounts on all DRI products, and toll-free number, \$95 per year; M-F 8:30-5

Other support services: user forum on CompuServe (Go DRI)

For more information, see Products Featured in This Issue.



Logical menu structure, a 300-image clip-art library, and a few well-chosen drawing tools combine to make Harvard Graphics 2.1 an easy-to-use winner.

Harvard Graphics 2.1



PROS: Strong charting capabilities, lots of device support and desktop presentations, inexpensive

CONS: Few drawing tools, can't flip or rotate objects, no zoom feature

Software Publishing's *Harvard Graphics* successfully combines solid charting, editing, and enhancing functions in one easy-to-use program. Decision makers will appreciate the program's comprehensive selection of charts and data manipulation capabilities, while the presentation-minded will enjoy its polished output. *Harvard Graphics*' only deficiency is its slim set of drawing tools.

The program offers abundant on-screen information but keeps the work area clean and uncluttered. As you select options from the main menu on the left side of the screen, submenus pop up on the right, giving you access to the program's built-in spreadsheet, gallery of chart types, editing and drawing features, symbol libraries, and other options.

In addition to standard graphs, you can select high/low/close, organization, and multiple charts, as well as use templates you've created with the program's enhancement options. Unlike some packages, which layer menus between the data entry screen and

the chart work-area, returning to the updated chart is a quick, one-key operation.

For extensive enhancements, a drawing mode turns the screen into a CAD-like drawing area with menu options listed in a column at the left of the screen. You can easily place lines, arrows, boxes, circles, and designs from a 300-image clip art library anywhere on the chart. However, *Harvard Graphics* can't flip or rotate objects and offers no zoom or magnification features.

Harvard Graphics provides excellent support for printers, plotters, film recorders, and slide services. Other pluses include a desktop presentation feature and, incredibly, a 77,000-word spelling checker. The attractive user interface, excellent integration of powerful charting and drawing features, and fair price make *Harvard Graphics* the best all-around business graphics package of those reviewed here.

WHERE TO BUY

Harvard Graphics 2.1

Software Publishing Corp.
1901 Landings Dr.
Mountain View, CA 94043
415/962-8910

List price: \$495, *Harvard Graphics* LAN Pack \$1795

Requirements: 512K, hard disk, DOS 2.00 or later version
Not copy protected

Technical support: unlimited free support, no toll-free number, M-F 8-4

Other support services: user forum on CompuServe (Go Spcforum), free user newsletter three times a year

For more information, see Products Featured in This Issue.

Microsoft Chart 3.0

PROS: Powerful analytical functions, inexpensive

CONS: Maze-like interface; lacks drawing features, clip art symbols, and other enhancement capabilities

When it was introduced, *Microsoft Chart* earned a reputation as powerful but hard to learn and use. With version 3.0, the shoe still fits: *Chart* remains an impressive charting package with few drawing tools.

Although you can enhance charts with lines, text, boxes around legends, and 3-D ef-

fects, *Microsoft Chart* can't draw circles or polygons, nor does it offer a clip art library. The program also lacks the interactive manipulation of screen objects offered by many other programs. After you select an object with a mouse or the cursor keys, you can't move, copy, or scale it. To edit and change the object, you must resort to a menu at the bottom of the screen.

Charting is *Microsoft Chart*'s strong suit. The program handles a wide range of chart styles and plots a huge amount of data. And it offers more regression analysis and data manipulation features than any of the other packages. For instance, *Microsoft Chart* is the only product reviewed that performs trigonometric functions on data values.

Picking a Graphics Partner

Creating a polished graph involves three basic steps: charting, editing, and enhancing. *Charting* is the process of turning data into a bar, pie, or line graph. *Editing* involves changing colors, fonts, line styles, and the like. *Enhancing* is the fun part. It involves dressing up charts with symbols, geometric shapes, freehand drawings, and so on and generally requires a thorough knowledge of the product—not to mention artistic talent.

How well a package integrates these functions is key to its ease of use. Five of the six products reviewed here—*Freelance Plus*, *Harvard Graphics*, *Microsoft Chart*, *35mm Express*, and *Windows Graph*—are fully integrated programs that let you select all major functions from a single menu or work area. *GEM Presentation Team*, on the other hand, is a multimodule product that forces you to load and unload programs to access different functions; you can even buy its charting module as a stand-alone product.

All six packages in this review create charts from data keyed in directly or imported from such applications as spreadsheets, data managers, and word processors. They also provide on-screen data entry forms, which range from worksheets with spreadsheetlike rows and columns to multiple fill-in-the-

blank screens. Some even offer spreadsheetlike data manipulation capabilities, enabling you to indulge in graphical "what-iffing."

From raw data you can quickly plot a chart from a list of preformatted styles. All the programs offer basic business graphs, including vertical bar, horizontal bar, pie, line, and word charts. Some also provide high/low/close graphs, organization charts, combination graphs, and even such exotic charts as histograms, pictographs, and 3-D graphs. The more preformatted styles available to you, the less time you have to spend editing. The best programs let you switch from one chart type to another with minimal effort.

After you've settled on a chart, you can edit it to create a legend, change shading patterns, explode a pie slice, or show a percentage. Programs with mouse support, like *GEM Presentation Team* and *Windows Graph*, make chart editing a simple point-and-click operation. Others, such as *Harvard Graphics*, require you to exit the chart and fill in forms.

No matter how pretty a graph is, it's useless without text. All the packages reviewed provide a variety of fonts for titles, labels, legends, and word charts (the most popular chart format), but some programs are more flexible than others. *GEM Presentation Team* and *Windows Graph*, for instance, can mix many more fonts per chart than *Har-*

vard Graphics or *Freelance Plus* can. Most programs also use logical default sizes for text—for example, titles are larger than subtitles, axis labels are shorter than legends, and so on—but generally you can change the defaults at any time.

If your job involves presentations, a program's chart enhancement features are crucial. Freehand drawing and CAD-like control of geometric shapes, plus access to shading, clip art libraries, and a full selection of hatch patterns, give talented users the opportunity to create showstopping output. Naturally, these capabilities require mouse support. *Freelance Plus*, *GEM Presentation Team*, and *35mm Express* offer the best enhancement options.

Finally, there's the question of compatibility with output devices. Laser printer support, which is now universal, is all you'll ever need for reports; support for plotters and high-end slide cameras is less widespread, but a must for presentations. Innovative types should look for the so-called desktop presentation function, which cycles full-screen charts one after another on your computer's monitor. —R. J.

Microsoft Chart also supports lengthy legends and titles and is the only program that will rotate text automatically. You can create word graphs with *Microsoft Chart* also, but it doesn't let you select text attributes such as bold or italics as an editing-menu option.

Although it does have a slide show capability, *Microsoft Chart*'s few drawing tools and lack of a clip art library limit its ability to produce showy presentations. A steep learning curve and emphasis on analytical graphics make the program best suited to departmental gurus who generate graphics mainly for in-house use.

WHERE TO BUY

Microsoft Chart 3.0

Microsoft Corp.
16011 N.E. 36th Way
Redmond, WA 98073
206/882-8080, 206/882-8089

List price: \$395

Requirements: 320K, DOS 3.10 or later version

Not copy protected

Technical support: unlimited free support, no toll-free number, M-F 6-6

Other support services: on-line developers service \$450 a year (gives access to all MS-DOS system-level products), monthly newsletter free to registered users (covers all Microsoft products)

For more information, see Products Featured in This Issue.

35mm Express 4.1

PROS: 3-D features, versatile drawing capabilities, excellent device support, built-in communications module

CONS: Few chart types

If you need to turn graphics into colorful, high-quality slides, look no further. Thanks to a recent price cut to \$495, Business & Professional Software's *35mm Express* now delivers even more bang for the buck. While not a power charting program like *Harvard Graphics*, *Microsoft Chart*, or *Windows Graph*, *35mm Express* offers quality drawing tools, a built-in communications module, and outstanding color graphics output.

35mm Express plots data in standard, predesigned graphics that include 3-D, area,

word, bar, and pie charts and line graphs, but it doesn't offer scatter or high/low/close graphs, regression analysis, or data manipulation functions. You can edit or replot data with any one of 13 preformatted layouts for color, typeface, type size, and margins.

35mm Express supports up to 64 colors on an EGA display. Its predesigned color scheme option is especially useful.

Once you've created a graph, you bring *35mm Express*'s drawing tools to bear, including an extended cursor, cursor coordinates, and a zoom feature. Although rulers and grids aren't provided, *35mm Express* offers as much control over compound elements and operations as any other product reviewed here. To marshal the many drawing options, *35mm Express*'s classy interface makes excellent use of pop-up menus and overlapping option boxes.

35mm Express's handiest feature is probably its built-in telecommunications module for sending files directly to the MAGICorp Network, a service bureau that produces high-resolution slides, prints, and transparencies. This option is terrific when you're facing a deadline, since you needn't exit the program to use separate communications software (as you must with *Harvard Graphics* and *Microsoft Chart*, which also support MAGICorp). Any business that requires top-drawer slides fast should consider *35mm Express* first and foremost.

WHERE TO BUY

35mm Express 4.1

Business & Professional Software
143 Binney St.
Cambridge, MA 02142
617/491-3377

List price: \$495

Requirements: 256K (320K for DOS 3.00), two disk drives, DOS 2.00 or later version

Not copy protected

Technical support: free, unlimited toll-free support; extended support, including free upgrades and enhancements, \$250 per year; M-F 9-5

Other support services: 30-day money-back guarantee

For more information, see Products Featured in This Issue.

Windows Graph 1.0

PROS: Interactive Windows interface, power charting, excellent device support

CONS: Doesn't generate titles automatically, lacks slide show feature

Micrografx's *Windows Graph* boasts a wealth of charting and drawing capabilities and has the added advantage of running under the graphics-based *Microsoft Windows 1.04* interface. Its many features make it hard to learn, however, and it doesn't support the Polaroid Palette. At press time, Micrografx was poised to ship *Graph Plus*, an upgraded version that runs under *Windows 2.0*.

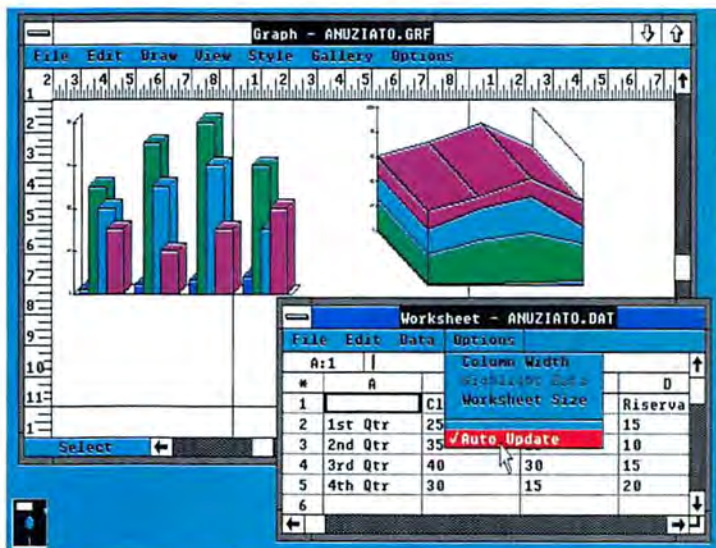
Windows Graph's impressive range of chart styles includes 3-D area graphs, high/low/close graphs, and Gantt charts. Since it also features regression analysis, scaling, and data manipulation functions, *Windows Graph* joins *Harvard Graphics* and *Microsoft Chart* as a good choice for power users. Unlike *Harvard*, however, it can't produce organization charts or proportional pie charts.

Like *GEM Presentation Team*, *Windows Graph* can display data and plotted graphs in two separate windows simultaneously, but it's unique in its ability to update the graph window immediately whenever a change is made in the data window. These two programs are also the only products tested that can be used on full-page monitors, such as the MDS Genius.

Windows Graph's drawing capabilities, including rulers, a grid, and a zoom mode, are adequate if unimpressive. For example, the program can't select all graphic elements simultaneously, deselect one element out of a group, or flip and rotate a graphic object.

Unlike the other products reviewed, *Windows Graph* doesn't let you automatically create a title for a graph based on the data you enter in the worksheet. Instead, you must type the graph's title using a text tool and then move it into position manually.

Micrografx says that its new *Graph Plus* includes a slide show feature, a completely rewritten manual, and a number of minor fixes. Upgrades are free to registered users.



Windows Graph (or *Graph Plus*) is the logical choice for *Microsoft Windows* users, at least until Zenographics' new *Pixie* becomes better known. If you don't use *Windows*, it isn't worth giving up the extra storage space on your hard disk to install a run-time version of *Windows* for just a single program. Nevertheless, the Micrografx program's many features and intuitive interface make it an excellent value at \$395.

WHERE TO BUY

Windows Graph 1.0

Micrografx
1820 N. Greenville Ave.
Richardson, TX 75081
214/234-1769, 214/234-2694

List price: \$395

Requirements: 512K, two disk drives, DOS 2.00 or later version
Not copy protected

Technical support: 60 days, no toll-free number; extended support, including quarterly technical newsletter and free upgrades but no toll-free number, \$150 per year; M-F 8-6

Other support services: free quarterly user newsletter

For more information, see Products Featured in This Issue.

In this *Windows Graph* screen, 3-D bar and area graphs are displayed in the graph window while the worksheet window shows the data used to plot them.

Richard Jantz, a desktop publishing consultant and freelance writer in Berkeley, California, is the author of Ventura Publisher for the IBM PC: Mastering Desktop Publishing (John Wiley & Sons, New York, 1987). ●

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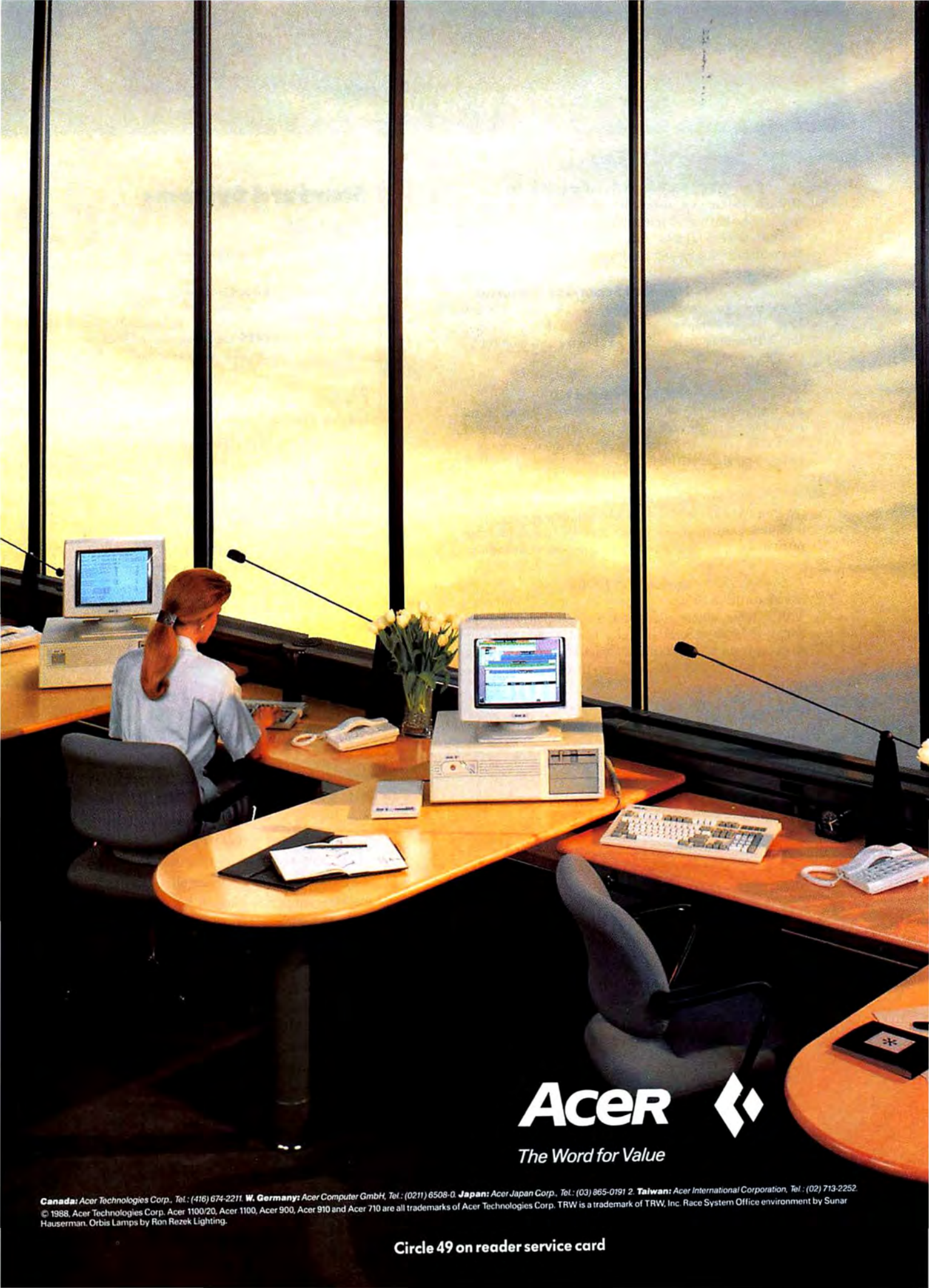
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178 **Stanford Systems 286-16**

If you're looking for a sizzling 286 machine at a rock-bottom price, this one should be high on your list—it aced most of its NSTL tests. Just don't expect any help from the manual.

182 **Hyundai Super-16T XT-Turbo**

Sometimes you get what you pay for. Despite a low price, tolerable performance, and some clever design decisions, this XT clone is undercut by hard drive and monitor trouble.

186 **NEC Multispeed HD**

For businesspeople who need more than a laptop on the road, the schizophrenic Multispeed offers the luxury of a hard disk and an expressive screen at the expense of weight and short battery life.

190 **QuadStar LAN**

An icon-based Starlan whose best quality is ease of use, it thrives on twisted-pair wire, and it's almost half the price of an Ethernet. The catch? It's slow as molasses.

192 **Kyocera F-1000A**

It sounds like a dream—a LaserJet Series II imitator with 79 fonts, 39 bar codes, and a speed that burns the Series II by 20 percent. But this printer accepts its additions only from Kyocera, its LaserJet emulation is shaky at times, and it makes the user jump through configuration hoops.

Stanford Systems 286-16

AT-compatible system

PROS: Outstanding performance, inexpensive

CONS: Expansion slots out of alignment, poor documentation

It's fortunate for Stanford Systems that its hotshot 286-16 performs well enough to offset its misleading hype. The system's name is clearly intended to make you think you're getting a 16-MHz PC, when, in fact, it's a 12-MHz machine that "approximates" 16-MHz throughput (whatever that means). But when the smoke screen dissipates, you do end up with a very hot machine at a very low price. The 286-16 turned in some of the fastest scores of any 80286 computer reviewed by *PC World*. Its only serious drawbacks are some internal design flaws and dreadful documentation.

The 286-16 achieves its high-velocity throughput without benefit of disk caching or exotic memory management; it simply runs its 80286 CPU at a 12-MHz, zero-wait-state clock speed. (You can throttle it down to 10 MHz with one wait state if you wish.) One megabyte of speedy 80-nanosecond dynamic RAM on the motherboard makes the high CPU speed possible. To maintain the speed with expansion memory installed, you can switch a jumper to boost clock speed on the bus, normally 8 MHz, to 12 MHz. Of course, setting the jumper for the higher speed affects every slot on the bus—and not all expansion boards work at such a clip.

The basic \$1479 system includes 1MB of RAM, a 1.2MB floppy disk drive, and a parallel and serial port. For only \$2467 you get a system with a 40MB hard disk, an EGA auto-switch board, and an enhanced color monitor. If you want a more advanced setup, Stanford Systems is ready with a warehouse of options, including a variety of monitors and display adapters, internal tape backup,

3½-inch drives, an 80287 math chip, EEMS extended memory, and hard disks ranging from 20MB to 130MB.

The 286-16 lives in a fairly standard AT-style box that's slightly smaller than usual, thanks to a compact Turbo Baby mother-board. There's a keylock, a front-mounted reset button, and indicators for power, disk access, and turbo mode. A half-height 1.2MB floppy drive sits in the usual externally accessible location, just above two half-height bays, for additional drives or tape units. To the left of the bays, there's room for one full-height or two half-height devices.

The 286-16 may look like just another AT clone, but hidden beneath its mild-mannered exterior is enough speed and power to blow away most 80286 PCs. When National Software Testing Laboratories (NSTL) put it to the test, the 286-16 turned in the best *WordStar* and *1-2-3* scores of any 80286 computer ever reviewed by *PC World*. Out of 23 machines tested (not all results are shown in the figure), it easily whipped all but 2 in Lattice C tests—including PS/2 Models 50 and 60. Its performance on disk-intensive tests like

dBASE III Plus was less impressive, due to its lack of disk caching.

The cramped system unit is one place where the 286-16's cut-rate price makes itself felt. At first glance, the unit's expansion capacity seems respectable enough, with five 8/16-bit slots and three 8-bit slots. Two of the 8/16-bit slots are occupied by a serial/parallel board and a drive controller, leaving you with six available slots. However, you may only get to use five, since the controller's ribbon cables jut so far out that any board placed in the adjoining slot must be bent drastically. Furthermore, all the end guides for full-length boards are out of alignment by a few fractions of an inch, causing boards to warp slightly.

The keyboard features a 101-key IBM-style layout with decent tactile response and a switch to swap the <Ctrl> and <Caps Lock> keys. Carrying on an unfortunate IBM design tradition, the keyboard plugs into the middle of the back of the computer.



JOHN GREENLEIGH

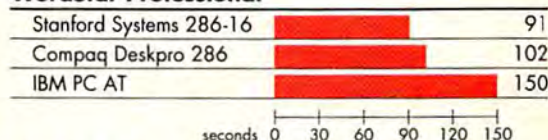
Don't be fooled by the Stanford Systems 286-16's humble exterior—it's a super-fast AT clone that aced its NSTL tests, carries a bargain price tag, and incurs only a few demerits.

NSTL TEST REPORT

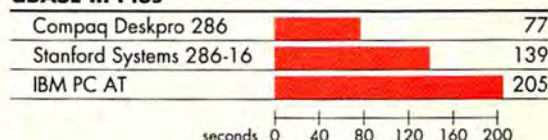
Stanford Systems 286-16

The 286-16 turned in the best WordStar and 1-2-3 scores of any 80286 machine ever tested by NSTL for PC World.

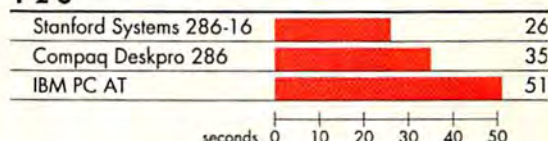
WordStar Professional



dBASE III Plus



1-2-3



The 12-MHz Compaq Deskpro model 40 was tested with a disk cache using 192K of extended memory. The IBM PC AT tested was an 8-MHz Model 339 with a 30MB hard disk.

WordStar Professional

Although disk access plays a small part in this benchmark, processing and memory access speeds are the most significant factors. The test measures the time required to perform four operations on a 15,364-word document.

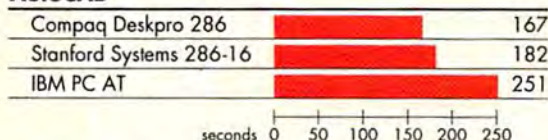
dBASE III Plus

Disk access speed is the most significant factor for this benchmark. The test measures the time required to produce a report based on a three-file join, select, and sort.

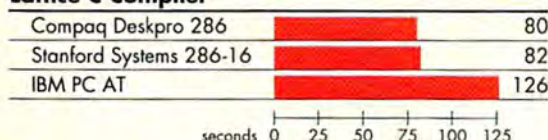
1-2-3

Because no disk access is required, this benchmark depends almost entirely on the processing and memory access speeds of the systems. In this test, a 1-2-3 macro executes a series of recalculations within a 50-by-50-cell matrix.

AutoCAD



Lattice C Compiler



AutoCAD

Disk access, processing, and memory access speeds all contribute to a product's performance in this benchmark. However, the speed and type of math coprocessor used by the system are the most important factors. The test uses the sample office drawing provided with AutoCAD containing six two-dimensional and seven three-dimensional views and measures the time required to retrieve and display the drawing, zoom in on a small detail within the drawing, zoom out to reveal the entire drawing, and print the entire drawing. All of the views are then displayed in the last step of the benchmark.

Lattice C Compiler

In this benchmark, the sequential disk access rate is the most important factor. Applications such as file managers commonly rely on this type of disk access. The test measures the time required to compile and link two 1000-line programs and is performed automatically using a DOS batch file.

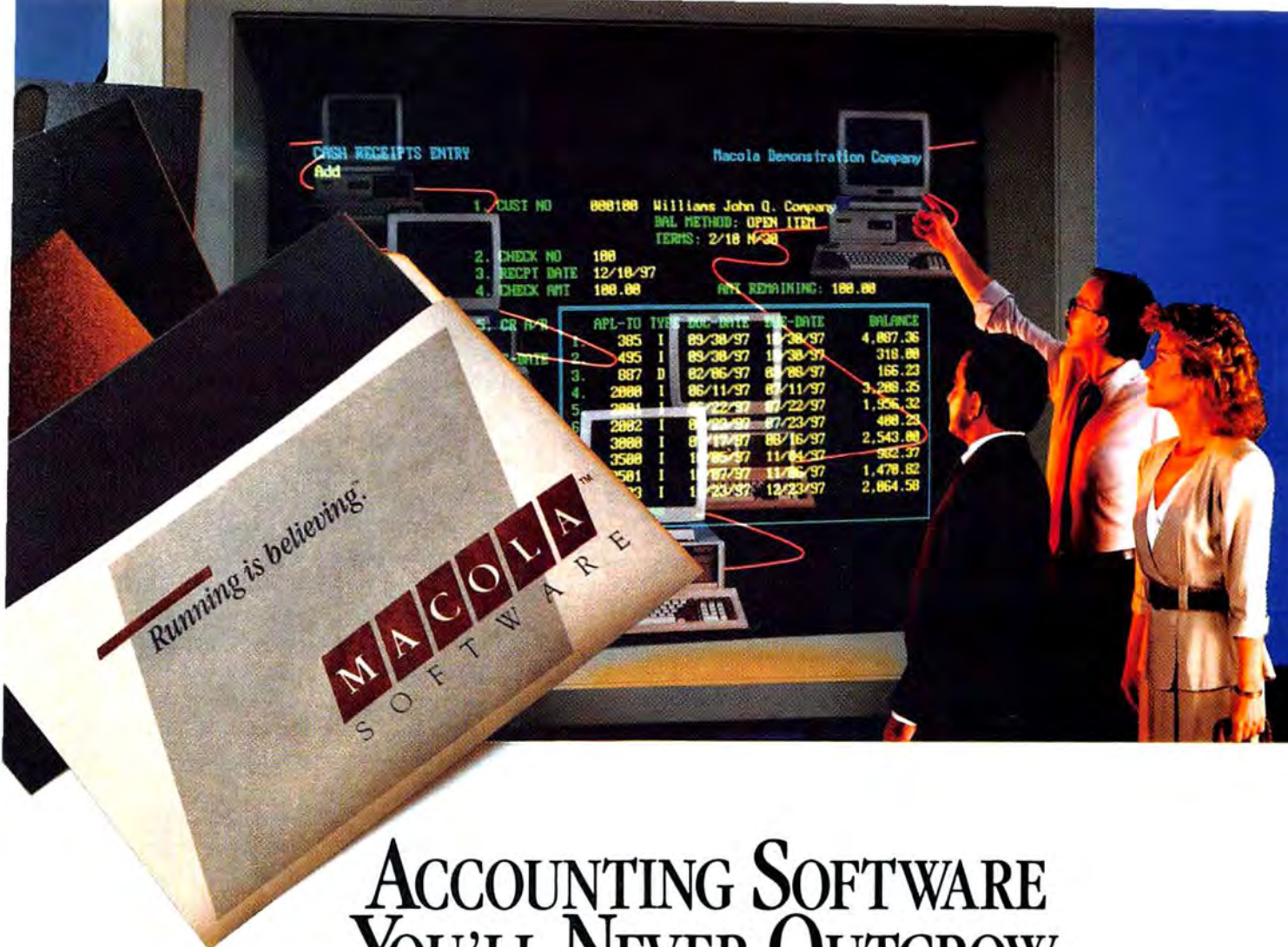
Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

Documentation is very poor. The grammar and spelling in the incomprehensible pamphlets are laughable—but you'll stop laughing in a hurry if you ever need that information. The unit reviewed used a ROM-based setup utility to get up and running, but it took a phone call to technical support to learn the necessary keystroke combination because the manual didn't provide it.

Stanford Systems' act may be a little rough around the edges, but a six-year track record of selling PC compatibles under the 786 Computers label should help allay fears about the company's stability. Furthermore,

it purchases most of its components and peripherals from established companies like Seagate, Thomson, and MiniScribe.

But despite poor documentation and internal crowding, the Stanford Systems 286-16 is an excellent value. If speed is what you need—and the ability to run 80386-specific software, such as *Windows/386*, is not an overriding concern—you can take a ride in the fast lane on Stanford's rocket, and save yourself a bundle. —Eric Brown



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Warranty: one year parts and labor

Extended warranty: none

Technical support: unlimited phone support, toll-free for first year, M-F 8:30-5

Other support services: none

For more information, see Products Featured in This Issue.

Hyundai Super-16T XT-Turbo

XT-compatible system

PROS: Low price, dual-speed CPU, multimode video board

CONS: Display and hard drive malfunction

Can a huge Korean conglomerate gain a toe-hold in the American computer market by offering a dual-speed XT compatible for under \$1000? Hyundai hopes the answer is yes. Its \$999 Super-16T XT-Turbo boasts a 4.77/8-MHz 8088-2 processor, a sleek 15-inch-square footprint, and a multimode video board. Unfortunately, serious hardware problems and a substandard keyboard may send discriminating buyers off in search of something more reliable.

You've got to give Hyundai points for trying. Nice touches include a front-mounted power switch, a side-mounted keyboard plug, and 640K of RAM out of the box. The inside of the system unit shows evidence of good

planning, too. There's room for two half-height drives and six 8-bit expansion boards. The floppy drive controller is built into the motherboard, as are parallel and serial ports. An 8087 coprocessor socket and a 135-watt power supply are provided as well.

Although the Super-16T won't set any speed records, it performs quite honorably for an 8088 PC. In NSTL's performance tests, the Korean newcomer trounced the IBM PC XT. However, it was itself bested by AT&T's 8086-based PC 6300.

The system comes with a 12-inch amber monochrome monitor and a "multivideo board" that supports standard CGA, MDA, and Hercules modes, plus a special 640 by 200, 16-color mode that works with popular programs such as *1-2-3* release 2.0, *Framework II*, and *AutoCAD*. The monochrome monitor comes with a tilt-and-swivel base and produces clean, sharp images. Sometimes.

Unfortunately, under certain conditions the display proves to be one of the Super-16T's biggest problems. If you place the monitor on top of the system unit, a common set-up for crowded desks, the image oscillates violently. This may be due to insufficient shielding on a thick strand of cable that runs from the power supply to the on/off switch inside the system unit.

Another unpleasant surprise is waiting inside the Super-16T: a mysterious metal strut that divides the interior between the expansion slots and the disk drives. Presumably it's intended to provide structural strength—but its sharp, unfinished edges are an unnecessary hazard to users who venture under the hood.

Disk drive hassles add to the Hyundai's demerits. A Seagate hard drive (20MB or 30MB) is offered as an option, but trying to snake its cables past the floor-mounted floppy controller produces a tangle of wires messier than a Hollywood freeway interchange.

Worse yet, the unit tested developed serious hard drive malfunctions. If the system was left on for more than 5 or 6 hours, frequent hard disk read/write errors began to

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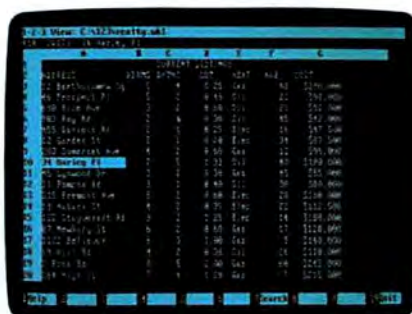
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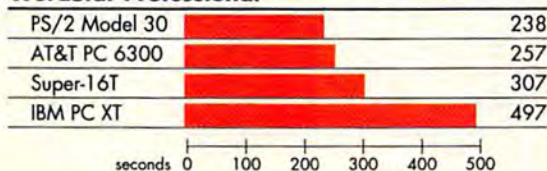


NSTL TEST REPORT

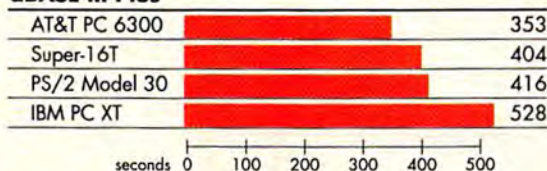
Hyundai Super-16T XT-Turbo

Hyundai's low-cost Super-16T is invariably faster than IBM's PC XT, but it can't match AT&T's PC 6300 Plus.

WordStar Professional



dBASE III Plus



WordStar Professional

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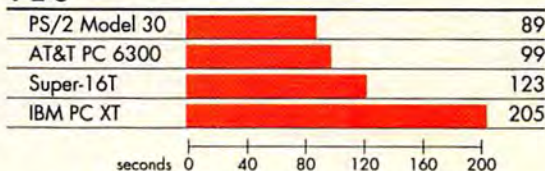
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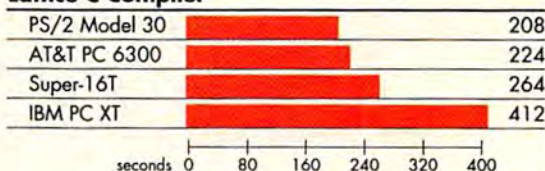
1-2-3

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1-2-3



Lattice C Compiler



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In this benchmark, the sequential disk access rate is the most important factor. Applications such as file managers commonly rely on this type of disk access. The test measures the time required to compile and link two 1000-line programs and is performed automatically using a DOS batch file.

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

occur. Files were mangled, and subdirectories were unexpectedly combined. A 30-minute cool-down period generally restored normal operation, but unless you like long coffee breaks and a lot of file-rescue operations, it is not an acceptable solution.

The Hyundai's 84-key keyboard is lightweight and annoyingly flimsy. A 101-key enhanced keyboard is available as an optional replacement; hopefully it is more impressive.

Hyundai bundles a handy package of software with the Super-16T: a spelling checker and Alpha Software's *Electric Desk*, which includes a word processor, a spreadsheet, a data base, and a communications program.

MS-DOS 3.2x, GW BASIC 3.2, and a system diagnostic disk are also included.

Despite the software extras, the magic that Hyundai worked with its phenomenally successful automobiles seems to have failed with the Super-16T. The inherent limitations of the aging XT genre are discouraging enough in the best machines. To overcome them, a new XT has to offer exceptional features, high performance, or an astoundingly low price. The Hyundai Super-16T's price is low, but not low enough to offset its flaws.

—Paul Meyers

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List price: Super-16T XT-Turbo with multivideo display, single 360K floppy drive, monochrome monitor with tilt-and-swivel base, MS-DOS 3.2x \$999; with CGA monitor \$1249

Accessories: 360K floppy drive \$100; 20MB hard drive \$400, 30MB hard drive \$500; 101-key enhanced keyboard \$69

Warranty: 18 months

Extended warranty: none

Technical support: none

Other support services: none

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

NEC Multispeed HD

Laptop computer

PROS: Fast CPU, good display, excellent ROM-based utilities

CONS: Short battery life, slow hard disk, no expandability

The NEC Multispeed HD falls into the heavy-weight laptop category. It's loaded with a 20MB hard disk, 640K, and a backlit LCD screen that's easy on the eyes.

The new generation of hard disk laptops seems to be suffering from delusions of grandeur. Can a computer sit on your lap, run on batteries, and still deliver the performance of a desktop machine? Does it make more sense to buy a hard disk laptop, a heavier (but more powerful) no-battery portable like Compaq's Portable III, or a featherweight floppy disk laptop like Toshiba's 6-pound T1000? NEC's answer is a definite "sort of."

The \$3695, 14-pound NEC-HD is an enhanced version of its predecessor, the Multispeed EL. It comes with a 20MB hard drive, 640K of RAM, a highly readable backlit LCD screen, and a powerful set of ROM-based, pop-up utilities. The EL's full 85-key keyboard has been retained with minor improvements, and an internal 2400-bps modem is available.

As is true for all laptops, these impressive luxuries add weight and consume battery power at a prodigious rate. With all the goodies installed, one hour of battery operation is all you'll get. NEC's cure for the low-battery blues is a pop-up utility that lets you

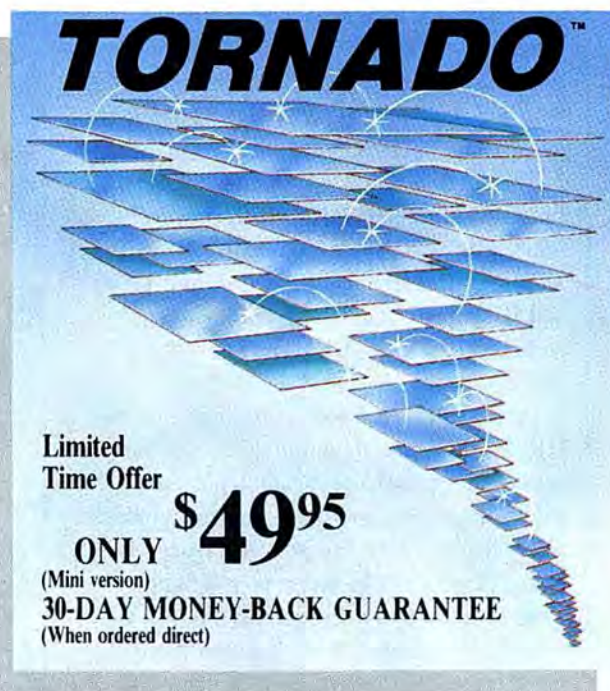


JOHN GREENE/CH

Software Breakthrough: the RANDOM information processor

New Concept

With all the software tools available, it is surprising that an important need has been overlooked—a way to deal with the countless bits of RANDOM information you spend hours with every day. Tornado will not only give you instant access to this important information ... it will help you make better decisions and even think more clearly. Try Tornado risk-free and discover the productivity software package for your PC that works wonders.



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30-DAY MONEY-BACK GUARANTEE
(When ordered direct)

RANDOM Information

Did you ever realize that over half the information you deal with every day is the RANDOM type? Not databases—not spreadsheets—not long documents—but the information scattered around your workplace and in your head. Yet amazingly, until now there was no great software to help you—the tools were either too structured or without organization. But now, at last, there is a quick and easy solution—Tornado—acclaimed by rave reviews and accepted by corporations nationwide. Whether you are a business executive, consultant, engineer, or in any other profession, you need Tornado—it will save you endless time and effort every day—guaranteed—or your money back. Here is how it works:

Specifications: **FEATURES:** free-form & predefined windows, scrolling within window, import & export to files & screens, cut & paste, auto word wrap, time & date stamp, move & join & dup windows, mono or selectable color, definable Hot-key or non-resident, unloadable, LAN support, context help, extended ASCII, smart fully adjustable windows, parallel text processing, progressive resolution and “and-or-not” like searching without keywords, and more. **COMPATIBILITY:** IBM-PC/XT/AT/PS2 and compatibles; mono, CGA, 80 col EGA, and Hercules displays; 60K minimum RAM **CAPACITY:** Up to 500 windows and 50K per pile - 50 piles. Not copy protected.

Information Windows

With Tornado, you process information in stacks of superfast “intelligent” windows—several on your screen at once. You type into the windows; interconnect and prioritize them; and scan through them in remarkable ways.

Free Form

Tornado is FREE-FORM. It works the way you think. To start a new window you just press N, and enter information. No file names. No extra keystrokes. To retrieve information you just press G (for Get), with any word or phrase—you’ll watch Tornado zip through your windows like

lightning linking and opening those requested. You can even flip through your windows with the arrow keys and watch them instantly pile up and lift away. These are just three of 18 easy but powerful features.

Countless Uses

There are thousands of uses for Tornado. When Harry calls you on the phone, in two seconds flat you’ll display the six windows on Harry before he finishes his first sentence! No more embarrassing pauses or scrambling for information. Tornado is so versatile you can: write and print a letter faster than ever; track things to do; edit electronic mail; and plan a project or event—quickly and easily. You can even build a sophisticated “knowledge” base—or an unstructured data base—without programming. And that’s not all. Track phone conversations, numbers, customers, and all your other RANDOM information. On a portable, Tornado is your ideal moving office. Best of all, you tailor Tornado to your own needs—easily!

25,000 Windows

Instead of one window or ten, imagine up to 25,000! It’s like extra memory...for your brain! The uses are endless. If you can “type” it—you can “Tornado” it. And because it’s memory resident (if you choose) you can quickly jump in from other programs—even move information between them. All this power, yet reviewers agree you can start “Tornado-ing” in 15 minutes—not 15 days.

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Choose the Tornado that’s right for you:
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PC World, Patrick Marshall

“one of the niftiest ... programs I’ve ever seen.”
BYTE, Jerry Pournelle

“Excellent value”
InfoWorld, Review Board

“Editor’s Choice”
PC Magazine

Regular Tornado—\$99.95—Full version with all commands and full information capacity (up to 25,000 windows and 2,500,000 characters).

Library Tornado—\$149.95—All commands, full capacity, plus “Library” of windows containing: free-form year logger, simple project planner, grid maker, city/state/area code/time zone translator, and more templates and references.

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NSTL TEST REPORT

NEC Multispeed HD

The NEC Multispeed HD laptop finishes the processor-intensive 1-2-3 benchmark at the head of the pack and beats the IBM PC XT across the board.

WordStar Professional

NEC Multispeed HD	217
IBM PC XT	497

dBASE III Plus

NEC Multispeed HD	387
IBM PC XT	528

1-2-3

NEC Multispeed HD	79
HP Portable Vectra CS	81
Toshiba T1000	161
IBM PC XT	205

Lattice C Compiler

NEC Multispeed HD	192
IBM PC XT	412

seconds 0 100 200 300 400 500

WordStar Professional

Although disk access plays a small part in this benchmark, processing and memory access speeds are the most significant factors. The test measures the time required to perform four operations on a 15,364-word document.

dBASE III Plus

Disk access speed is the most significant factor for this benchmark. The test measures the time required to produce a report based on a three-file join, select, and sort.

1-2-3

Because no disk access is required, this benchmark depends almost entirely on the processing and memory access speeds of the systems. In this test, a 1-2-3 macro executes a series of recalculations within a 50-by-50-cell matrix.

Lattice C Compiler

In this benchmark, the sequential disk access rate is the most important factor. Applications such as file managers commonly rely on this type of disk access. The benchmark measures the time required to compile and link two 1000-line programs. The test is performed automatically using a DOS batch file.

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

temporarily disable backlighting and the hard disk. This buys you another hour of battery power—but you're left with a far less impressive machine.

Since the \$99 rechargeable nickel-cadmium battery pack is relatively light and compact, a precharged spare or two can be carried along to provide power for an entire

transcontinental flight. For operations away from the power plug, NEC has included an impressive array of visual and aural low-battery warnings.

As with most hard disk laptops, the NEC's 20MB drive is slow by desktop standards. On the other hand, it has the important ability to park the heads automatically whenever the machine is turned off—whether by the user or a dying battery.

The screen is a big improvement over that of the old EL. It has been enlarged to about 9 by 5 inches, and backlighting is now standard. Under normal artificial light the display is superb, with crisp, electric blue characters on a silver background. The representation of color as various shades of blue, lavender, and violet is particularly good for a monochrome LCD screen.

Thanks to a V-30 CPU that switches between 4.77 and 9.54 MHz, the HD delivers impressive performance scores. In NSTL's 1-2-3 test, the HD beat both Toshiba's T1000 and HP's Vectra CS laptops. And it even trounced IBM's PC XT in the full range of NSTL tests.

Several unusual features are built into the HD. Its ROM-based pop-up utilities include a telecommunications program, a notepad, a simple data base, an outline manager, and a phone dialer. These can be called from within any program. The user can assign up to 128K of RAM as a nonvolatile RAM disk that will store data safely for 8 hours or more. For a price, NEC engineers will place user applications on plug-in ROM chips that go in two spare sockets; if desired, these applications can even be designed to work as pop-ups. A well-designed (and comfortable) semi-rigid carrying case is available too.

Unfortunately, the HD can't seem to decide whether it's a laptop with portable capabilities or a portable with battery operation added; predictably, it fulfills neither role very well. As a laptop, its heavy weight and short battery life put it at a distinct disadvantage. As a portable, its slow hard disk and lack of expandability make it an unattractive alternative to cheaper, faster machines such as the Toshiba 3200. On the other hand, businesspeople who spend long



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weeks on the road and require battery operation, maximum portability, and a hard disk will find that the NEC Multispeed HD—with its bright screen, nonvolatile RAM, and powerful pop-up utilities—is aimed right at them. —*John Diebold*

WHERE TO BUY

NEC Multispeed HD

NEC Home Electronics (U.S.A.)
1255 Michael Dr.
Wood Dale, IL 60191-1094
312/860-9500, 800/447-4700

List price: with 640K, one 20MB 3½-inch hard drive, one 720K 3½-inch floppy drive, backlit liquid crystal monitor, MS-DOS 3.20 \$3695

Accessories: soft carrying case \$99, semi-rigid carrying case \$129; 2400-bps modem \$499; extra battery pack \$99

Warranty: one year limited

Extended warranty: none

Technical support: unlimited, toll-free phone support

Other support services: none

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

QuadStar LAN

Twisted-pair Starlan

PROS: Easy to use, fully featured, inexpensive

CONS: Slow throughput, no inter-LAN connectivity, limited distance between nodes

If your company is looking for a low-cost, user-friendly local area network, especially one that will work on inexpensive twisted-pair telephone cables, QuadStar may be a star worth wishing on.

A typical five-station Ethernet LAN goes for about \$4000; QuadStar connects the same five nodes for as little as \$2200. Unfortunately, you'll have to trade performance for price. QuadStar delivers only 1- to 2-megabits-per-second network transmission speed, compared to 4 from IBM's Token-Ring and 10 from 3Com's Ethernet.

As you might guess from its name, QuadStar is a Starlan. Unlike bus networks, in which workstations are connected in a long daisy chain, each node on a QuadStar net is connected to one of several hubs that control

the data links between stations. QuadStar is also a distributed-server LAN that allows server functions to be distributed between various workstations.

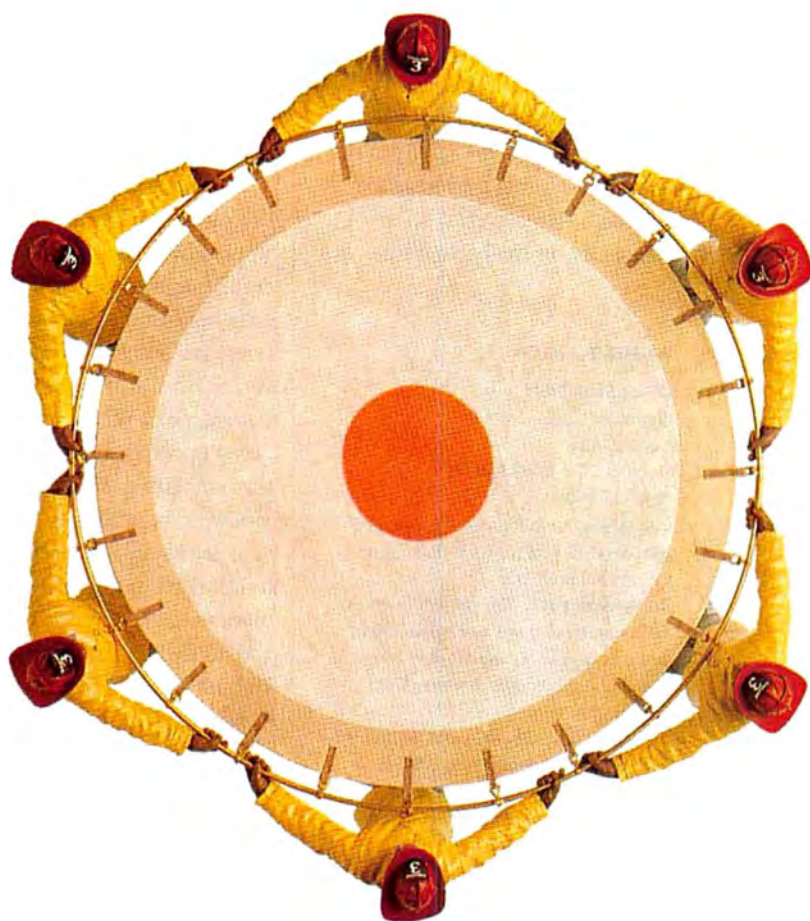
QuadStar includes adapter boards, hub connectors, inexpensive twisted-pair cables, and a proprietary version of Torus's *Tapestry* network operating system. It requires PCs, XTs, ATs, or PS/2 Model 25s or 30s as workstations; support for PS/2 Models 50, 60, and 80 is currently unavailable.

Since QuadStar seems intended for environments where ease of use is a primary concern, its marriage with *Tapestry*, Torus's fully featured, icon-based operating system, is a good one. Not only is *Tapestry* easy to use—it's fun. Although not as powerful as, say, *Netware*, *Tapestry* packs in goodies like electronic mail, a text editor, a telephone directory, and modem-sharing capability. QuadStar's hardware works with a number of other network operating systems too.

With *Tapestry*, logging on to QuadStar is as simple as inserting a boot disk and turning on the computer. Users never see the DOS prompt; instead, they are greeted with QuadStar's main menu. Applications appear as icons; so do electronic mail, the text editor, and the telephone directory.

QuadStar is relatively easy to install and can be customized for different LAN configurations and budgets. Two adapter boards are available. The \$375 QS-100 is suitable for most workstations; nodes operating as network servers or running heavy data base tasks will perform better with the high throughput of the \$495 QS-188.

Quadram offers two kinds of hubs. For networks with no more than six nodes, the \$575 QS-PH6 is perfectly adequate. It combines a QS-100 adapter board with a six-connector hub and can be installed in any workstation. This low-cost unit has several failings, however. It imposes an 800-foot maximum distance between any two nodes on the LAN. Furthermore, if the workstation crashes or is turned off, all the PCs on its "star" are instantly disconnected, with possible loss of data. The stand-alone QS-HUB12 solves these problems. It costs more



Coming from Lotus.

(\$795), but it provides 12 connectors and does not require a computer. Hubs can be connected to incorporate a maximum of 50 nodes.

QuadStar does have its drawbacks. In addition to poky performance, hard disk space on the software library server must be pre-allocated, and the network must be completely reinstalled if mass storage requirements change. Furthermore, QuadStar does not connect to other networks—not even to another QuadStar LAN.

If speed is your main concern, QuadStar is clearly no network superstar. Nonetheless, if your wish list includes an easy-to-learn, icon-based network operating system—and you're willing to trade top-of-the-line performance for substantial savings—this starlet offers real benefits, especially on the bottom line.
—Hal Chapel

WHERE TO BUY

QuadStar LAN

Quadram Corp.
1 Quad Way
Norcross, GA 30093-2919
404/923-6666

List price: QuadStarter kit (2 nodes) with one QS-PH6, one QS-100, Tapes-try, and cables \$1095

Requirements: 25K per workstation, 320K and a hard disk per server, 384K and a hard disk for the network manager; 8-bit PC-compatible slot; DOS 2.00 or later version

Accessories: QS-100 adapter board \$375, QS-188 adapter board \$495; QS-PH6 hub \$575, QS-HUB12 hub \$795; 25-foot cable \$15, 50-foot cable \$25, 100-foot cable \$30

Warranty: one year

Extended warranty: none

Technical support: dealer support, toll-free phone support

Other support services: none

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

Kyocera F-1000A

Laser printer

PROS: Epson FX-80 emulation, many built-in fonts

CONS: Incomplete LaserJet emulation, difficulty switching fonts and emulation modes

Imagine a laser printer that matches the popular HP LaserJet Series II feature for feature—and prints 20 percent faster. Add 79 built-in fonts, all 39 industry-standard bar codes, and seven emulation modes (including Epson FX-80)—and you have the Kyocera F-1000A laser printer. Who could ask for anything more? Well, you might ask for better duplication of LaserJet fonts, improved ease of use, and more third-party support.

The \$2895 Kyocera F-1000A costs \$300 more than the LaserJet Series II, but at ten pages per minute it prints faster. In NSTL tests, it beat the LaserJet II by 20 percent (text) and 10 percent (graphics). However, in other areas it does not compare so well.

For instance, if you intend to stray from the safe but small world of Kyocera drivers, you ought to look at the F-1000A's printer emulations very carefully. (An F-1000A driver is built into a number of popular applications, including *WordPerfect*, *Microsoft Word*, *WordStar 2000*, *MultiMate*, and *Aldus PageMaker*.) When no laser printers at all are supported, the F-1000A's Epson dot matrix emulation will see you through handily. However, in situations where a LaserJet driver is listed on a printer menu, you will have to fall back on the Kyocera's LaserJet II emulation—and that can be a problem.

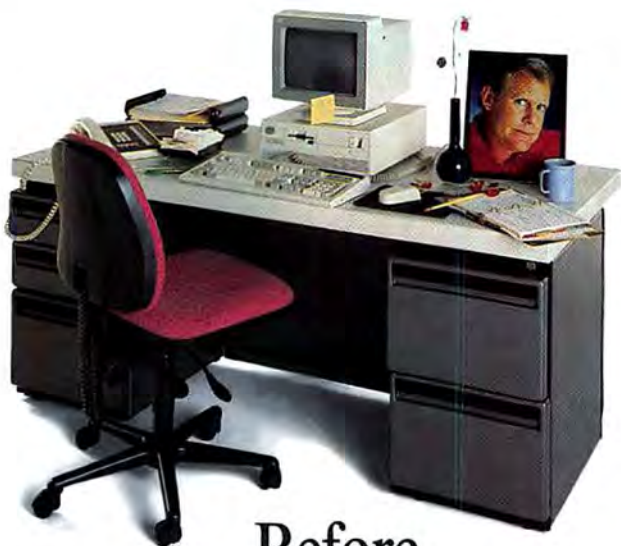
The F-1000A offers a generous selection of 79 built-in fonts (compared to the LaserJet's 6) but, as is true of most LaserJet "compatibles," not all the fonts work perfectly in LaserJet emulation. During testing, mono-spaced fonts seemed fine, but text printed in proportionally spaced Times Roman or Helvetica, for instance, was not justified properly. On the other hand, a page printed under LaserJet emulation from *Ventura Publisher*, which uses downloaded soft fonts, was perfect.

User convenience is another area where the F-1000A falls short. Shunning HP's handy, single-module approach, Kyocera forces you to replace up to three separate units—a toner cartridge, a developer unit, and an organic photoconductor imaging system. Still, this is a minor inconvenience compared to the hassles Kyocera puts you through to change fonts or emulation modes. The LaserJet Series II lets you vary font settings from the front control panel, but the

Conversion by MicroComputer Accessories, Inc.

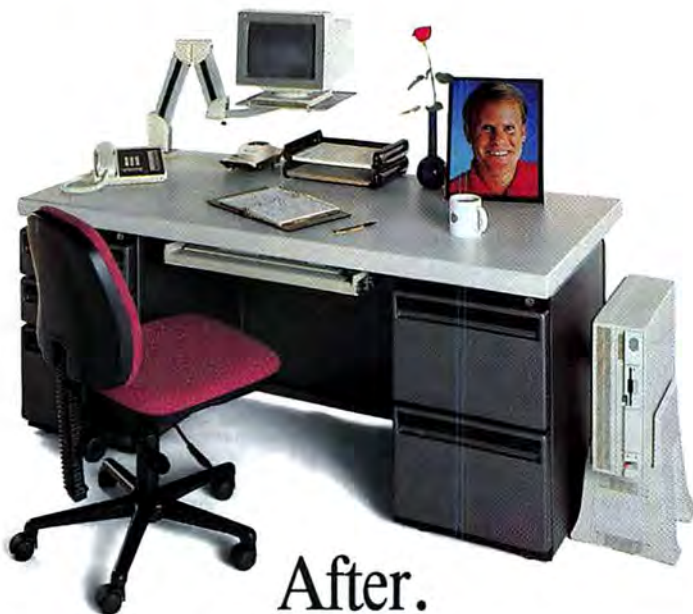


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NSTL TEST REPORT

Kyocera F-1000A

Kyocera's F-1000A laser printer outruns the HP LaserJet Series II in speed tests.

Text printing

Kyocera F-1000A	44.9
HP LaserJet Series II	57.1

seconds 0 15 30 45 60 75

Graphics printing

Kyocera F-1000A	290.0
HP LaserJet Series II	319.3

seconds 0 70 140 210 280 350

Text printing

This benchmark measures the time it takes to print a text document. A 5-page document was sent to the printer using XyQuest's XyWrite III.

Graphics printing

This benchmark measures the time it takes to print a 4-page document created using Xerox's Ventura Publisher. Each page was different and included a scanned photograph, line drawings, and raster graphics.

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

F-1000A offers no such convenience; instead, the user manual suggests writing a BASIC program! As it happens, the printer can be reconfigured with a small batch file—but it took a call to Kyocera to figure this out.

Third-party support for the F-1000A is very thin. Unlike LaserJet owners, who can buy add-ons from a variety of manufacturers, if you want memory expansion or font cartridges for the F-1000A, you'll have to buy them from Kyocera, at Kyocera's price. Nor is it easy to find other add-on hardware—like a board to provide PostScript compatibility.

The F-1000A does offer some unique capabilities. For instance, all 39 types of industry-standard bar codes can be printed; the LaserJet handles only two—and you need a special cartridge. In addition, two slots at the front of the printer accept tiny, programmable boards. For a fee, Kyocera will provide IC boards with customized forms, company logos, or signatures; these elements can

be added to documents with a few quick keystrokes.

The F-1000A's overall image quality is slightly inferior to the LaserJet's. Fine horizontal lines tended to break up; vertical lines looked overly heavy. Although type quality was excellent, stray toner introduced a slight fuzziness. Ordinary type looked like boldface, and the printer has no density control to adjust the darkness.

The F-1000A's special features and slightly higher speed make it an interesting alternative to the LaserJet Series II for those who can use its customized integrated circuit boards, Epson emulation, and vector graphics. In an ordinary office environment, however, the unit's poor front panel controls, slightly inferior output, and higher price outweigh its advantages. —Daniel Kehoe

WHERE TO BUY

Kyocera F-1000A

Kyocera Unison, Inc.
3165 Adeline St.
Berkeley, CA 94703
415/848-6680

List price: Kyocera F-1000A laser printer \$2895

Requirements: parallel or serial port, appropriate cable

Accessories: 1MB RAM expansion \$495, toner cartridge \$34.95, OPC drum \$169.95, integrated circuit card (used for fonts and graphic overlays) \$55 plus preparation fee

Warranty: 90 days parts and labor

Extended warranty: none

Technical support: toll-free support line, M-F 8-6

Other support services: none

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

Eric Brown is a contributing editor for PC World. Paul Meyers is a San Francisco-based video producer and freelance writer specializing in science and technology. John Diebold is a marine geophysicist specializing in computer analysis of seismic data. Hal Chapel is a Northern California-based LAN consultant. Daniel Kehoe compares laser printers as a product manager and is the author of PostScript Buyers' Report, distributed by Peachpit Press, Berkeley, California. ●



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FH	Micropolis 1333	30ms	44MB	\$555
FH	Micropolis 1335	28ms	71MB	\$699
FH	Maxtor 1140	27ms	117MB	\$1669

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Tiny Turbo 286 **\$289**

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Premier Issue!

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MultiFinder, HyperCard highlight Expo

250 vendors offer multitude of new Macintosh products



shows off innovative system software

BY DAVID J. KATZ
The Expo '87 Macintosh software stack is a collection of software products that demonstrate the capabilities of the Macintosh operating system. The stack includes a variety of applications, from word processing to database management, and is designed to showcase the power of the Macintosh platform.

SPECIAL REPORT ST LOOK AT HYPERCARD

BY DAVID J. KATZ
HyperCard is a revolutionary new software product from Apple Computer, Inc. It allows users to create interactive stacks of information, which can be navigated through a series of interconnected screens. This makes it an ideal tool for creating interactive presentations, tutorials, and more.

Even promises 200 MIPS Mac II

BY DAVID J. KATZ
Apple's new Mac II computer is a significant upgrade from the previous generation. It features a faster processor, more memory, and a variety of new features that make it a more powerful and versatile machine. The Mac II is designed to handle more demanding applications and to provide a better overall user experience.

Apple's LU 6.2 seen in show spotlight

BY DAVID J. KATZ
Apple's new LU 6.2 software is a major addition to its lineup of productivity tools. It is designed to help users manage their data more effectively and to streamline their workflow. The software is easy to use and integrates seamlessly with other Apple products, making it a valuable tool for anyone using a Macintosh.

BY DAVID J. KATZ
The Macintosh Expo '87 was a major event for the Macintosh community. It brought together hundreds of users, developers, and industry professionals to showcase the latest in Macintosh technology. The Expo was a great success and provided a valuable opportunity for everyone involved to learn more about the Macintosh platform.



At left: Macintosh setup displaying the Expo '87. The photo was captured by David J. Katz. At right: A close-up of the Expo '87 software interface, showing a stack of information.

Expo packs 'em in

BY DAVID J. KATZ
The Expo '87 Macintosh software stack is a collection of software products that demonstrate the capabilities of the Macintosh operating system. The stack includes a variety of applications, from word processing to database management, and is designed to showcase the power of the Macintosh platform.

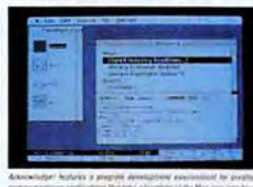


Users hail Mac-to-VAX link; DEC has even bigger plans

BY DAVID J. KATZ
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Communications program adapts Mac interface to remote systems

BY DAVID J. KATZ
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Communications program adapts Mac interface to remote systems

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- ☐ 20. Distributor/wholesaler
- ☐ 21. Manufacturer (computers, software, peripherals)
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- ☐ 23. VAR/systems house/integrator
- ☐ 99. Other (specify) _____

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- ☐ E. Project manager/chief/group leader
- ☐ F. Art director/writer/chief/group leader
- ☐ G. Engineer/scientist
- ☐ H. Administrator
- ☐ I. Consultant/advisor
- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
- ☐ L. Educator
- ☐ M. Professional (lawyer, doctor, etc.)
- ☐ Z. Other (specify) _____

3. Department or function (check only one)

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4a. Does your company own or lease any mainframe computers at this location?

☐ Yes (indicate quantity below) ☐ No

- | | Existing
(quantity) | Plan to buy
(quantity) |
|--|------------------------|---------------------------|
| ☐ 1. IBM | _____ | _____ |
| ☐ 99. Other (specify) _____ | _____ | _____ |

4b. Does your company own or lease any mini-computers at this location?

☐ Yes (indicate quantity below) ☐ No

- | | Existing
(quantity) | Plan to buy
(quantity) |
|--|------------------------|---------------------------|
| ☐ 1. IBM | _____ | _____ |
| ☐ 2. DEC VAX | _____ | _____ |
| ☐ 3. Sun/Apollo | _____ | _____ |
| ☐ 99. Other (specify) _____ | _____ | _____ |

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ Yes (indicate quantity below) ☐ No

- | | Currently
own | Plan to buy
within 1-12 mos. |
|---------------------------|------------------|---------------------------------|
| 1. Macintosh 128/512 | _____ | _____ |
| 2. Macintosh Plus | _____ | _____ |
| 3. Macintosh SE | _____ | _____ |
| 4. Macintosh II | _____ | _____ |
| 5. IBM or compatible | _____ | _____ |
| 6. Sun/Apollo workstation | _____ | _____ |
| 99. Other (specify) _____ | _____ | _____ |

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. _____	A. _____	A. _____
B. Develop/manufacture	B. _____	B. _____	B. _____
C. Evaluate/select vendor	C. _____	C. _____	C. _____
D. Own one	D. _____	D. _____	D. _____
E. Own two or more	E. _____	E. _____	E. _____
F. Purchase or acquire	F. _____	F. _____	F. _____
G. Establish specifications	G. _____	G. _____	G. _____
H. Recommend to others	H. _____	H. _____	H. _____
I. Sell	I. _____	I. _____	I. _____
J. Train people to use/ or provide support	J. _____	J. _____	J. _____
K. Use	K. _____	K. _____	K. _____
L. No involvement	L. _____	L. _____	L. _____
Z. Other (specify by name and quantity)	Z. _____	Z. _____	Z. _____

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

- | | |
|-----------------------------------|---|
| ☐ A. 1-3 | ☐ E. 50-99 |
| ☐ B. 4-9 | ☐ F. 100-499 |
| ☐ C. 10-19 | ☐ G. 500+ |
| ☐ D. 20-49 | ☐ H. None of the above |

8. How many people are employed by your entire company? (check only one)

- | | | |
|-----------------------------------|---------------------------------------|--|
| ☐ A. 1-9 | ☐ D. 100-499 | ☐ G. 2500-4999 |
| ☐ B. 10-24 | ☐ E. 500-999 | ☐ H. 5000-9999 |
| ☐ C. 25-99 | ☐ F. 1000-2499 | ☐ I. 10,000 or more |

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9. Please list below any individuals at this location who also help to recommend, specify, acquire or approve the purchase of computer systems, peripherals, software or services to whom you would like us to send a complimentary subscription of Macintosh Today.

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CONSUMER WATCH

Advice and information for the computer consumer

Can peer pressure help keep
the mail-order industry in line?
A report on a trade group's
ambitious plans.

Anita
Amirrezvani

Mail Order on its Toes

Bust-out mail-order schemes have ripped off consumers—but they've also spurred the mail-order industry into action.

Partly as a response to recent scams, 12 mail-order companies formed the Microcomputer Marketing Council in March. According to Richard Langham, chairman of the council and president of mail-order company S-100, "Our mission is mainly educational." By establishing a series of programs, which were under development at press time, the council intends to create a resource for the computer mail-order industry and to educate consumers about what to expect when they shop by mail.

The council operates under the aegis of the Direct Marketing Association (DMA), an industry trade group in New York with more than 6000 members. Membership in the council is unrestricted, open to any mail-order company willing to join the DMA. For consumers, the good news is that all members of the Microcomputer Marketing Council must agree to grievance mediation through the DMA. Consumers with unresolved complaints can write to Mail Order Action Line, Direct Marketing Association, 6 E. 43rd St., New York, NY 10017. Another DMA service removes consumers' names from national mailing and telemarketing lists at their request.

ANTHONY RUSSO

But don't expect the Microcomputer Marketing Council to have sharp teeth. "We urge all our members to follow our guidelines, but they're not enforced," says DMA spokesperson Karen Generelli. Although DMA members have occasionally had their memberships revoked due to consumer complaints, such punitive action is extremely rare. "We do not give out the names of companies we've had complaints about, nor would we say if a member had been terminated by our ethics policy committee; we would simply say the company was no longer a member," says Generelli.

The Power of Friendly Persuasion

Originally, some members of the Microcomputer Marketing Council wanted it to serve as a watchdog group—an understandable reaction to the bad publicity that accompanies mail-order bankruptcies and scams. "When we first started this whole business, we hoped there could be a *Good Housekeeping*-type seal of approval on vendors, but that's really not possible because of antitrust laws," says Peter Haas, director of customer affairs for PC Connection.

"We can't do or say anything that could put other companies out of business," says council
(continues)

chairman Langham. "For example, we may have to drop our recommendation that magazine publishers ask mail-order companies to pay for ads up front, because that could discriminate against start-up businesses."

But members of the council's operating committee believe that peer pressure will help keep the industry clean. "Some of the advertising techniques used in our business are a little more creative than they ought to be," says Mark Malloy, president of the Shamrock mail-order company in Westlake Village, California. "For example, I see mail-order ads making performance claims that aren't supported by the product's manufacturers. Who's going to want to buy a hard disk drive when they see six different performance specifications for the same product?"

Malloy points to confusing advertising for two popular Seagate hard drives, the ST251 and the ST251-1. The drives run at 40ms and 30ms, respectively, so naturally there's a big difference in price. Beyond that, Malloy says, performance is sometimes quoted for an entire drive and sometimes for a partitioned drive. Shamrock, for instance, advertises an ST251 hard drive as "preformatted into a pair of 21MB/28ms partitions"—much faster than the unpartitioned drive's speed of 40ms. But according to Malloy, some dealers don't bother to clarify the difference. "Through the council, mail-order companies will realize that things like this affect all of us," says Malloy.

Member education could also make a big difference. "A lot of the problems people have with

Some of the advertising techniques used in our business are a little more creative than they ought to be."

mail order stem from companies not knowing how to run a business properly," says PC Connection's Peter Haas. As an example, Haas mentions the irksome practice of charging credit cards before an order is shipped. "Some companies precharge credit cards because they don't realize that getting a bank authorization on a credit card guarantees them the money," says Haas, even if they don't charge the card until shipment.

Frank Fiore, co-owner of Computer Warehouse and Telemart, is developing guidelines for mail-order companies. According to Fiore, these guidelines will list suggested mail-order policies and practices, such as clearly stating all shipping and handling charges, issuing credits and refunds promptly, and publishing a physical street address (not just a post office box).

Other issues, like technical support, need to be clarified on both sides of the mailbox. "Among mail-order companies, the amount of support ranges from very little to a great deal," says Richard Langham. "Both are valid ways of doing business, but dealers should be responsible

for saying how much support they provide." Meanwhile, he says, "Consumers shouldn't expect the best support in the land and the lowest price."

Informing consumers about what to expect from mail order is prominent on the council's list of projects. The council's educational guidelines—which will appear regularly in *PC World* and other publications—will list questions mail-order shoppers should ask before placing an order, such as: How long has the company been in business? What kind of technical support is provided? Are there repair facilities on site? Is there a formal return and refund policy? Is the company willing to go through mediation in case of dispute?

The council also intends to create a logo that will appear on all members' ads. Consumers will first spot the logo on ads belonging to the 12 companies on the council's operations committee: Advanced Computer Products, Computer Mail Order, Discount Computer Warehouse, PC Connection, Priority One, Jade, Jameco, JDR Micro Devices, S-100, Shamrock, Tussey, and Computer Warehouse/Telemart.

Shop Talk

80386 Users Alert

Reader Todd Klugh of Butler, Pennsylvania, recently wrote to *Consumer Watch* about his troubles with Scientific Storage Technology (and related company Quantus), two mail-order firms that filed for reorganization under Chapter 11 of the Federal Bankruptcy Act in March. (continues)



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Circle 208 on reader service card

Klugh's complaints, although numerous, had been resolved except for one—his 80386 computer, purchased primarily for CAD work, stumbled on 32-bit math operations.

In a phone interview, Klugh said he had contacted Intel to find out whether its 80386 microprocessor was causing the trouble. According to Klugh, an Intel spokesperson said that the chip was part of a batch that had been clearly labeled "for 16-bit software only" when sold to original equipment manufacturers (OEMs) in the first half of 1987.

When *Consumer Watch* contacted Intel about its microprocessor upgrade policy, spokesperson Ursula Herrick said Intel will provide replacement 32-bit 386 microprocessors, free of charge, to its OEMs and authorized dealers. If you purchased an 80386 machine with an Intel microprocessor, contact your dealer before December 31, 1988, to find out if your chip should be replaced. Or examine the microprocessor: Marked on one side of the 16-bit chips is the number SX025 and the warning "16-bit S/W only."

At press time, Intel had not announced how it would handle consumers like Mr. Klugh, whose dealer is unavailable to administer the replacement program.

Where Is OS/2?

In February *PC World* stated in two different places that OS/2 is available for \$200 as an upgrade from DOS 3.x.x. On a recent trip to the U.S., I visited several IBM dealers in Florida: Entre Computer in St. Petersburg, and NYNEX and Businessland in Tampa. None of them had heard

of such an upgrade. A call to IBM was even less encouraging.

John W. Moore

Rio de Janeiro, Brazil

Editor's note: When Consumer Watch contacted several IBM dealers in San Francisco about the upgrade, the responses were similarly confused. A call to IBM elicited the following information: You can't get the OS/2 upgrade directly from IBM dealers; however, they should be able to give you a form for ordering the upgrade. To benefit from the offer, you must send the upgrade form, \$200, and the original title page from your DOS manual. Requests must be postmarked by June 30, 1988. However, the offer is good only for residents of the United States and Puerto Rico. Policies vary overseas; unfortunately for Mr. Moore, the upgrade is not available to residents of Brazil.

Are We Compatible Yet?

As a result of an article in *PC World*, I purchased a copy of *FlickerFree*. However, it did not function with *dBASE III Plus*. I called Gibson Research, and they said a new version that would handle both *dBASE III Plus* and *1-2-3* would be out by May 12, 1987, and that I would be sent a copy. It never came.

An ad quoting the *PC World* article about the *dBASE* compatibility appeared in the June 8 and August 17, 1987, issues of *InfoWorld*. When will I receive what I thought I'd purchased in January 1987?

Russell Gunnard

Charlotte, North Carolina

Editor's note: PC World sent a letter to Gibson Research but received no response. Later, in a

phone conversation, Sue Wilcox of Gibson Research said that an upcoming version of FlickerFree will include dBASE III Plus drivers. "We're hoping for a new release by the end of the year, but we can't promise anything yet," said Wilcox. Meanwhile, Wilcox said Mr. Gunnard would receive a refund if he returned his FlickerFree disk and manuals.

PC Plaudits

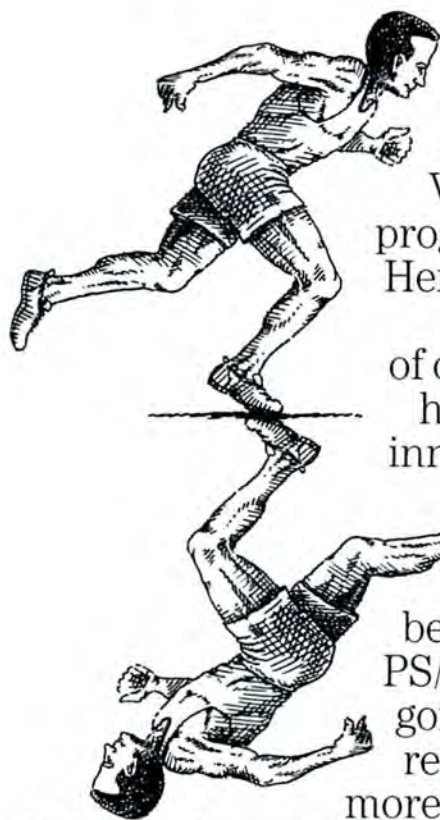
I'd like to bring to your attention the outstanding customer support I received from Mike Brown, president of Central Point Software (maker of *PC Tools*). While I was testing the program's backup/restore utilities, I had a recurring problem with my MiniScribe hard drive. Mike Brown personally spent about 3 hours helping me straighten things out. I've had good customer support before, but nothing to match personal attention from the president of a company.

W. Lee Eckhardt, Jr.

Portland, Oregon

Got a gripe? Want to set the record straight? Write Consumer Watch, PC World, 501 Second St., San Francisco, CA 94107, or use MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908. Include your name, city, state, and daytime telephone number with all correspondence. All letters are subject to editing. Due to the volume of mail, we cannot acknowledge every letter. ●

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THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

A not-so-ultimate hard disk upgrade, a 1.2MB floppy drive for the PC, keeping the PC cool, and more

Robert
Luhn

Awesome Hard Disk Boost

It is, in a word, awesome. Plug CSSL's Awesome I/O Card into the back of an AT, a Deskpro 386, or a compatible machine, and your lollygagging hard disk drive turns into a speed demon that suddenly has 25 percent more storage space. The Awesome I/O Card doesn't replace the disk controller, but it radically alters the way your hard disk does business.

What the Awesome I/O Card does is efficiently remap the hard disk's data structure to slash access times (for example, it puts the disk directory and file allocation table in the middle of the disk); compress and expand data on the fly, increasing disk capacity by as much as 25 percent; provide an intelligent 128K CMOS RAM disk cache (expandable to 512K); and maintain overall data integrity with a proprietary error-correction scheme. The Awesome I/O Card allows you to create multiple DOS volumes or a single DOS volume as big as 512MB. According to the company, the Card works with 70 percent of the disk controllers on the market that run nearly 170 drives from Atasi to Seagate to Western Dynex. Not bad for \$644.

Unfortunately, installing the Awesome I/O Card can be an awesomely irritating experience. The Card conflicts with many expanded memory boards, and worse, CSSL's manual and ad-

denda are unorganized, contradictory, and plain inaccurate. This is not an upgrade for the inexperienced.

Of course, some difficulty is unavoidable: Any radical improvement calls for radical measures. Before setting up the Card, you must uninstall any copy-protected software and back up the hard disk. Next, set the Card on top of its antistatic wrapper and connect the lithium battery that will maintain the Card's configuration settings. Simply locate the S1 jumper block next to the large round lithium battery at the top left corner of the Card and slip the black jumper over the two pins on the block. While the board is out, note how many banks of RAM it holds—you'll need this information later. Park the system's hard disk, turn the machine off, remove all external cables, slide the cover off, and pop the Card into a free 8/16-bit slot. Reattach all external cables and switch on the machine, but don't put the hood back on—more work may lie ahead.

The first step in revamping the hard disk is to delete all existing partitions. Contrary to CSSL's instructions, if you have a 32MB or smaller hard disk, slip a bootable DOS 3.x disk holding FDISK.COM into drive A: and type **FDISK <Enter>**. Select option **3** from the menu (*continues*)

lete DOS partition), then option 1 (Delete Primary DOS partition), and the job is done in a flash. Press <Esc> and let the system restart.

If the disk exceeds 32MB (and was set up with *Speedstor* or some other third-party utility), you must low-level-format the disk with the computer's advanced diagnostics program. If you're upgrading an AT, that means using *Advanced Diagnostics for the IBM Personal Computer AT* (not *Diagnostics for the IBM Personal Computer AT*), which accompanies IBM's hard-to-find *Hardware Maintenance and Service* manual. Boot the system with the diagnostics disk in drive A: and select in sequence 'System Checkout', 'Run Tests One Time', '17', 'Format Menu', and finally 'Unconditional format'.

When the machine restarts, slip the DOS 3.xx disk into drive A:. If the machine has more than one speed, make sure it's running at the highest rate. Then swap CSSL's utility disk into drive A:, type **AWESOME** <Enter>, and follow the prompts to configure the board. The program will ask about the number of RAM banks on the Card, ferret out the best address for the Card's ROMs, and then ask you to select automatic or manual installation. Select the former, and the program tests the Card's chips, readjusts the drive's interleaving, and performs other retooling. Eventually, you're asked how the disk should be formatted. Depending on the size of the disk, you can select a single volume of 32MB or less, multiple volumes (such as two 15MB volumes on an AT's 30MB disk), or a single volume exceeding 32MB. Select the multiple volumes option, for ex-

ample, and the program creates C: and D: drives and restarts the system.

The program doesn't create a bootable C: drive, so return the bootable DOS disk to drive A: while the machine kicks over. To create a bootable volume, type **SYS C:** at the A: prompt and press <Enter>, wait for the 'System Transferred' message, and finally, type **COPY COMMAND.COM C:** and press <Enter>. If the Card doesn't conflict with anything in your system (an unlikely event, as it turns out), restore your files to the disk and speed away at Warp 10.

However, if the system holds an AboveBoard/AT expanded memory board, the Awesome I/O Card will shut it down fast—and every time you turn on the system, the message '164-Memory Size Error-(Run SETUP)' will flash on the screen. But running the Setup program won't do any good. CSSL's convoluted (and undocumented) solution: Reconfigure the AboveBoard/AT as extended RAM, run the computer's diagnostics utility to confirm the memory change, run the Awesome configuration utility, and finally, install a third-party EMS emulation program that converts the AboveBoard back into an expanded memory device. CSSL's recommended emulator: *Above Disc* from Tele-Ware West of Seal Beach, California. The added cost: \$99.95.

This is an awesome upgrade in more ways than one. The performance gains are startling, but getting there takes a lot of patience. To be fair, CSSL's technical staff is patient and expert, and the company's customer BBS maintains the latest news and software patches. A company spokesperson also vouches that CSSL not only is fixing the man-

ual but is writing a menu-driven installation program that includes a low-level-format program. If CSSL makes good on this claim, the Awesome I/O Card could well win a thumbs-up. In the meantime, if you need a speed fix, take the Awesome leap—but only if you're prepared.

WHERE TO BUY

Awesome I/O Card

CSSL, Inc.
909 Electric Ave. #202
Seal Beach, CA 90740
213/493-2471

List price: \$644

Requirements: PC-DOS or MS-DOS 3.00 or later version; PC AT, Compaq Deskpro 386, or compatible 80286 or 80386 machine

Warranty: one year parts and labor

Extended warranty: none

Technical support: unlimited phone support, no toll-free number, M-F 8-5

Other support services: customer BBS, free software upgrades

For more information, see Products Featured in This Issue.

Treble Storage

When the AT made its splash in 1984, PC users on a budget lived with their envy but wailed, How about a 1.2MB floppy drive for the rest of us? IBM never answered the call, and PC users were left to fume—or to make the AT upgrade for a mere \$5795.

If you've hung on to your PC and made the requisite improvements over the years (hard disk, turbo board, three-speed blender), but the limits of its puny 360K drives drive you mad, seethe no more. Weltec Digital's half-height M-16P 1.2MB floppy disk for the PC and XT costs

only \$149, is a snap to install, and uses either machine's existing disk controllers. Weltec's solution is admittedly imperfect: The drive can't read or write 360K disks or function as drive A:, which means XT users must already have a half-height floppy drive A: in place. But if a cheap storage boost is what you need, the Weltec drive is the bargain matinee ticket.

Some optimistic souls might assume you can pop the AT's 1.2MB drive into a PC and start working. Unfortunately, the PC's BIOS ROM chip lacks the routines that recognize this high-density, 96-track-per-inch (tpi) drive. Transplanting the AT's 16-bit disk controller is equally fruitless, since the PC has 8-bit slots. The only solutions: Add

an 8-bit controller that has the proper routines in on-board ROM, or add a device driver to DOS. Weltec takes the latter approach; the other branch in the upgrade path will be explored in a future column.

Adding a Weltec drive to a PC isn't a big job even if you've never installed a floppy disk drive before. You slide the drive in, attach data and power cables, copy a device driver to the PC's boot disk, and start reading, writing, and formatting 1.2MB disks. Relevant DOS commands such as CHKDSK will work, but FORMAT won't. You must instead use Weltec's equivalent FORMATHD.COM program, which formats disks for use by any 1.2MB DOS drive.

Before you pull out your small flathead and Phillips screwdrivers, print out the three documen-

tation files on the utility disk that comes with the drive, copy Weltec's WELTEC.DRV and FORMATHD.COM files to a bootable floppy disk, and add the command DEVICE = WELTEC.DRV to its CONFIG.SYS file. Then get out the PC's *Guide to Operations* or your clone's equivalent manual, because Weltec fails to show you how to remove an existing floppy drive.

At this point, park any installed hard disks, turn off the system, remove all external cables, take off the system cover, and ground yourself. In this example, a dual floppy PC is being upgraded, so remove drive B: by undoing the two screws on the right that secure it to the PC's frame, unplug the blue data ca-

(continues)

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ble and white power connector from the back of the drive, and slide the unit out. Then take the Weltec drive out of its box and reverse the process. Note: The data connector on the back of the Weltec drive is inexplicably upside down, so invert the keyed connector on the blue data cable and pop it on. Secure the drive with the two screws.

Don't reassemble the PC just yet. Locate the SW1 DIP switch block just behind drive A:, and with a ballpoint pen ensure that switch 7 is off and 8 on. Now reassemble the PC, and with the modified boot disk in drive A:, turn the system on.

When the PC boots up, the Weltec copyright message appears, followed by the message 'High Density diskette unit number 1 installed as drive C:'. (The

Weltec drive is assigned the designator C: unless your system includes a hard disk, in which case the Weltec drive becomes D:.)

However, you can refer to the Weltec as drive B: for all commands except FORMATHD B:. If you want that command to work, simply include the statement ASSIGN B = n in the system's AUTOEXEC.BAT file, where n is the drive letter assigned by the Weltec driver.

That's all there is to it. The drive's inability to use 360K disks may rightly put off some upgraders—Weltec claims an impending release will overcome this key limitation. But if you need access to high-capacity 5¼-inch disks right now, the Weltec drive is one affordable solution.

WHERE TO BUY

M-16P

Multiface Series

Weltec Digital, Inc.
17875 Sky Park N, Ste. P
Irvine, CA 92714
714/250-1959

List price: \$149

Requirements: PC, XT, or compatible

Warranty: one year parts and labor

Extended warranty: none

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

Other support services: none

For more information, see Products Featured in This Issue.

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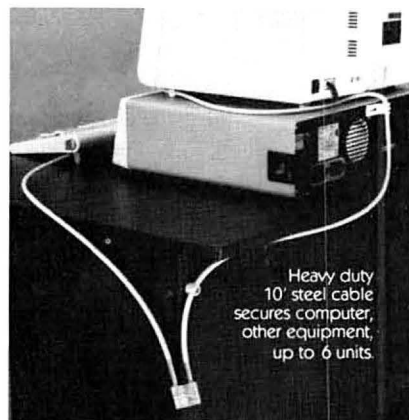
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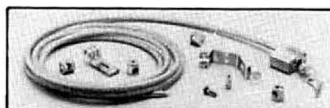
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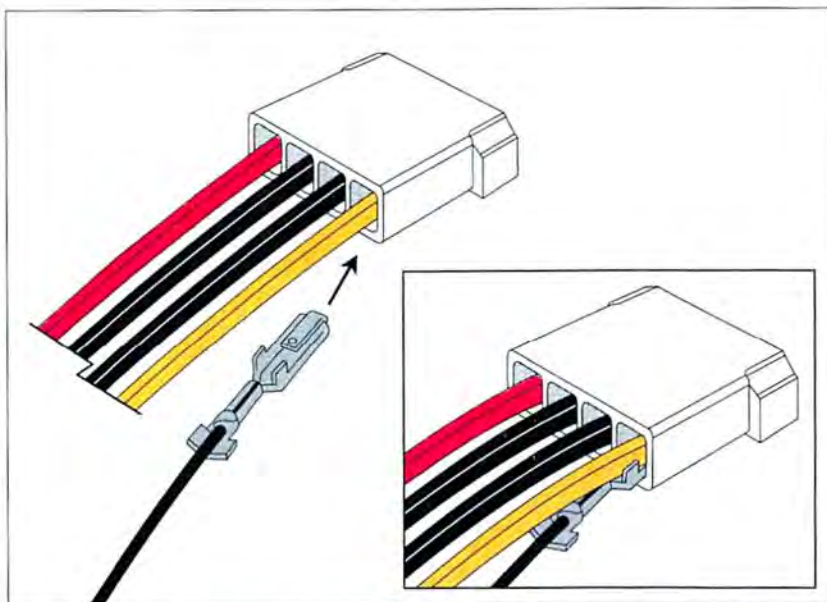


FIGURE 1: Getting the Coldblue fan some juice involves slipping an attached wire under the yellow wire in the power connector that attaches to drive A:. Slide the wire until most of its metal head is covered, and you've made a connection.

become a personal space heater. But personal discomfort is only an annoyance—the damage wreaked by heat on modem boards, hard disks, and other expensive components can be disastrous.

Luckily, a relatively inexpensive solution is close at hand: the Coldblue dual-fan ventilation system from Mandrill. Clip this 5-by-5-inch unit over the vents on the front of the PC's chassis, and system temperatures drop by as much as 27 degrees. Additional bonuses: The Coldblue is whisper-quiet, uses 2.5 watts, and offers three speed settings.

However, don't fall prey to the company's claim that you can install Coldblue in a few minutes. The Coldblue manual is a little unorganized in places, and powering the fans means inserting one end of a wire from the unit into the white power connector attached to the PC's A: drive.

Budget a half hour for the job, and make sure you have a flat-blade screwdriver and a ¼-inch nut driver.

As always, turn off the PC, remove all external cables, and pop the hood off. Locate the row of air vents at the front left of the chassis, and make sure they aren't obstructed by dust, dirt, or cables. At this point, the manual directs you to wipe this area and the top of the power supply with a damp sponge or cloth. Make sure it is only *slightly* damp—since you're dealing with an electrical device, drips would be dangerous, and the areas should be dry before you proceed with the installation.

When you're ready, follow the manual's instructions and snap the Coldblue's plastic clips into the U-shaped cutout at the top of the chassis and the steplike cutout at the bottom left corner of the chassis. Not all PCs and XT's have exactly the same cutouts, so securing the Coldblue may take some doing. Don't let your impa-

tience get the upper hand or you can easily damage the Coldblue's plastic shell.

(Note: When the Coldblue is attached to the PC, it's pressed against the metal screws that secure the PC's speaker and thus is automatically grounded. If your system lacks a speaker or the speaker isn't mounted with metal screws, you must install a supplied dummy speaker bracket before attaching the Coldblue. So check out the PC's speaker setup first.)

The next step is connecting the Coldblue to a power source—in this case, tapping into the power cable that runs drive A:. Clear some room by pulling out any boards between the Coldblue and drive A:, locate the white power connector attached to the back of the drive, and gently rock the connector out of its socket. Take the black wire attached to the Coldblue and push the folded-over metal tip under the yellow wire leading into the connector (see **FIGURE 1**). Reconnect the power cable to drive A:, and replace any expansion boards you removed during the process. To test the connection, reattach the PC's cables, but don't put the system cover back on. Turn on the PC, and if the Coldblue's indicator light is shining, you're in business. If not, make sure the unit is grounded properly and getting power.

To get the most out of Coldblue, follow the manufacturer's tips:

- To ensure proper airflow, make sure all expansion boards are properly screwed to the backplane and that the slot covers shield any empty slots.
 - Don't let the ribbon cables inside the PC bunch up so they
- (continues)

restrict air flow. If you have the patience, wend these cables under the disk drives and boards to minimize airflow obstruction.

- Place "hot" boards—hard disk cards, internal modems, and the like—in the center slots so they get the most ventilation.

Now you're ready for cool computing.

WHERE TO BUY

Coldblue

Mandril Corp.
P.O. Box 33848
San Antonio, TX 78265
800/531-5314, 512/341-6155
List price: \$185 (IBM PC or XT); \$149 (AT, AT clone, PC or XT clone)

Warranty: one year parts and labor

Extended warranty: none

Technical support: unlimited, toll-free number, answering service 7-11, 7 days a week

Other support services:

none

For more information, see
Products Featured in This
Issue.

Upgrade Update

The WORM may turn even quicker for the PC. ISI, maker of optical disk drives for the PC, the XT, the AT, and 386 machines, has just slashed the price on its internal 525WC write-once, read-many drive ("Bright Lights, Big Storage," *The Upgrade Path*, April 1988). The \$2595 drive is now only \$1888; the external version of the drive now lists for \$2088. The cost of blades for this razor—namely, removable 115MB and 230MB cartridges—has actually increased, to \$98 and \$158, respectively.

PC Cooling's Silencer 150 power supply for the PC is now not only quieter but cheaper. The company has dropped the price from \$149 to \$129.

Please forward submissions and queries to The Upgrade Path, PC World, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail PC-WORLD, CompuServe 74055,412, or The Source STE908. Articles submitted by mail should be accompanied by a self-addressed, stamped envelope and an ASCII file of the item. ●



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Karl
Koessel

Foreign Power

Q. *I am planning to use my PC compatible during a three-month stay in Switzerland but have been warned by the manufacturer that the voltage and frequency there must be converted to 110 volts, 60 hertz. I was told a device that both transforms voltage and converts frequency is available for about \$100, but an exhaustive search in the United States located only a 250-watt unit for \$2500. Do you know where I can purchase a transformer/converter for about \$100, either here or in Europe?*

John T. Madell
Western Springs, Illinois

A. Yes, but first we need to discuss the terms *transformer* and *converter* in relation to power supply. **FIGURE 1** graphs the change in voltage of alternating current (AC) for 110-volt/60-hertz power (blue), 220-volt/50-hertz power (green), and the power output of an electronic *converter* (red). The blue and green curves are simple sine waves. In the blue curve, the voltage level alternates 60 times a second, changing from 0 to +110, moving back to 0, continuing down to -110, and then increasing to 0 again. The green curve follows a similar pattern but changes amplitude by a factor of 2 (from +220 to -220 volts) and alternates only 50 times per second.

The red curve illustrates the way in which converters alter the flow of power. Converters use

electronic components to cut each voltage pulse in half; that is, each voltage pulse lasts only half as long as it would without a converter (the green curve). The voltage pulses are not clipped at ± 110 ; voltage still reaches peaks of ± 220 volts 50 times per second. Note that in the shaded sections (the first positive pulse of each wave), the red shading covers half as much area as the green. If you use a common voltmeter to measure the voltage coming out of an electronic converter, you'll get a reading of 110 volts for the red curve because the voltmeter will calculate its AC voltage readings relative to the area under the pulse of the wave. Reducing the total amount of electric flow by passing only the first half of each pulse is fine for appliances such as irons and hair dryers, which merely need *current* reduced to U.S. levels. It's not OK for surge protectors and computer power supplies. The ± 220 peak voltages that pass through electronic converters will damage such devices, which are sensitive to actual voltage levels.

Computer hardware requires a transformer (or more formally, a step-down autotransformer). A transformer uses a pair of wire coils, ensuring that the voltage levels emitted (as well as the amount of current) are always half that of those received.
(continues)

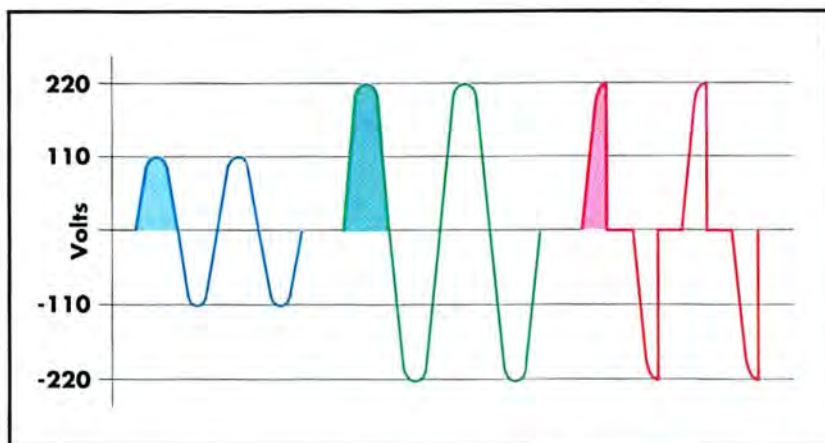


FIGURE 1: Graphs of alternating-current voltage levels for 110-V/60-Hz power (blue), 220-V/50-Hz power (green), and electronic converter power (red).

True, the frequency remains unchanged, but this should pose no problem since most computer hardware runs just fine using 50-hertz power. Step-down auto-transformers come in different sizes (all of them fairly heavy because of the coils) and can be obtained at most electric supply houses. The size needed will depend on the total wattage the computer and its peripherals will draw. If you can't find what you need locally, contact Todd Systems, Inc., 50 Ash St., Yonkers, NY 10701; 914/963-3400.

A Break for Your Laser?

Q. *I've followed the debates over whether to leave one's computer on all the time or to shut it off when it's not in use. My system draws relatively little power, and I'm convinced that I can increase the life span of my hard disk by not starting and stopping it repeatedly, so I've opted to leave my system on.*

But I have a similar concern for which I have yet to receive a satisfactory answer. Should I leave my laser printer on all the

time or turn it off between printouts?

*Walter Simmons
Walnut Creek, California*

A. Although no one likes to wait for a laser printer to warm up, it should be shut off when not in use. Laser printers draw a substantial amount of power, even while idle. In addition, the heating element may damage the print drum when the printer is left on. Only the LaserJet Series II printers, to my knowledge, avert heat damage; they rotate the drum slightly every 10 minutes or so. The bottom line? Shut off your laser printer whenever it will be inactive for an extended period of time.

Embarrassing Dash

Q. *I work with PageMaker 1.0a and a Hewlett-Packard LaserJet Series II printer. According to page 7 of the PageMaker 1.0a Supplement [an addendum to the manual], PageMaker is supposed to translate double hyphens (--) into an em dash (—), but they don't appear as em dashes on my screen or printouts. On page 206, under the*

heading "Typing special characters," the manual tells me I can type <Ctrl>-<Shift>- = to produce an em dash. On some screens it appears as an em dash, on others as two hyphens. In either case it's treated on screen as a single character but still prints out as two hyphens. What am I doing wrong? How do I print an em dash?

*Jillian Andersen
Tacoma, Washington*

A. Unfortunately, the automatic character conversions explained on page 7 of the supplement only work with PostScript printers. Worse, there are currently no ready-made commercial fonts that print PageMaker's <Ctrl>-<Shift>- = as an em dash on the LaserJet.

If you're not planning to get a PostScript printer, you have few options. You can manually kern a pair of hyphens until they print as an em dash, and then paste them in where needed. Or you can use modifiable fonts such as those from *Publisher's Type Foundry* (see "Publisher's Type Foundry 1.02" in this issue) and create an em dash for <Ctrl>-<Shift>- = for each font you use. If you're feeling especially creative, you can use PageMaker's line-drawing functions to make your own em dashes.

While we're on the subject of special characters, here's another problem to watch out for: While LaserJet clones supply Times Roman and Helvetica font cartridges, the fonts are not always exact duplicates of Hewlett-Packard's. For example, <Ctrl>-<Shift>-| prints a " on an HP LaserJet with the Times Roman F cartridge, but pro-
(continues)

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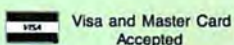
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Programming Prep

Q. *I work with a Tandy 1000sx and am thinking about giving my career a boost by learning some programming skills. Some of my colleagues tell me I should learn assembly language. Is that true? Why can't I find any information about assembly language in the DOS manual? What other languages should I consider studying?*

John Marx

Chesterton, Indiana

A. Although I'm unfamiliar with Tandy's DOS manuals, I can tell you that assembly language has made only incidental, and increasingly infrequent, appearances in IBM's DOS manuals. The chapter detailing DEBUG's commands—in particular, A (Assemble) and U (Unassemble), which directly concern assembly language—is no longer included in the IBM DOS 3.30 manual. Most users can get what they need from DOS without any awareness of assembly language. In fact, most programming professionals do not know assembly language. And they don't need to.

There's nothing magical about assembly language. Although each language has its unique characteristics, they all produce programs that perform work. And businesses need pragmatic programs that solve problems and carry out day-to-day chores. You would do best to learn a language that lets you manage your business's computer needs.

A	C	LISP	Prolog
Actor	COBOL	LOGO	RAMIS
Ada	dBASE	NOMAD 2	R:base
ALGOL	Focus	OCCAM	R\BASIC (Revelation)
AMBIT	FORTH	PAL (Paradox)	REXX
APL	FORTRAN	Pascal	RPG
B	Fred (Framework)	PL/1	Simula
BASIC	HAL (for 1-2-3)	PL/M-86	SNOBAL

FIGURE 2: Babel has nothing on the multitude of computer languages.

Today's computer languages have come a long way from their rudimentary machine-language beginnings. Each generation, from assembly to fourth-generation languages (4GLs), brought new methods to programming: Assembly language brought mnemonic commands, third-generation languages provided English-like commands, and 4GLs gave us nonprocedural programming. The languages in each generation continue to be enhanced, both in capability and with improved programming tools and environments. Furthermore, many applications (especially data base management systems) include sophisticated internal programming languages. And—though slightly less demanding than data base languages—spreadsheet macros, telecommunications scripts, even mail merge templates all involve some degree of programming.

For a general overview of programming techniques, I suggest that you start with BASIC or Pascal. Then, do some research on the languages listed in **FIGURE 2**. If any of them are used in your company's applications, your choice may be very easy. After all your research, if you still want to learn assembly language, check out *Assembly Language Programming for the IBM Personal Computer* by David J. Bradley (Prentice Hall Press,

Englewood Cliffs, New Jersey, 1984), *Peter Norton's Assembly Language Book for the IBM PC* by Peter Norton and John Socha (Brady Books, New York, 1986), or *8086 Book* by Russell Rector and George Alexy (Osborne/McGraw-Hill, Berkeley, California, 1980).

1.44MB Floppy Disk Drives on a PC

Q. *Reader David Rowe of Pleasanton, California, writes: "I read 'A Third Floppy Drive' in February's Help Screen and thought I'd tell you about my successful venture installing a 3½-inch 1.44MB floppy disk drive in my PC. After scores of calls, I found a mail-order house, Liwski International, that sold me a Toshiba 4603GOK drive and, most important, a very affordable Mini Micro FDC floppy disk controller card (for two internal floppies) that did the trick. My PC can now format, read, and write 1.44MB 3½-inch disks."*

"According to the manual, the card also works in ATs. I am running DOS 3.30, but Liwski has a software utility for DOS 2.xx users. Anyway, I'm in 3½-inch heaven. It's nice to put the (continues)"

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Alias tables	✓	✓	✓	✓	✓
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Circle 177 on reader service card



SOURCEBOOKS

Further explorations into personal computer technology

Everything the desktop publisher needs to know in two compendia and a hefty tome on the costs and considerations of CD ROM projects

Michael Harper
and
Marlene Nesary

Twenty Desktop Prophets Publish



Desktop Publishing Bible
The Waite Group: James Stockford, editor
Howard W. Sams & Co., Indianapolis,
1987
470 pages
\$24.95 softcover

Desktop publishing is in some ways a misnomer. As Jim Stockford points out in his preface to the *Desktop Publishing Bible*, what's involved has less to do with *publishing* than with *production*. Moreover, desktop publishing encompasses a whole range of processes, each demanding particular skills and expertise.

Convinced that no single professional could adequately treat "the vast field of desktop publishing"—even at the level of a basic introduction—The Waite Group decided to commission 26 separate essays from more than 20 experts.

The *Desktop Publishing Bible* is divided into four sections: publishing and production fundamentals; hardware; software; and applications and techniques. Each essay identifies its level of difficulty—introductory, intermediate, or advanced—and in-

cludes a list of keywords, a bibliography of related essays, a synopsis, and a summary. There's also a good index, so it's easy to find your way around the book according to your interests and expertise.

Collective authorship shines in this well-defined format; an intelligent beginner can reap the benefit of authoritative explanations on a wide range of products and applications. When discussing desktop publishing's number one product, PostScript, the book explains what a page description language is and how it works—complete with an effective PostScript tutorial. Another essay compares *PageMaker* and *Ventura Publisher* and shows what features are important in page layout software. Graphics issues get their due with a chapter that covers cards, standards, high resolution, and large screen displays.

Variety is also the hallmark of the essays that discuss applying the technologies. Essays on producing magazines and newsletters rub shoulders with discussions of specialty software for comics and cartooning and desktop music publishing. A chapter on forms generation software offers strategies for linking your existing paper forms with data entry screens—a tactic you don't have to be a desktop publisher to *(continues)*

appreciate. All in all, the *Desktop Publishing Bible* is a trustworthy guide to an increasingly complex field.

The Typesetting Connection



The Illustrated Handbook of Desktop Publishing and Typesetting
Michael L. Kleper
TAB Books, Blue Ridge Summit,
Pennsylvania, 1987
770 pages
\$29.95 softcover

A professor of graphic arts at the Rochester Institute of Technology in New York, Michael Kleper knows a lot about the world of type and typesetting. And he's deucedly eager to share it all. The result is a 770-page, 4½-pound "handbook," sort of a literary equivalent of COMDEX: It's full of attractions but has no obvious principle of organization to guide you in your wanderings.

The *Handbook's* unwieldiness results partly from the sheer mass and variety of information it includes and partly from the fact that Kleper appears to have different kinds of readers in mind at different times. Unlike Stockford with the *Desktop Publishing Bible*, Kleper doesn't organize the *Handbook* into sections that target specific types of readers. And some of his discussions are only marginally useful, as when he spends six pages on the outdated Radio Shack Model

100 laptop and its proprietary software.

Uneven though it is, the book excels at covering what other desktop publishing tomes neglect: the microcomputer's role as an input station for phototypesetting. The *Handbook* alerts readers to potential causes of problems (such as the difference between what your word processor produces and what typical phototypesetters can recognize) and explains hardware and software choices that can make the conversion/transfer process as efficient and trouble-free as possible.

If professional typesetting services are impractical for you, Kleper's ambitious compendium can still help. Laser-printer desktop publishing is addressed in chapter 11, itself nearly book length (200 pages). The lion's share of this chapter goes to the Macintosh, but there's an extensive survey of such PC-based products as *ClickArt Personal Publisher*, *FrontPage*, *SCLaser-Plus*, *Xerox Ventura Publisher*, and *PageMaker*. Copious detail and excellent sample screen illustrations provide a good idea of the look and feel of these programs as well as an overview of their capabilities.

If you're involved in desktop publishing or plan to be, Kleper's *Handbook* should be on your desktop, but it shouldn't be the only book you read or the first one. In any case, reading it from beginning to end is too daunting a prospect and may give you a bad case of data indigestion. The sensible thing is to keep one bookmark in the index and another in the table of contents and then browse wherever fancy takes you.

Home, Home on the ROM



The Brady Guide to CD-ROM
Laura Buddine and Elizabeth Young
Brady/Prentice Hall Press, New York, 1987
476 pages
\$19.95 softcover

Finally, a practical and comprehensive book about CD ROM. If you're a manager exploring the feasibility of a CD ROM project for your organization, Laura Buddine and Elizabeth Young have packed just about everything you need to know about this capacious new storage medium into their clear, readable, and authoritative *Brady Guide to CD-ROM*.

After a brief overview of optical storage devices, the *Guide* focuses on application development. The goal here is to help a reader decide which parts of a CD ROM project—if any—should be handled in-house and which parts should be contracted out.

The *Guide* lists 22 CD ROM service bureaus that can organize, index, and premaster your data, produce the CD ROM master tape, and supply retrieval software for a data base stored on optical disks. The *Guide* describes each of these procedures and explains how to estimate costs, how to evaluate the services offered (no two bureaus are

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the same), and the pros and cons of buying a complete turnkey service instead of an à la carte selection.

Since a 500MB disk of information is useless without an efficient method of searching it, user interface and retrieval strategy are crucial. The *Guide* helps out with a comparative, in-depth look at ten retrieval software packages available from service bureaus. Nine of these run on an IBM PC or compatible and work with all the major CD ROM drives. Buddine and Young actually tested the retrieval software with CD ROM disks. Since most vendors upgrade and enhance their products regularly, the authors emphasize that their descriptions are overviews rather than reviews.

The Brady Guide to CD-ROM gives a good idea of the medium's potential by examining some of the more interesting applications that have been developed. For example, the *Visual Dictionary* (Edition Quebec Amerique/Facts on File) integrates text, audio, and images to compare two languages. Not only can you find the correct French or English word for any element of the *Dictionary's* bit-mapped images, you also get the correct pronunciation. With *World Atlas* (DeLorme Mapping Systems), you can start with the world and zoom through 16 levels of enlargement until you get a detailed plan of an area ½-mile square.

Section II of the *Guide* will appeal primarily to techies; it's filled with detailed explanations of CD and CD-I specifications—including the High Sierra proposal for an industrywide stan-

Your first hard disk is like your first child. "You aren't going to undo your mistakes any time soon."

dard. There's an excellent index, and appendices provide brief product profiles and names and addresses of service bureaus. For people who are seriously considering CD ROM, this book is a valuable reference tool as well as a sophisticated primer.

BOOKS IN BRIEF

Hard disk users know the cautions: Don't nest directories more than two or three levels deep. Name files so you'll remember them six months from now. Organize files according to the way you really work. And so on. Joseph-David Carrabis, author of *Hard Disk Management Techniques for the IBM*, claims such advice works for your second hard disk. Your first hard disk is like your first child, he says, and "you aren't going to undo your mistakes any time soon." Carrabis's practical approach combines with a reassuring tone to help you unsnarl files and directories, write AUTOEXEC.BAT and CONFIG.SYS files, and use shells like *Windows* and *GEM*. He also reviews a passel of hard disk utilities for finding, backing up, and recovering files. A steal at \$22.95, this ex-

cellent resource also includes 100 pages of tips for optimizing installation of popular data base, spreadsheet, and desktop publishing software. Howard W. Sams & Co., Indianapolis, 1988; 447 pages, softcover.

After years of working with *AutoCAD*, you may still be daunted by the program's extensive, obstreperous data base powers. In addition to computerizing your drafting chores, *AutoCAD* can also help you store information about costs of materials, extract and organize drawing attributes, and import or export drawing files—but it won't be easy. Frederick H. Jones and Lloyd Martin's *The AutoCAD Database Book: Accessing and Managing CAD Drawing Information* can boost your *AutoCAD* productivity. One chapter details a bill of materials program (including its interface with *dBASE*); others focus on *AutoLISP* programming, extracting attributes from drawings, and using DXF files. Chapters follow a serviceable "type this, see the following response" format, and the end of the book includes a reading list, several appendices, and an index. High-priced for softcover format, the book (and its optional utilities disk) is a bargain compared with authorized training. \$39.95 (with disk \$69.95), Ventana Press, Chapel Hill, North Carolina, 1987; 331 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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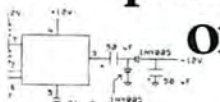
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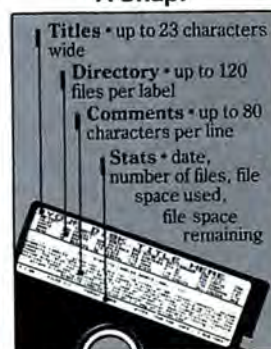
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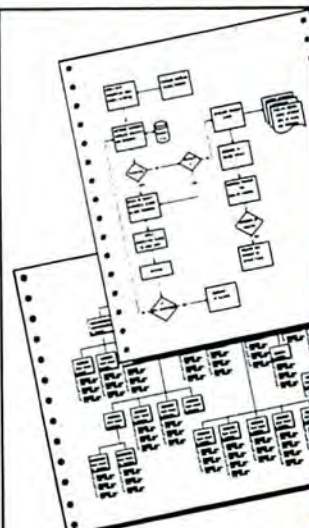
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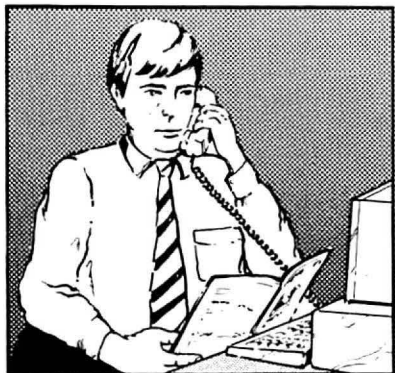
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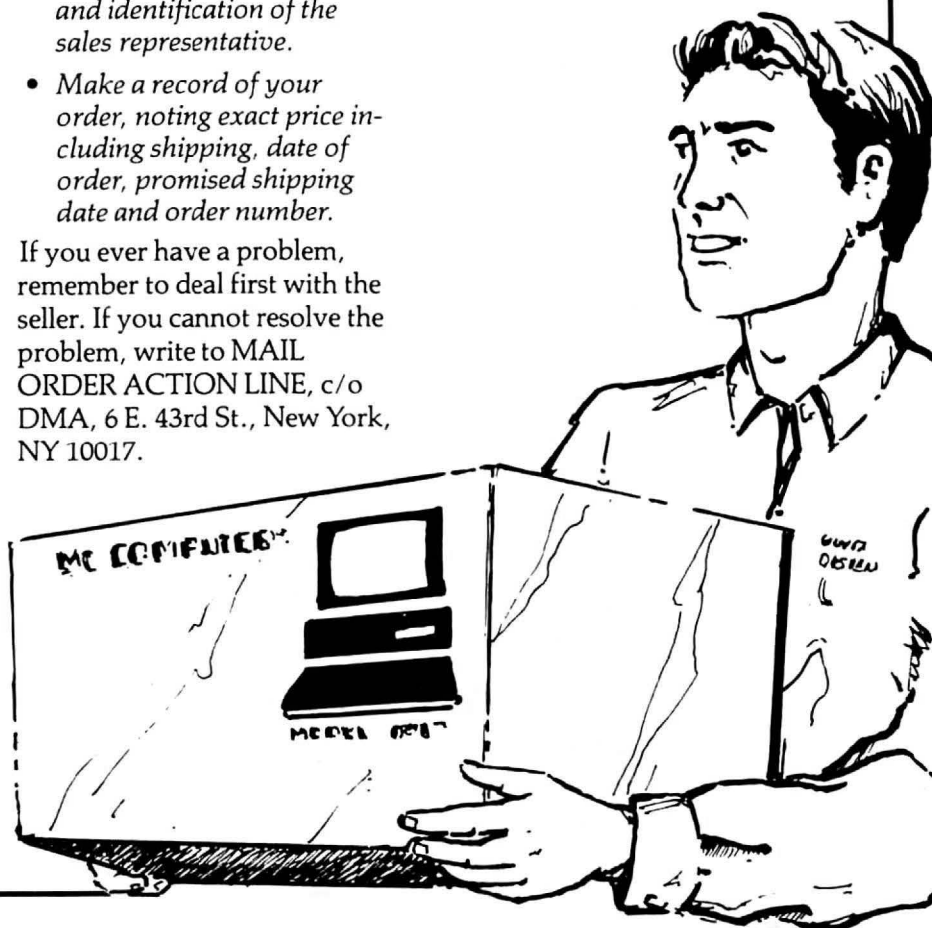
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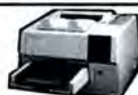
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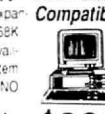
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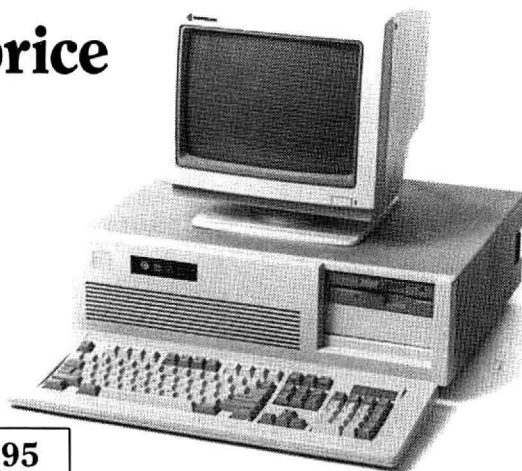


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Shareware or Greedware?



Michael
A. Covington

One of the nicest things about the PC has been the large amount of good software that you can legally obtain free of charge. But lately, this pleasant situation has deteriorated into a mess of compulsory payments and hypocritical license agreements that no one can decipher. Shareware authors today seem more interested in making a buck than in spreading the good word about computing.

In the old days, there were two kinds of software—commercial and free. Commercial software costs money, and you can't legally pass it along. But programmers have always produced free software for others.

In 1982, Andrew Fluegelman bridged the gap with shareware—a way to disseminate good programs without bankrupting programmers. His *PC-Talk* communications program was superior to many of the commercial alternatives, but payment was voluntary, and he encouraged users to distribute the program even if they hadn't paid for it.

Fluegelman conceived shareware as an implicit social contract between programmer and users. The programmer gave users the product free. In return, some made voluntary payments but, more important, all helped popularize and distribute

the product. This worked beautifully for *PC-Talk* and inspired other programs.

Naturally, shareware was copyrighted and you had to pay if you wanted technical support. Those caveats notwithstanding, the BBS's of America soon became a cornucopia of high-quality, shareable software.

Unfortunately, voluntary payments aren't good enough for the new breed of shareware authors. Much shareable software now comes with warnings that payment is compulsory. Some licenses refer to vague "trial" periods of unspecified length, and I've even heard of a data base program that suddenly refuses to run after a certain number of days if you haven't registered it.

Even more annoying are guiltware programs like *ARC*, *DOG*, and *PC-File+* that don't make payment compulsory but suggest that "your karma will never be the same" unless you send a check. Shareware authors still depend on users for word-of-mouth advertising and distribution, but now they make them pay as well.

Also, the license is an invitation to bad faith—since no one can check up on you, you're sorely tempted to disobey it. Finally,

the compulsory payment is often a nasty surprise discovered only after you've spent \$20 downloading a program long distance.

I suggest a three-pronged attack on "greedware."

First, don't use it if you don't need it.

Second, warn people in your BBS or user group about compulsory payments by putting a dollar sign next to greedware listings.

Third, give away some of your own work. I wrote *AHED* so I'd have a *WordStar*-like editor that I could give to my students with no strings attached. There are plenty of free spreadsheet templates, Pascal subroutines, and UNIX utilities on the wire.

We need more of this spirit in the PC world. The user community thrives on the free exchange of ideas, not on petty attempts to make money without incurring business expenses. ●

Michael Covington does artificial intelligence research at the University of Georgia and has written several pieces of freely distributed software.

Have a different perspective? Write Mike Hogan, Another Angle, PC World, 501 Second St., San Francisco, CA 94107.

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