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PC WORLD

SPECIAL HOW-TO ISSUE

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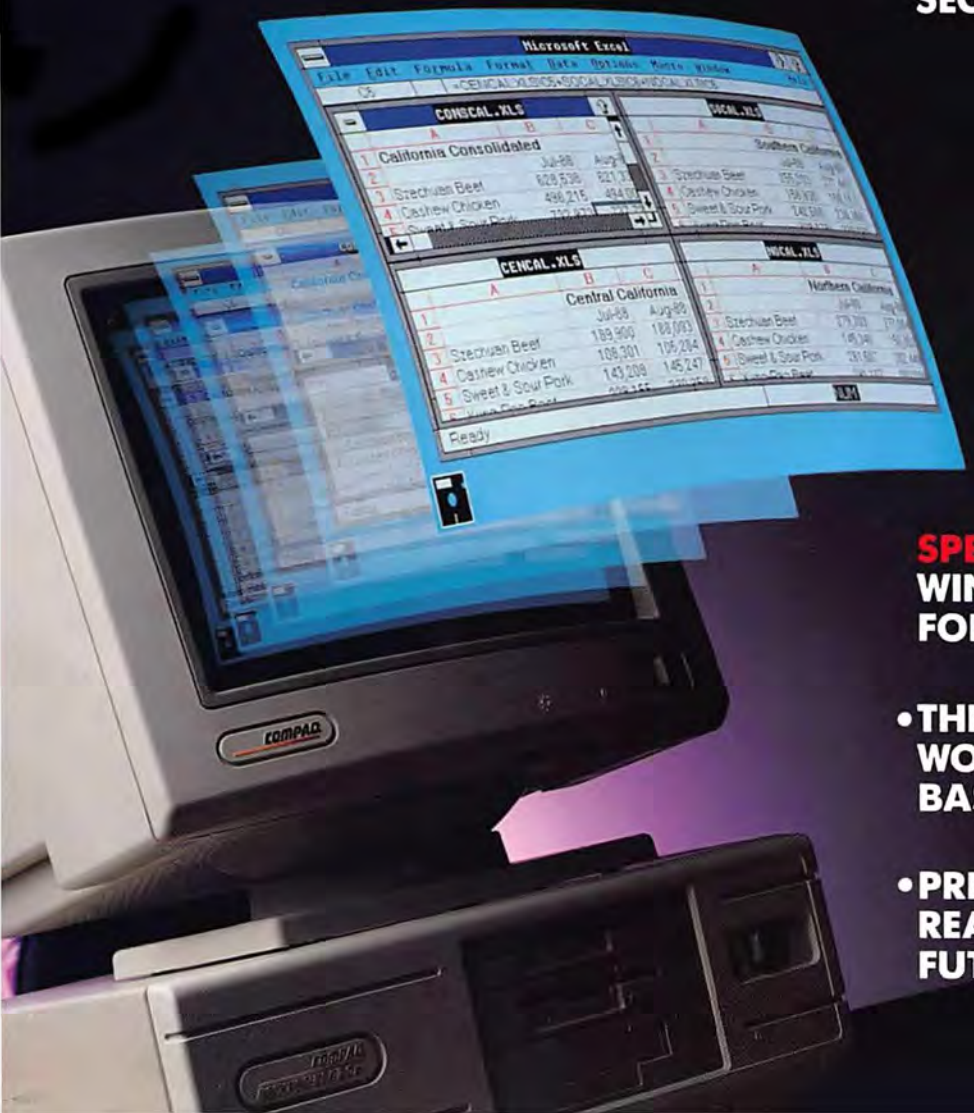

SPECIAL REPORT
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- THE LATEST SOFTWARE—WORD PROCESSING, DATA BASE, FINANCE, AND MORE
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THE NEW 25 MHz 386 SYSTEM 325.

When you need the highest possible performance of any 386, this is the technology of choice. Running at 25 MHz, the System 325 is faster than the Compaq 386/25. Besides unequaled speed, it also offers Intel's Advanced 82385 Cache Memory Controller and high performance disk drives. As a result, it gives you workstation-level performance for CAD/CAM and desktop publishing applications. It's also especially effective as a network file server, and more than capable of handling the most complex spreadsheets and databases.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 25 MHz.
- 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math 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.
- 8 industry standard expansion slots.

OPTIONS:

- 25 MHz Intel 80387 math coprocessor.
- 1 MB or 4 MB memory upgrade kit.
- 2 MB or 8 MB memory expansion board kit.

***Lease for as low as $252/Month.*

System 325	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
150 MB-18 ms ESDI	$6,999	$7,299
322 MB-18 ms ESDI	$8,999	$9,299

The Dell System 325 is an FCC Class A device, intended for business use only.

THE DELL 20 MHz 386 SYSTEM 310.

For business users who need a 386 system, this is the best combination of performance and value available. Running at 20 MHz, this 32-bit system is faster than the IBM PS/2 Model 70 and the Compaq 386/20e. Since it has the same high performance disk drives and Intel Advanced 82385 Cache Memory Controller as our System 325, it brings a new level of performance to complex spreadsheets and databases. As you might expect, it runs windowed software at extremely high speed. It's also well-suited for desktop publishing applications, or as a network file server.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math 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.
- 8 industry standard expansion slots.

OPTIONS:

- 20 MHz Intel 80387 math coprocessor.
- 1 MB or 4 MB memory upgrade kit.
- 2 MB or 8 MB memory expansion board kit.

***Lease for as low as $148/Month.*

System 310	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
40 MB-28 ms	$4,099	$4,399
90 MB-18 ms ESDI	$4,899	$5,199
150 MB-18 ms ESDI	$5,399	$5,699
322 MB-18 ms ESDI	$7,399	$7,699

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THE DELL 20 MHz 286 SYSTEM 220.

It's an 80286 system that's as fast as most 386 computers. But at less than half the price. Which means you get the best price/performance of any system. The System 220 runs at 20 MHz, with less than one wait state. It also features complete compatibility with Microsoft MS-DOS and MS OS/2, plus a remarkably small footprint. The System 220 is the ideal executive workstation.

STANDARD FEATURES:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM* expandable to 16 MB† (8 MB† on system board).
- Page mode interleaved memory architecture.
- Integrated diskette and VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- 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 integrated on system board.
- 3 full-sized industry standard expansion slots available.

OPTIONS:

- External 5.25" 1.2 MB diskette drive.
- 3.5" 1.44 MB diskette drive.
- Intel 80287 math coprocessor.
- 1 MB RAM upgrade kit.

***Lease for as low as $85/Month.*

System 220	With Monitor	
Disk Drives	VGA Mono	VGA Color Plus
One Diskette Drive	$2,299	$2,599
40 MB-29 ms Hard Disk	$2,999	$3,299
100 MB-29 ms Hard Disk	$3,799	$4,099

THE DELL 12.5 MHz SYSTEM 200.

A great value in a full-featured AT compatible. An 80286 computer running at 12.5 MHz, this computer is completely Microsoft MS-DOS and MS OS/2 compatible. The System 200 offers high speed drive options, industry standard compatible BIOS and on-site service. As Executive Computing said of this computer's predecessor, "If faster processing speed and low cost are two key issues affecting your purchase decision, this machine might be the ideal choice for your office."

STANDARD FEATURES:

- 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB† (4.6 MB† on system board).
- Socket for Intel 80287 math 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.
- 6 industry standard expansion slots.

OPTIONS:

- Intel 80287 math coprocessor.
- 512 KB RAM upgrade kit.

***Lease for as low as $99/Month.*

*PERFORMANCE ENHANCEMENTS (SYSTEMS 325, 310 AND 220):

640 KB is available for programs and data. The remaining 384 KB is reserved for use by the system to enhance performance.

†Using 1 MB SIMMs. Inquire as to availability.

System 200	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
40 MB-28 ms	$2,699	$2,999
90 MB-18 ms ESDI	$3,499	$3,799
150 MB-18 ms ESDI	$3,999	$4,299
322 MB-18 ms ESDI	$5,999	$6,299

LASER PRINTERS AND MORE.

The obvious companion for a high performance Dell system is a Dell laser or dot matrix printer. All printers come with 30-day money-back guarantee. And be sure to ask about our software offerings, which include most popular third-party applications as well as Dell Enhanced operating system software.

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Laser System 60, 6 pages per minute: $2,195.

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DOT MATRIX PRINTERS.

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Printer System 300: $199.95.

9-pin dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Parallel interface. Narrow carriage.

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Dell Enhanced Microsoft® MS-DOS® 3.3: $99.95

Dell Enhanced Microsoft MS-DOS 4.0: $119.95

(Both MS-DOS versions with disk cache and other utilities)

Dell Enhanced MS® OS/2 Standard Edition 1.0: $324.95

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800-426-5150

IN CANADA, CALL 800-387-5752

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Why You Should Consider The Dell 386 Systems, Despite Their Suspiciously Low Prices.

Our 386-based systems are priced about 35% less than comparable systems–like Compaq's.* Which may make you wonder if we've left something important out. Like high performance.

Well we haven't.

In fact, these are among the fastest 386-based systems available. With more advanced features than you'd get in systems that list for up to $3000 more.

Like Compaq's.

For instance, our 20 MHz System 310 offers you the best value available in any 386-based system. PC Magazine (6/14/88) describes it as "fast enough to burn the sand off a desert floor."

And If That Sounds Fast, Wait Till You See Our New 25 MHz 386-Based System.

At 25 MHz, our new System 325 offers you the highest possible performance in a 386. Like the System 310, it utilizes the very latest technology, including the Intel* 82385 Cache Memory Controller, advanced 32-bit architecture and high performance drives. And of course, both systems are fully IBM* PC compatible. (For more detailed specifications, see the inside pages.)

But speed isn't the only reason to buy from us. Or even the best reason.

The First Personal Computer That's Truly Personal.

Dell configures systems to your own personal specifications. After an evaluation of your needs, we'll help you select the features that are right for you. After your system unit is custom built, we'll burn-in everything, add-in boards and all, to make sure the entire system works perfectly.

Toll-Free Support And On-Site Service Included In The Price.

Every Dell system includes the Dell System Analyzer, a complete set of diagnostic tools. Which lets Dell's expert technicians resolve problems right over the phone. This toll-free support service is available from 7 AM to 7 PM (CT) every business day, at no extra charge.

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When you buy or lease from Dell, you buy directly from our manufacturing facility in Austin, Texas. Which means we eliminate dealer markups, allowing us to give you a lot more 386 for less.

This same principle is behind all the Dell systems. Review them in detail. Then call us at (800) 426-5150 to order the system that's right for you.

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PC WORLD

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- *Microsoft Windows* has been upgraded and rechristened *Windows/286*, but even at $25, it looks like window dressing to us
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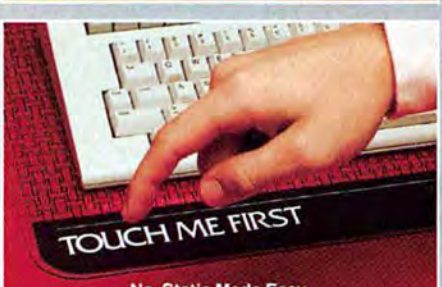

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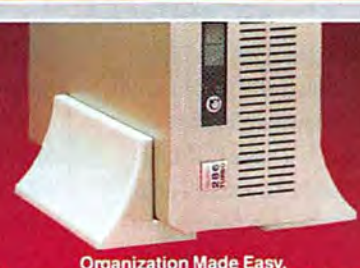

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Circle 308 on reader service card

New Year's Resolution

ROBERT CARDIN

Senior Editor Robert Luhn and Senior Associate Editor Anita Amirrezvani

It never fails. You'd give your right arm for the *1-2-3* macro you once saw in *PC World*, and all you know is that it's somewhere in that stack of magazines on your bookshelf. If that feeling is familiar, keep this issue handy—our 1988 Annual Index might save you hours of riffling through back issues. Under the direction of Senior Copy Editor Tema Goodwin, Bay Area–based Bayside Indexing Service tackled the project from the ground up. The result is an index unlike any we've produced before, a compact, cross-referenced, 10-page compendium of every review, every product announcement, every productivity tip we published last year. If you can summon up even a vague memory, you can find that elusive article in seconds.

Another *PC World* tradition gets a bit of an update this month, too. Call it a New Year's resolution if you'd like, a renewed commitment to helping you become a smarter PC user. There's certainly nothing new about the spirit behind our How To section; we've devoted countless pages to hands-on tips and techniques ever since our premiere issue, six years ago. But beginning this month, you can look forward to an expanded How To section.

Senior Associate Editor Anita Amirrezvani coordinates our how-to coverage. "We'll focus on at least four important application areas in every issue," Amirrezvani promises. This month, our lineup includes step-by-step productivity boosters for *Word* and *WordStar* users, for *1-2-3* and *Excel* spreadsheet jockeys, for LaserJet owners, and for anyone who's been baffled by the Hayes AT command set. If you can't find a useful tip in this issue, you probably don't own a PC.

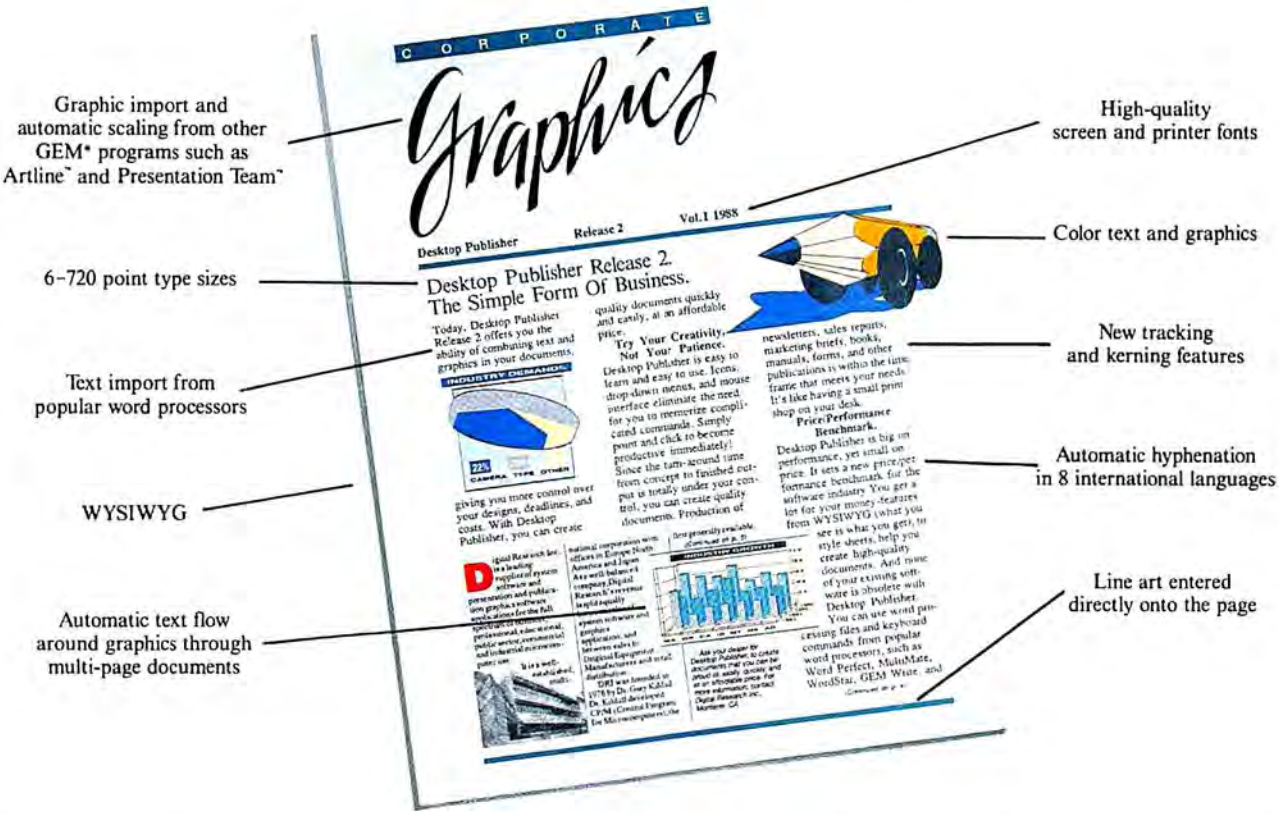
Our encore *Windows* Special Report has a new look, too. Senior Editor Robert Luhn, who's been a *Windows* observer since Microsoft first announced its plans to develop a graphics-based user interface, put together our magazine-within-a-magazine. (For more on this Special Report, be sure to read Richard Landry's column.)

Also in this issue: When was the last time you backed up your hard disk? Contributing Editor Art Wilcox ("Fast Floppy Backup") reviews a handful of programs that promise to take the tedium out of your backup routine. And don't even think about investing in expanded memory until you've read our Buyers' Guide to EMS 4.0 memory boards. ●

Ed Bott

Ed Bott
Managing Editor

All It Takes To Make The News.



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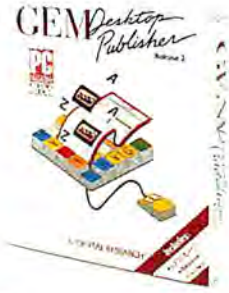

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Circle 266 on reader service card

One solution to three

The new IBM PS/2 Model 30 286.

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Affordability

The new Model 30 286 comes with many standard features that are optional on other systems in its class. For example, dazzling VGA graphics, as well as printer, communications, and mouse ports are all built into the system, so option slots are free for other uses. You also get a performance-boosting disk cache to help "turbo-charge" some of your applications.

And, of course, you get PS/2 quality and reliability, which helps make short work of your long-term decision.

One other small feature comes standard, too. The Model 30 286 costs less than you might expect, which makes it an affordable choice for everyone.

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The new Model 30 286 runs most of the DOS applications you use today, like Lotus 1-2-3,® Display Write,™ Microsoft® Works and dBase.® It accepts a variety of PC AT® expansion cards, and like the other entry level PS/2 models, many PC and PC XT™ cards as well.

Yet the Model 30 286 fits right in with the rest of the PS/2 family. It can communicate with the most advanced personal systems and can be configured to run IBM's OS/2™ versions 1.1.

For complete details about the Model 30 286 or any of the more advanced members of the PS/2 family, contact your IBM Authorized Dealer or IBM Marketing Representative. For a dealer near you, call 1-800-IBM-2468, ext. 101. You'll find that the new Model 30 286 is an investment that's *right for today, ready for tomorrow.*

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Mike Hogan

Brier Shows 20MB-Plus Floppy

Start-Up Targets Winchesters With a Drive That Can Read Standard Disks

A floppy disk drive that can fit 40MB of data onto a standard 3½-inch floppy has been announced by Brier Technology. At the COMDEX Fall show, the two-year-old San Jose firm demonstrated a version of its Flextra drive that can hold 21.4MB on a formatted disk and expects to ship versions that hold 40MB by the end of the quarter. The drive's 35ms average access time is on a par with most hard disks'. Brier expects the 3½-inch drive to retail for between $500 and $800, depending on whether it is sold as an add-in or a subsystem. The Flextra differs from previous high-capacity floppy drives in both the amount of data that it stores and its ability to read data from standard 720K and 1.44MB floppies. Brier boosts capacity by using its Run Length Limited encoding scheme and by magnetically adding another "layer" to the disk media to store servo signal/track location information. Also, outside tracks on a Flextra-encoded floppy incorporate extra sectors. In addition to the Flextra's obvious benefits for laptops, its speed, data security, and relatively low price will make it competitive with desktop Winchesters, maintains Leland Strange, president of principal Brier investor Intelligent Systems. Anticipating strong competition from Japanese drive makers, Strange will try to create a standard by licensing both the drive and the floppy-encoding technique to as many U.S. manufacturers as possible, including Intelligent Systems companies Quadram and Datavue. Strange expects to see both media and drives on store shelves by summer.

IBM Shows Off MCA

Answers Critics by Flexing Multiprocessor Muscle at COMDEX

Stung by criticism over the lack of PS/2 add-on products that exploit the Micro Channel Architecture (MCA), IBM displayed a "wall of cards" at COMDEX Fall that demonstrated many of MCA's value-added capabilities. "You read or hear people talk about there not being much available on the Micro Channel," notes Dick Gough, manager of IBM's personal systems product line evaluation, "but we think that 600 cards from more than 250 different vendors illustrates that this isn't true." IBM's exhibit included several MCA multiprocessor "technology demonstrations." One illustrated how a Token-Ring busmaster on a PS/2 Model 50 demands less CPU overhead and provides greater throughput than a comparably equipped Industry Standard Architecture 80286 system. IBM also demonstrated communications between three Model 80s equipped with nine hard disks. Another display highlighted simultaneous processes, with a PS/2 Model 60's 80286 running one PC application while two RISC busmaster cards worked together on UNIX applications. In yet another demonstration, a Model 50 ran one application while two virtual-mode applications were conducted in the MicroMaster 386, an AOX 80386 processor busmaster. However, since not even OS/2 can arbitrate interprocess communications between Intel CPUs, none of the multiprocessor demonstrations involved cooperative processing of DOS or OS/2 applications.

PC-File Updated

Shareware File Manager Gets dBASE Compatibility and a Pseudocompiler

ButtonWare has released a *dBASE*-compatible version of its $69 data base manager, *PC-File+*, and plans to ship a pseudocompiler for the product in the first quarter. The $89 *PC-File:dB*, introduced at COMDEX Fall, accepts *dBASE III Plus* .DBF, .NDX, and .DBT memo files and provides record locking for Novell, 3Com, and other NetBIOS-compatible networks. The package also offers improved graphics and the ability to store up to 1 billion records with larger field sizes. In addition, the Bellevue, Washington, software house plans an $89 pseudocompiler that will enable in-house developers to produce *PC-File:dB* applications that are unalterable by users and run faster than interpreted versions, though still slower than true native-mode .EXE files. *J.Base* will include a compiler and editor for creating applications, as well as a run-time module that can be copied and freely distributed among work-group members who can use it to execute those applications. *J.Base* was originally intended as a response to requests from some of the 500,000 registered *PC-File* users for a full relational language for application development, says President Jim Button. He decided instead to go with the industry-standard *dBASE* and simply provide the facility for creating shared applications.

AST Recasts 386 Products

Aggressively Priced Systems Boost Performance

AST Research launched phase two of its entry into the systems business this fall with a trio of 80386-based machines that round out its product line. The Irvine, California, supplier replaced its current 20-MHz Premium/386 line with models featuring a cached-memory scheme much like that offered by Compaq. An aggressive competitor whose 80286 technology is on a par with that of Compaq and IBM, AST has tried lately to charge the kind of premium prices that only those firms can command. But the new memory-cached Premium/386C line, which replaces all but one of AST's Premium/386 models, sports prices 10 to 21 percent below the old models', despite a 10 to 30 percent performance increase. "We want to make it clear to our resellers that we will stay 10 to 15 percent below Compaq and IBM and will restructure margins so that our dealers can make more by selling AST," asserts Product Manager Larry Fortmuller. The Premium/386C line includes models with up to 320MB of storage, equipped with 64K of 25ns, static-column, read/write cache memory. Premium 386/25 models feature a processor card with a 25-MHz 386 chip, an Intel 82385 cache controller, and up to 4MB of 32-bit memory. The system is designed for expandability and for use as a Xenix-based multiuser machine; it accommodates another 32MB of main memory on 32-bit memory cards. The Premium Workstation/386SX is AST's entry-level 386 machine—equipped with a 16-MHz Intel 80386SX, 32K of read/write cache, and 1MB of memory expandable to 16MB (6MB on the motherboard). The 40MB Model 45 costs $4195, compared to $5199 for the equivalent Compaq machine, the Deskpro 386S.

Plus Yields Impulse

Medium-Capacity Network Hard Drive Features Speeds Previously Found Only in Larger Drives

In February, Plus Development will explore another niche in the hard disk market by shipping a fast new drive targeted for network file servers. Plus Impulse will offer users either 40MB or 80MB of storage with an average access time of 12ms—a speed previously available only on drives twice as large. Plus product manager Bobby Lent cites International Data Corporation research indicating that the average network supports just over seven users, each of whom needs only about 10MB of storage. But in order to get sub-25ms speed, network users have had to buy 150MB to 300MB drives—although IDC estimates that the average net won't require 150MB before 1992. Plus has designed Impulse with its own on-board controller, so that up to 16 devices can be connected to a single network adapter card for incremental expansion. Each drive has a data transfer rate of 4MB per second in burst mode, thanks to the inclusion of a 64K disk cache. The Impulse is inappropriate for transaction-oriented applications that require more than 80MB of contiguous storage, but Lent maintains that such jobs account for less than 10 percent of the net market. Plus maximizes Impulse's performance by dedicating individual drives to separate applications and letting all users access them in distributed net fashion rather than having to line up for sequential seeks through a single drive controller. The 3½-inch disk comes with a mounting kit for a 5¼-inch form factor; the 40MB kit sells for $995 and the 80MB kit for $1379.

First V.42 Modems Arrive

Hayes, Microcom Agree on High-Speed Protocol

Hayes Microcomputer Products has released V.42 and X.25 modems, along with corresponding protocol enhancements for its V-series dial-up PC modems. The Norcross, Georgia, firm is the first to offer a V.42 modem, whose error-correction standard is a CCITT-endorsed compromise between Hayes and rival Microcom over high-speed modem protocols. Hayes's implementation of V.42 makes it backward-compatible with the V-series line as well as with Microcom's MNP protocols, levels 2 through 4. The V-series X.25 is designed for use with X.25 packet-switched networks and provides four simultaneous multiple sessions and point-to-multipoint communications. Shipping concurrently, versions 1.1 of Smartcom II and III support the new protocols. Smartcom III 1.1 permits four simultaneous connections. Both new modems retail for $899 for 2400-bps and $1299 for 9600-bps versions; V-series owners can upgrade to one or the other protocol for $50.

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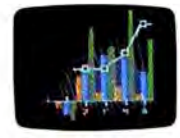

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Intel Provides Visual Edge

Laser Printer Add-On Turns Output Into Halftone-Quality Images

Intel Personal Computer Enhancement Operation (PCEO) in Hillsboro, Oregon, has introduced a laser printer board/software combination that both enhances resolution by 300 percent and speeds graphics output dramatically. Depending on the image, Visual Edge will increase print speed 200 to 600 percent and can produce halftone-quality images on a LaserJet Series II. Text is not affected by the adapter, so font usage will remain unchanged. A Visual Edge adapter in the PC separates out graphics images and reduces them to series of dots (much like a photographic halftone), which can be manipulated to simulate up to 64 shades of gray before being sent to a similar adapter in the video port of the LaserJet Series II. Visual Edge controls the laser beam to lay down a dot smaller than 1/300 of an inch, can group three times more dots than the standard 300-dpi printer, and can produce 64 shades of gray at a resolution of 70 lines per inch instead of the standard 19 lines. Applications must be written to the public domain Intel Image Processing Interface (IPI) specification, currently supported by the LaserJet drivers in Aldus's *PageMaker*, Xerox's *Ventura Publisher*, and Z-Soft's *PC Paintbrush*, among others. Visual Edge retails for $695 and requires 1MB to 4MB of expanded memory, depending on the amount of graphics involved.

Dac Markets for PCSG

Dallas Companies Split R&D, Marketing Functions

In an offbeat corporate pairing, accounting maverick Dac Software will take over all the marketing, distribution, and administrative functions for fellow Dallas-based company Personal Computer Support Group. This is more than a single-product joint-marketing agreement, but not an outright takeover of PCSG by Dac, emphasizes Dac chief executive Kevin Howe. Dac will now market PCSG's *Lucid 3-D* spreadsheet, *Lightning* disk-speedup software, and Breakthru 286 accelerator board through the more than 8000 dealers that carry other Dac products, while PCSG founders Sam Redman and Michael Stanford focus on new hardware and software products for the venture. Seventeen PCSG sales, support, and administrative employees will join Dac, which itself was bought by Fortune 500 conglomerate Insilco last year. Both Dac and PCSG will fund their activities out of the divided revenues of the venture but would not disclose details. The first products of the corporate engagement are *Lucid 3-D Plus*, a $199.95 version of *Lucid 3-D*, whose $149.95 price drops to $99.95; and Breakthru 386, an 80386 version of Breakthru 286. Both products are scheduled to ship in the first quarter. If the alliance works, Redman and Howe predict that many other small, development-oriented firms like PCSG will seek this kind of partnership. PCSG's annual sales are around $6 million, Dac's around $16 million.

Novell Expands Networks

LAN Leader Enhances Distributed Processing With High-Capacity SNA Gateway, SQL Engine

Novell has added two more pieces to its distributed processing strategy by demonstrating a high-capacity IBM SNA gateway and a SQL engine at COMDEX Fall. Novell was showing 50 workstations connected to a mainframe through the 56-kilobit link of its Netware SNA. Nancy Woodward, vice president and general manager for development products, maintains that Netware SNA responds to complaints from SNA gateway users about connection reliability, communication timing, data transfer speed, and difficult installation. Netware SNA requires a gateway card only in the server rather than in every net workstation. The $595 entry-level version handles up to 16 concurrent sessions. A $2995 full-featured version supports 128 simultaneous sessions on up to 97 nodes, each of which can run as many as 5 concurrent sessions. A single $995 copy of the Netware 3270 LAN workstation software is necessary for gateway access. All products will ship in the first quarter. Novell also demonstrated its ANSI-compatible Netware SQL, which shipped in December with support from WordTech's *DBXL* (a *dBASE* clone) and *Quicksilver* compiler. The Netware SQL engine is a back-end processor that can be accessed by front-end applications such as *DBXL* on Novell net workstations. Priced at $595 per server, it is optimized for the Netware operating environment and Btrieve development tools. Woodward indicated that Lotus's *1-2-3* release 3 and Borland's *Paradox* will also support the engine in the future. ●

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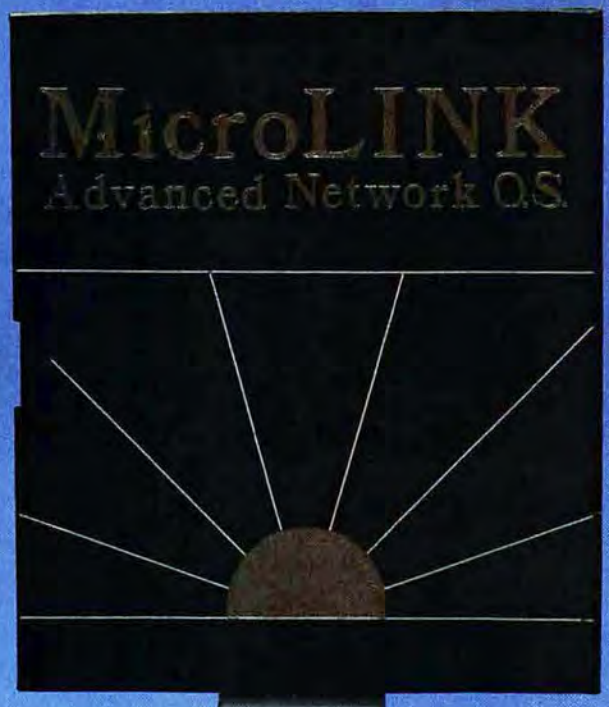

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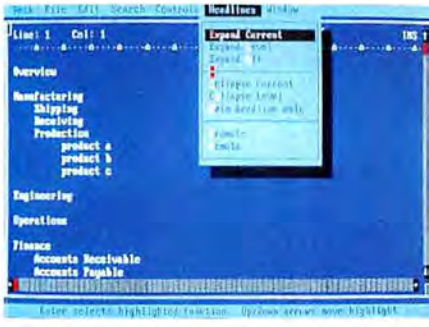

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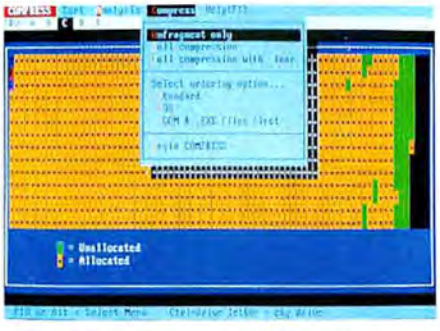

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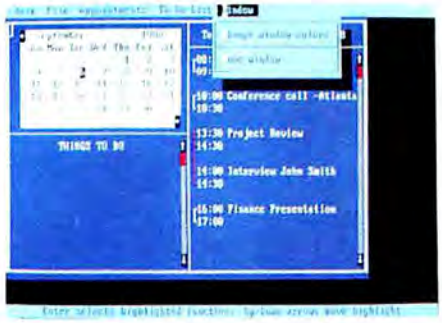

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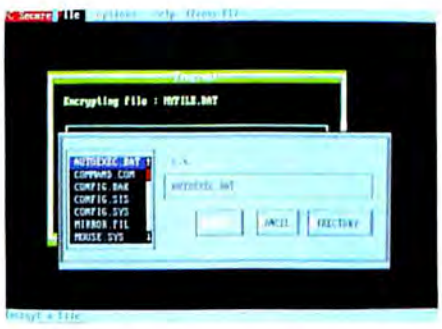

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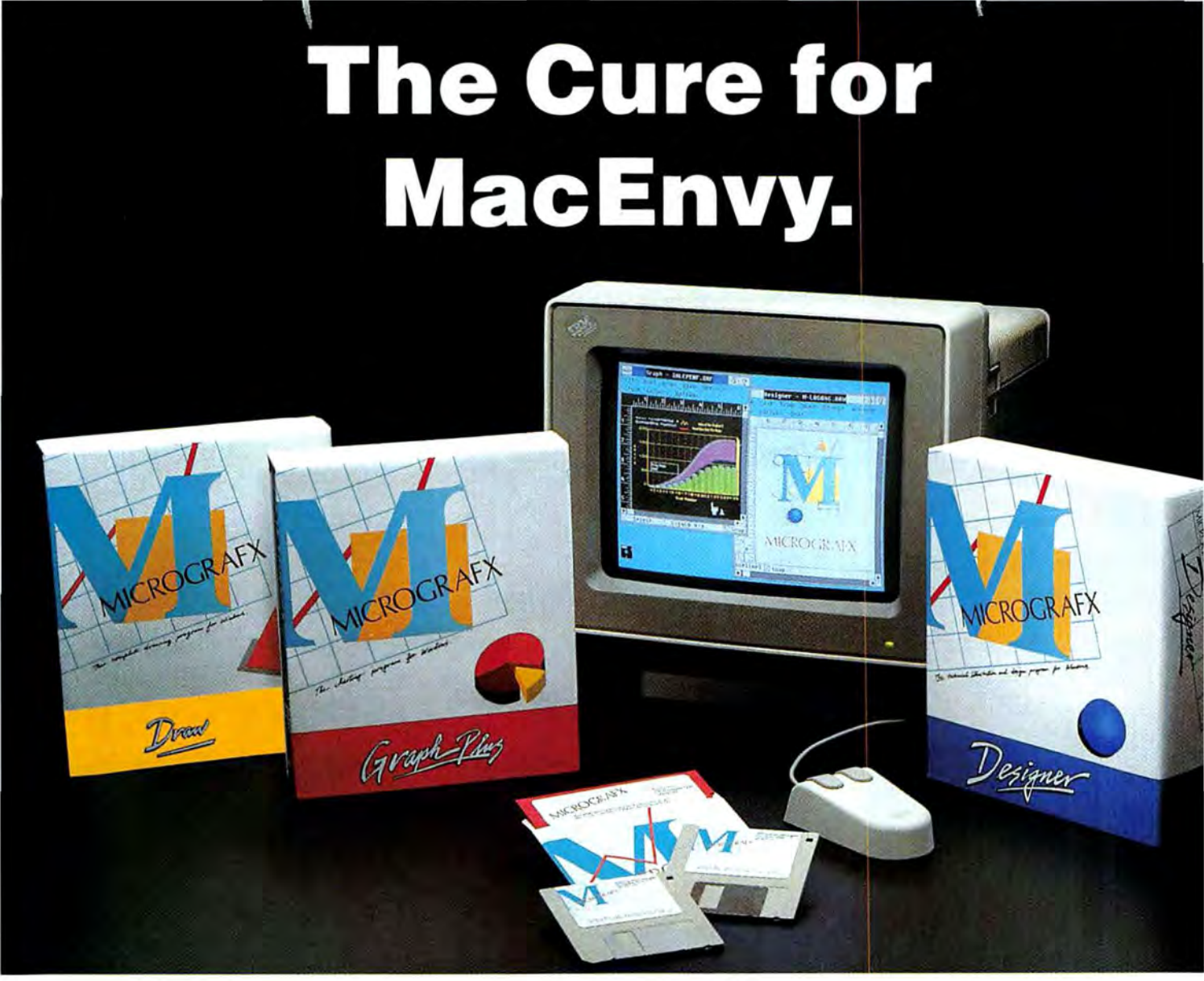

For years PC users have been conditioned to think of their computers in certain terms. Dependable. Versatile. Dull. To get superior graphics, some claimed that you need a different type of computer altogether. They said *their* computer was everything the PC wasn't. Easy to use. Graphically exciting.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

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Where's the PC Payoff?

When will PCs bring the big productivity boost they promise?

When we start caring as much about productivity as we do about power.

Richard Landry

HELO STAVSON

Here are some shocking statistics: According to a study conducted by the research firm Nolan, Norton & Company, the cost of owning a business PC more than doubled between 1984 and 1987, from $7500 to $18,000 per year. Yet despite this huge jump in costs, companies experienced a flat 10 percent return on their PC investment throughout the same period.

These numbers may not convince you to melt down your PCs for scrap iron, but they should make you wonder what kind of business investment personal computers really are. Of the $18,000 that companies spend per PC each year, only 28 percent goes to hardware and software. Fully 70 percent goes to training and support. With so much money devoted to PC productivity, you'd expect it to foster a highly trained, versatile work force. But the Nolan, Norton study also confirms that most employees use only one or two software packages regularly.

Now that OS/2 with Presentation Manager has finally made the scene, it's a good time to ask what the next generation of software is going to give users that the last generation has not. Industry insiders answer by pointing to the multitasking power of OS/2 and the Presentation Manager's power to integrate data from multiple applications. But maybe power isn't the key issue after all. If next-generation software were truly capable of answering the questions posed by the Nolan, Norton study, then first and foremost it would drive down the cost of support while driving up the skill level of users.

Getting greater productivity from PCs at lower cost is going to be the single most important issue of 1989—important enough that it could well determine the success or failure of OS/2 with Presentation Manager. That's why *PC World* will be tracking this issue in two ways.

First, beginning this month we'll be expanding our series of *Windows* Special Reports. With investment in PCs already at the choke point, businesses will decide to upgrade to OS/2 only if the new software creates more powerful users, not just more powerful systems. The Presentation Manager provides the

(continues)

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The 286/14 is also powered by an Intel 80286 CPU, but operates at 14 MHz (with zero wait states) for even faster performance. It, too, comes equipped with 1024KB memory, 1.2MB floppy disk drive, serial/parallel/game ports and a 101-key keyboard. No doubt about it — it's a hot machine and a dream to fly!

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underlying power that developers need to create intuitive software. It also has some rudimentary building blocks that enable programs from competing vendors to work together. And as corporate experience with the Macintosh clearly indicates, a standard interface based on a rich visual language significantly cuts learning time and encourages users to learn multiple software applications. But a standard interface won't do anything to make a poorly designed program easy to learn and powerful to use. It won't stop vendors from closing off their software to competitors. And it won't improve the quality of documentation or magically deliver good on-line help.

Many of you won't be able to run OS/2 software without significantly upgrading your office systems, but most of you do have the horsepower to run *Windows* applications. As our review in this month's *Software Shelf* demonstrates, we're not convinced that the *Windows* environment is yet ready for prime time. There's a lot Microsoft can and should do to provide an easy-to-use platform for productivity-enhancing applications. But a number of programs are emerging, such as *Ami* and *CFO Advisor*, that take advantage of the environment's features and overcome its limitations. We want to see more such applications, and in future *Windows* Special Reports we'll be covering them for you as they appear.

Second, we believe that training costs will go down and stay down only when users master the products they know and use, so they can do more with what they already have. That's why with this issue we're increasing our how-to coverage with a new section devoted to tips and techniques to help you build your skills in the major business application areas. You should find a lot of useful information there to help you train your fellow workers.

Except when it comes to PCs, nobody in the business world can justify skyrocketing expenses for a project that yields a consistently low rate of return. And guess what—that time's about to end for PCs. If there's going to be a next generation in software, it'll have to be founded on concepts that respect the human and financial resources we devote to it.

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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Rex Farrance
Assistant Editor

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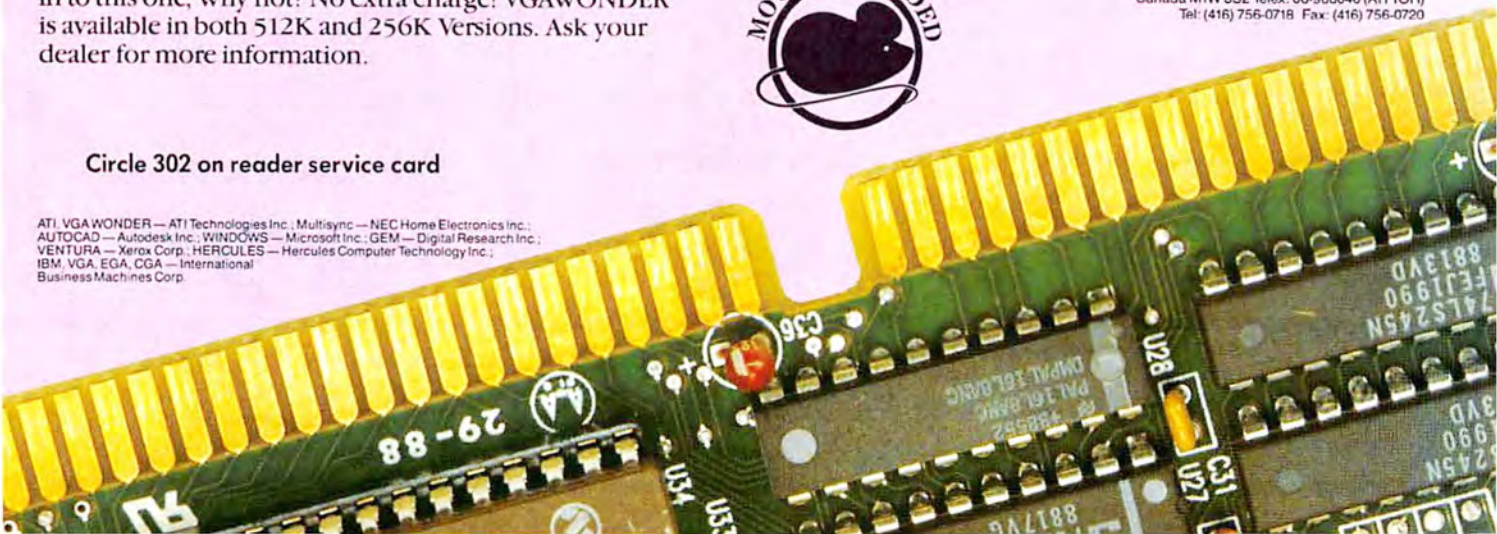

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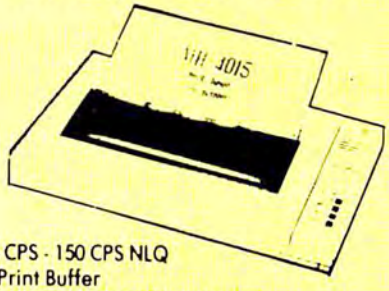

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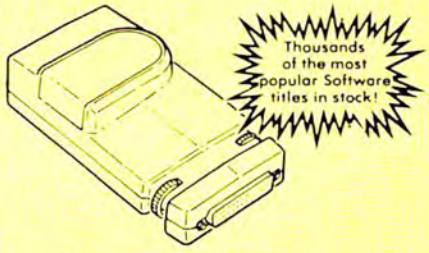

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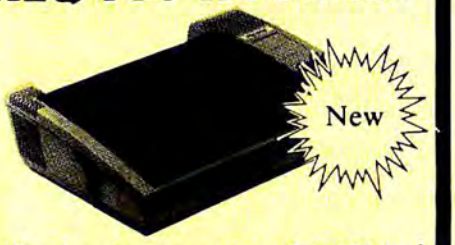

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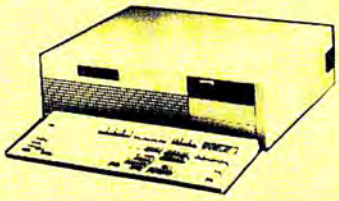

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S I G M A D E S I G N S

LETTERS

Reactions and responses from the PC World community

World Class Whoops

In reading "World Class Awards—The Readers' Choice" [*PCW*, October 1988], I noticed with dismay that you listed *WordStar 4.0* as having 4 percent of the votes (fourth place) and *WordStar Professional* 4 percent (fifth place). *WordStar 4.0* should have been given 8 percent of the votes (taking third place ahead of *PFS: Professional Write*) because it is the same product as *WordStar Professional.*

Richard C. Belthoff, Jr.
Charlotte, North Carolina

Imagine our chagrin. Our apologies to MicroPro and the short-lived bronze medalist, Software Publishing. —Ed.

And It Doubles as a Life Preserver

John Diebold's GridCase 1520 review (*The Hardware Shelf, PCW*, September 1988) contains several misconceptions. First and foremost, Mr. Diebold's claim that the Grid's long case makes it ill-suited for use on an airplane reveals that he didn't do any in-flight testing. In fact, its short, centrally mounted screen makes it much easier to fit on a tray table. Just try opening one of those clamshell computers when the passenger seat in front of you is fully reclined.

As for battery life, the Grid's standard 12-volt camcorder batteries are relatively cheap and widely available, if short-lived. With a couple of extra batteries in my briefcase, I have computed all the way across the Atlantic with my Grid.

Finally, the Grid's display supports a 640 by 400 AT&T-compatible mode, in addition to CGA modes. Run *Ventura Publisher* if you don't believe me.

Robert B. K. Dewar
New York, New York

Unaccounted Features

I just finished reading Ralph Soucie's accounting software review ["Accounting Software: Good for Business," *PCW*, September 1988], and I'm happy to see *Accpac BPI* hold its own against two products that are nearly twice the price. However, Mr. Soucie omits or misunderstands a number of key program features and operations. For example, the features table shows incorrectly that *BPI* lacks a password function when in fact <Alt>-<F2> lets you install password access to any module or any command on any menu. The table also says that BPI doesn't permit recurring invoices, but it does, via its automatic charge feature. Contrary

(continues)

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to the article, *BPI*'s batch processing is not optional. Entries to all journals (other than the general ledger) are batched, and any batch may be saved and reviewed on screen prior to posting. Also, *BPI* allows ten description lines of 40 characters each in its journals, not the 10-character lines described in the article. Another important function Mr. Soucie missed is the program's suspend feature, which, like *Solomon III*'s Quick Maintenance feature, lets users leave one task and move to another without losing their place or previous work.

BPI permits ten open periods at once, giving the user a great deal more flexibility than Mr. Soucie implies.

Finally, the $395 LAN Pak module was omitted from the Where to Buy listing at the end of the review.

Sharon L. Grimshaw
Product Champion
Accpac BPI

Ms. Grimshaw is correct on some but not all counts. BPI *does have operation-level password protection, something I omitted from the piece because I found no reference to it in the product's documentation.*

As for recurring invoices, BPI *doesn't allow the user to specify the number of times an item is billed or its billing frequency, so I judged* BPI's *automatic charge feature not equivalent to* RealWorld's *or* Solomon III's. *However,* BPI *should have received credit for its recurring invoice capability in a footnote.*

Ms. Grimshaw is correct about the ten-line journal entries, but my statements regarding batch processing in the General Ledger referred specifically to that module in each of the reviewed programs.

Besides a general-purpose Suspend function, Solomon III *offers quick maintenance of vendor and customer master files—a separate method that's more efficient than suspending. And although ten open periods provide enough flexibility for most users,* RealWorld's *all-periods-open design gives it a legitimate edge, albeit a slight one, over* BPI. *—Ralph Soucie*

Emulation Frustration

Your remote communications software review ["Remote Assistance," *PCW*, October 1988] states that *Close-Up* users can "even dial up the office PC to access the company's minicomputer or mainframe." This is misleading. I tried to use *Close-Up* version 3.0A on two PS/2 Model 60s running IBM PC 3270 emulation on a Token-Ring LAN. *Close-Up* couldn't handle the hot key toggle, while *Carbon Copy Plus 5.0* could. When I called Norton-Lambert for help, they informed me that what I had experienced was a *software bug.*

Kevin Pendergast
Chicago, Illinois

Norton-Lambert informs us that although Close-Up *works with most of the 3270 emulation software on the market, it isn't fully compatible with the IBM 3270 program you were using. Specifically, toggling in and out of 3270 mode can only be done from the* Close-Up *customer program and won't work when attempted in the support program. The company claims it is working with IBM to solve the problem, and a fix will be available to all its customers as soon as possible. —Ed.*

Squeak-Off Squawk

I read with interest Jim Heid's PS/2 mouse review [*The Hardware Shelf, PCW*, September 1988] and was impressed with his ability to keep the bad puns to a minimum. Apparently, in the interest of seeming fair, he felt it necessary to say something negative about the Microsoft Mouse, claiming it used a "cigarette pack–size" adapter. I don't know what kind of cigarettes Mr. Heid smokes, but they must come in an awfully small package (approximately ¾ by ¾ by 3½ inches). Keep up the good work!

Patrick Huber
Tamarac, Florida

Just Rope, Tie, and Brand 'Em

Judging by his piece on user groups in *Consumer Watch* *(continues)*

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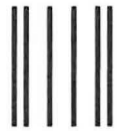

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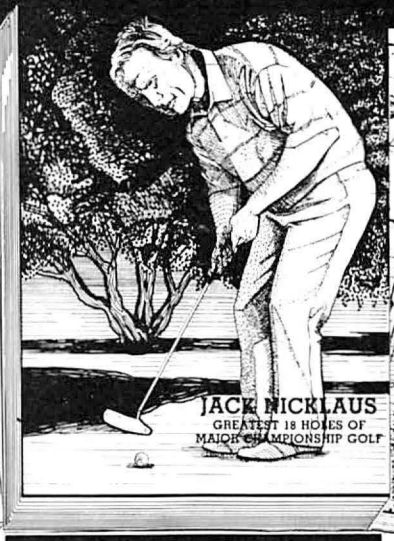

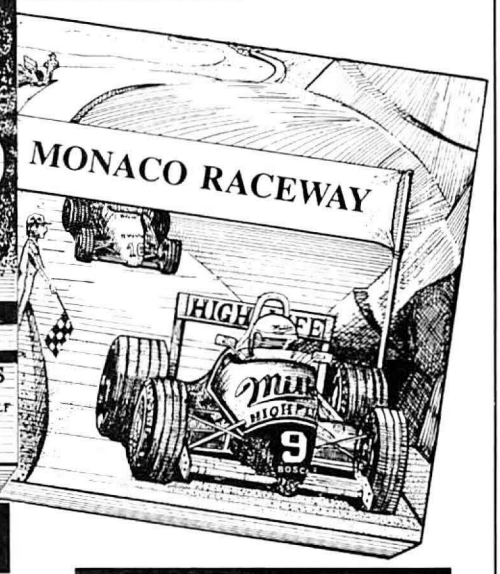

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[*PCW*, October 1988], Assistant Editor Wes Nihei is living in a dream world. In fact, he has a condo there.

I've attended many a user group meeting and have read dozens of group newsletters. Most groups are populated by hardware freaks who want to impress you with how durn smart they are, and how much better their Turbo Baloney II hardware is than the pathetic and overpriced thing you just squandered your savings on. One cordial group offered to help a friend of mine fix a problem with his newly purchased computer—for $50 an hour. He decided to figure it out himself.

In trying to present a roundup of user group facts, Mr. Nihei has merely corralled a bunch of strays that bear some suspicious brands on their hides.

Howard Decker
Panorama City, California

Blame It on Entropy

I enjoy using many of the tips and programs published in columns like *Star-Dot-Star* and *Help Screen*. However, I occasionally must correct a program or batch file before it will operate properly. The most recent example: the excellent set of mail merge shortcuts put forward by Paul Tempke [*Star-Dot-Star*, *PCW*, October 1988].

Line 10 of LISTING 1 on page 242 is missing a second pass through the filter, without which PADD.TXT will contain two extra lines, fouling up the addressing. Line 10 should read:

find "%1" ADDRESS.PAD | find "%1" >PADD.TXT

To quote my favorite error message: "Congratulations, only one fatal error!"

William B. Shook
Columbus, Ohio

Power Tips Comes of Age

I find lots of useful information in *PC World*, especially in your new Power Tips. However, Power Tip No. 12 [*PCW*, October 1988, page 22] contains an error. *Microsoft Word* does capitalize text—just select the text, go to the Format Character menu, and select 'yes' on the Uppercase option. *Word* can't change capitalized text to lowercase,

(continues)

SOUNDS FISHY!

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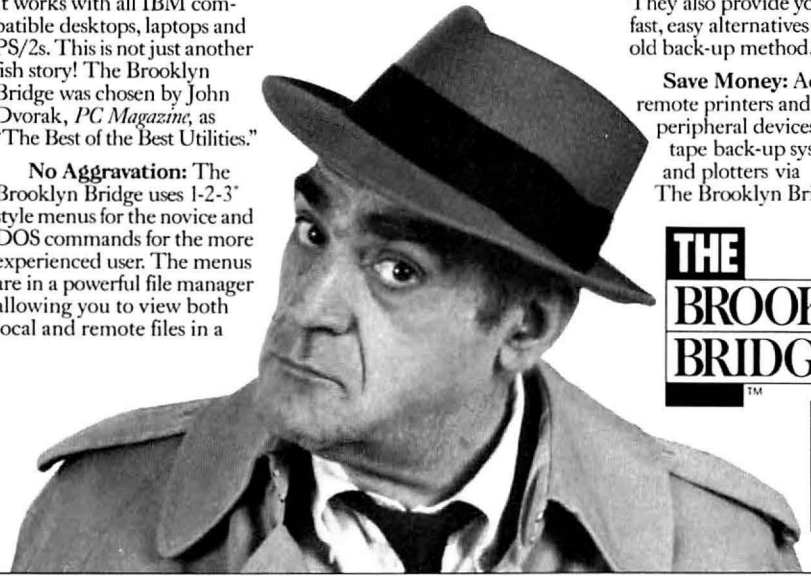

User Choice: The Brooklyn Bridge even gives you a powerful DOS utility package. These utilities let you work with multiple files on a single command line. They also provide you with fast, easy alternatives to the old back-up method.

Save Money: Access remote printers and other peripheral devices like tape back-up systems and plotters via The Brooklyn Bridge.

Save Time: Run tedious chores on your remote computer through The Brooklyn Bridge which equips you with dual independent processing power.

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Circle 47 on reader service card

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.

Circle 26 on reader service card

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.

The latest member of the HP LaserJet printer family prints on both sides of the paper. But that's just the icing on the cake.

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All good reasons to call **1-800-752-0900, Ext. 297A** for the name of your nearest dealer.

HEWLETT PACKARD

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Circle 26 on reader service card

though, a feature I wish it had.

E. John Whelan
Sacramento, California

Senior Editor Robert Luhn has been remanded to the custody of Microsoft support personnel, where he will be forced to memorize the Word *reference guide. By the way,* Word *will convert any combination of upper- and lowercase letters to all uppercase using the above technique. But if you initially entered the text in all caps,* Word *won't mess with it. Go figure. —Ed.*

Clarifications and Corrections

Encyclopaedia Brittanica, Inc. informs us that the on-line version of the *Encyclopaedia Brittanica* described in "Buyers' Guide: On-Line Services and Data Bases" (*PCW,* October 1988) is no longer available. The agreement between that company and Mead Data Central, publisher of Nexis, expired in August 1988, and the encyclopedia was removed from Nexis. The companies currently have no intentions of renewing the agreement.

In "Remote Assistance" (*PCW,* October 1988), Judy Getts criticized *Carbon Copy Plus* for being "the most expensive product reviewed." That honor actually belongs to *Close-Up,* whose modules sell for $245 (support) and $195 (customer). *Carbon Copy*'s modules sell for $195 apiece.

An item on page 96 of October's *Product Outlook* confused *R:base for DOS Runtime* with the as-yet-unreleased *R:base*

(continues)

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Circle 176 on reader service card

Compiler. Runtime allows an application written with *R:base*'s built-in command language to run without the presence of the full *R:base* product. Developers typically include *Runtime* with the proprietary *R:base* applications they sell to clients.

R:base Compiler is a "true" compiler that turns an application written in *R:base*'s command language into a stand-alone executable program file. Users won't need any additional software; better yet, compiled applications will run significantly faster. Microrim notes that *R:base Compiler* will retail for $895.

On page 102 of the same issue, *Product Outlook* mistakenly reported that registered owners of previous versions of Borland's Turbo Prolog 2.0 could upgrade to the new one for free. In fact, the upgrade costs $64.95, with an additional $5 shipping charge. *PC World* regrets the errors.

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

POWER TIP NO. 27

Sneaky Deletions in Word

Delete text in Microsoft Word, and the program stores it in Scrap for later recall. When you want to make a deletion without disturbing the contents of the Scrap, select the text you want deleted and press <Shift>-<Delete>.

Susan Mora
San Diego, California

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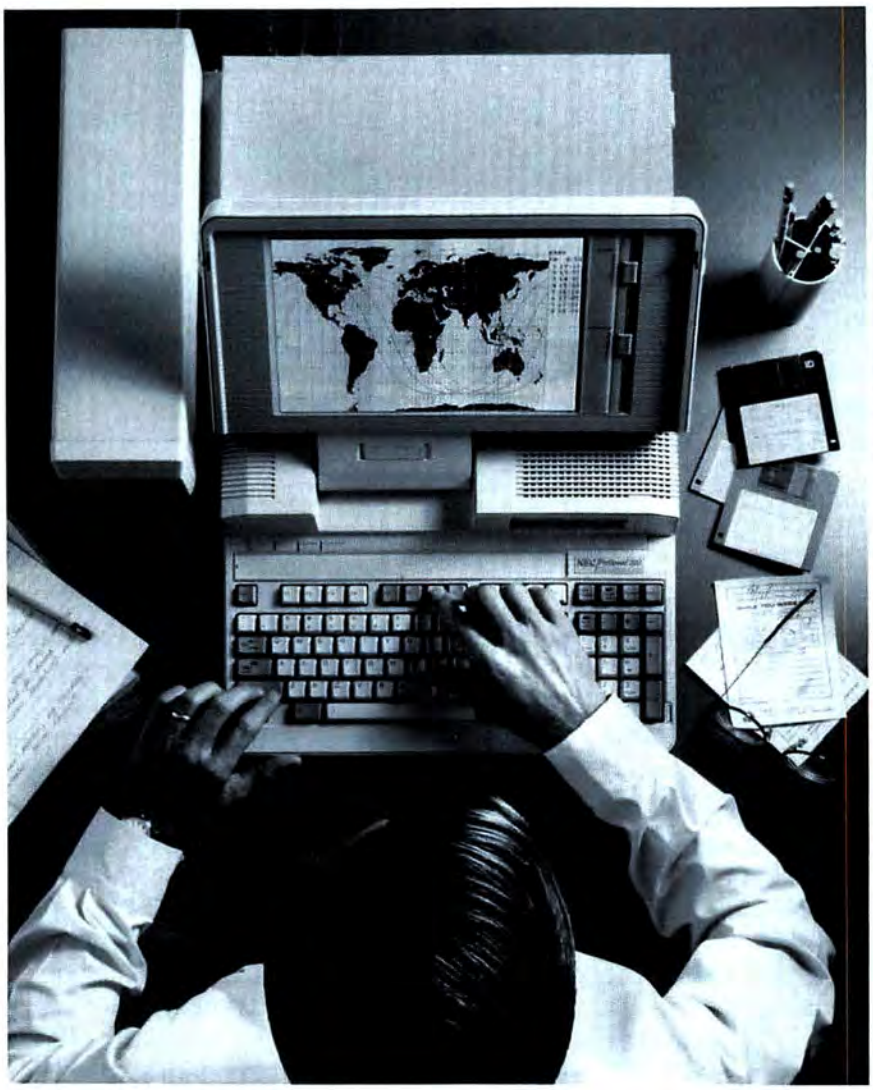
Circle 44 on reader service card

The ProSpeed™ 386 desktop.

To understand its massive power,



In the past, people who were serious about their computers have had a serious dilemma.

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C&C Computers and Communications

you have to take it apart.

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Networks 101

We need a remedial course for America's students—

and it can't happen a moment too soon.

FRED STAWSON

David Bunnell

Sometimes, when I'm not worrying about other things, I worry about the American educational system. Our declining test scores, the increasing dropout rate, and all the rest tells me that America is in danger of losing the edge as a leader in scientific and technological research, including computer science, for some time now.

Fortunately, I am not alone in my concern. Parents, teachers, administrators, politicians, and students themselves are addressing this complex problem. That's good news, because it will take a lot of thought and energy to improve the quality of American education from preschool through the graduate level.

There is one aspect of our educational backsliding that concerned *PC World* readers will want to know about, because they can do something about it: the creation of a nationwide high-bandwidth educational computer network. The most immediate benefit would be a dramatic increase in the exchange of research information. This could speed the completion of many exciting and socially beneficial efforts in engineering, medicine, and artificial intelligence now under way in various classrooms and labs around the country.

According to a report published by the *Chronicle of Higher Education*, 37 percent of the nation's campuses already have local area networks. Many of them are campuswide, connecting thousands of PCs, Macintoshes, and workstations. Wouldn't it be great if all these networks were linked? A national network, one that could connect personal computers everywhere, would help to make education a lifelong process.

Through organizations such as Educom, a nonprofit group that facilitates the use and management of information technology on campuses, universities have the wherewithal to work out all the technical matters of standardization and administration for such a system. But our universities don't have the financial resources to implement such a large system, alone or collectively.

The only way a national network can become a reality is with the financial support of the federal government, which would provide the necessary communications highways. I suspect most of you will agree with me that the gang in Washington can't, and shouldn't, be expected to solve all our social problems. But there are certain large-scale developments that only the federal

(continues)

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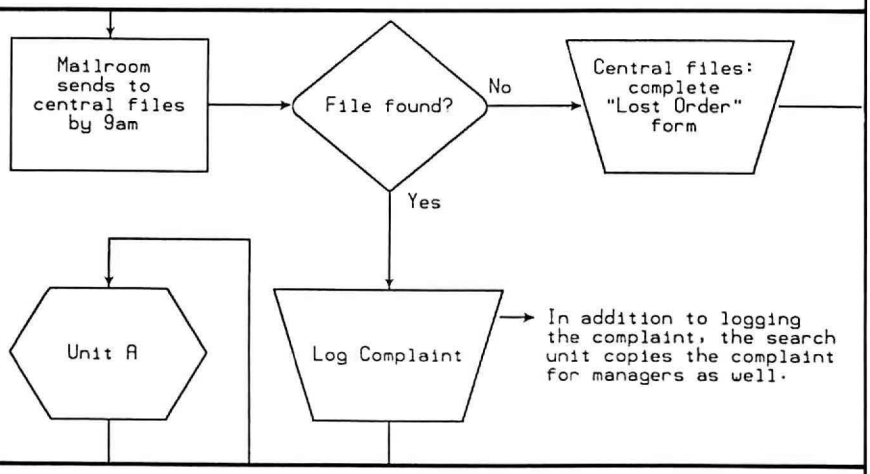

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government can afford to create, such as the interstate highway and postal systems. In this case, the government could regulate interstate transmission rates, which are key to making a network viable. Although I don't know what the costs might be, I can assure you they won't compare to the tax dollars we're currently shelling out for many less worthwhile programs.

Pennsylvania Rep. Douglas Walgren, who chairs the Science, Research and Technology Subcommittee of the House Science, Space and Technology Committee, is a leading advocate for this network. But to move any kind of bill through Congress in a time of budgetary restraint, he is going to need support from many of his colleagues who aren't aware of this project's potential to improve higher education and get America back into a technology leadership role. As Rep. Walgren noted in a recent address, "A new initiative has little hope for success in the absence of a broadly based endorsement of the merit and priority of [a network] from the relevant scientific communities at large."

This is where you come in. Let your representatives in Washington know that you support such a network. And if you'd like to know more about the public and private initiatives being developed for this computer network, I recommend that you order a copy of the hardback book *Campus Networking Strategies* from Digital Press, 12 Crosby Dr., Dept. 123, Bedford, MA 01730. You can phone an order to 800/343-8321. The book costs $30, and it's money well spent. As the saying now goes, I have seen the future, and it is campus networking. ●

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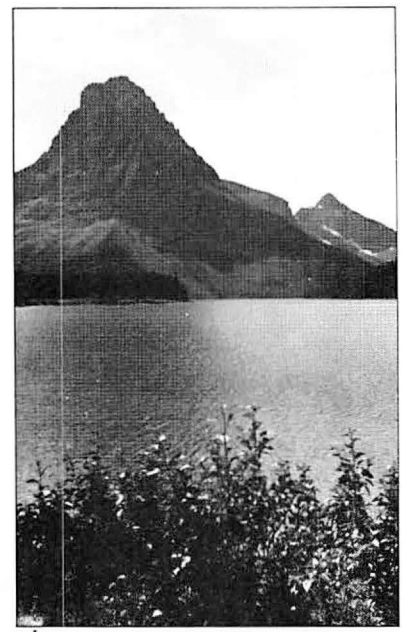

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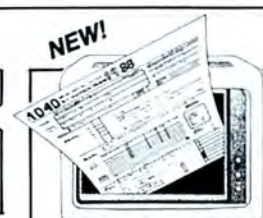

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Next in

PC WORLD

February

Bus Wars

Classic AT bus? Micro Channel Architecture? EISA? So far, the debate over bus standards has focused on technical esoterica. East Coast Editor Eric Bender cuts through the confusion and answers the burning question: If you stick with the industry-standard AT bus, will you be left out in the cold?

LaserJet Alternatives

Hewlett-Packard's venerable Series II finally has some serious competition. *PC World* reviews six laser printers that promise HP compatibility and extra features, and comes up with some surprising results.

How To

Robert Carr, the creator of *Framework*, shares his favorite productivity tips for Ashton-Tate's popular integrated package. Plus: how to prevent a hard disk disaster; a nifty phone-dialing trick for *SideKick Plus;* tips for Q&A users; and how to save money on CompuServe.

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D ☐ Corporate Purchaser
E ☐ DP/MIS Manager

2. Which products are you most interested in?
A ☐ 286 architecture
B ☐ 386 architecture

3. Are you interested in computer products for:
A ☐ Home
B ☐ Business

4. How many PCs do you have installed now?
A ☐ 1-10
B ☐ 11-20
C ☐ Over 21

5. How many PCs do you (your company) plan to purchase in the next twelve months?
A ☐ 1-10
B ☐ 11-20
C ☐ Over 21

6. Is your requirement:
A ☐ Immediate
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B ☐ 386 architecture

3. Are you interested in computer products for:
A ☐ Home
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4. How many PCs do you have installed now?
A ☐ 1-10
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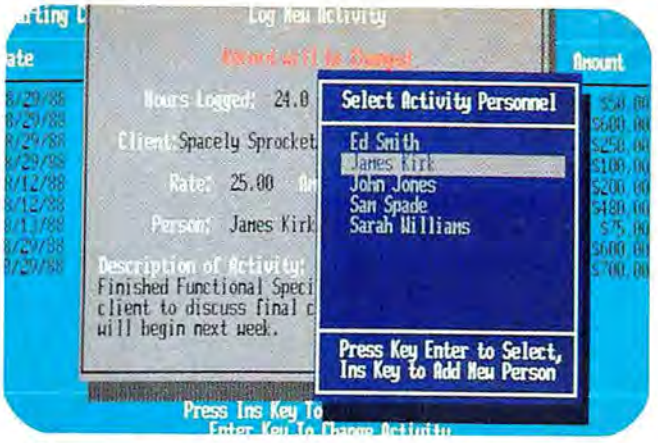

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What If IBM Took the Next Step?

In an industry-shaking coup de theatre, Steve Jobs has joined forces with IBM to revolutionize computer technology.

Could this signal the breakup of the IBM/Microsoft alliance?

FRED STIMSON

Stewart Alsop

In an unprecedented move, IBM and Next placed an ad in last October's *Wall Street Journal* to tell why IBM decided to license the user interface and development system (collectively called NextStep) from Next and why Next decided to license its software to IBM.

It's amazing that the gigantic IBM and a start-up headed by the eternally mercurial Steve Jobs could cooperate enough even to take out a joint advertisement. More remarkable is the faint possibility that this one relationship and the technology it represents could upset every applecart in the personal computer industry (no pun intended).

It could present a more significant competitive challenge to Apple's Macintosh than does OS/2 with Presentation Manager or Sun and AT&T's UNIX with Open Look. And it could present such a competitive challenge to the Presentation Manager itself that it could damage IBM's relationship with Microsoft, supplier of virtually all of IBM's PC system software since 1981.

Some background: While the personal computer industry has been frittering away its resources on look-and-feel copyrights and suits over who owns the trash-can icon, Next's software designers have gone back to the drawing board and reexamined the industry's assumptions about the person-machine interface. They came up with a fundamentally new design approach to a user interface and built an operating environment that enables new kinds of software to be written.

What's new about NextStep is its ability to organize huge numbers of files (thousands instead of hundreds), its ability to integrate applications into a multitasking environment (by giving you ways to avoid obscuring windows under other windows), and its adoption of object-oriented software development tools. Next has incorporated into its user interface and operating environment the very features and approaches that leading-edge software designers have been talking and dreaming about for the past two years.

At the same time, advances in the two standard graphic environments of the day—the Macintosh and the Presentation Manager—have been slow to arrive. The Macintosh is hung up on its own past: It's stuck with a fixed menu bar; a 72-dot-per-inch, 9-inch, black-and-white screen; and five years of system fixes

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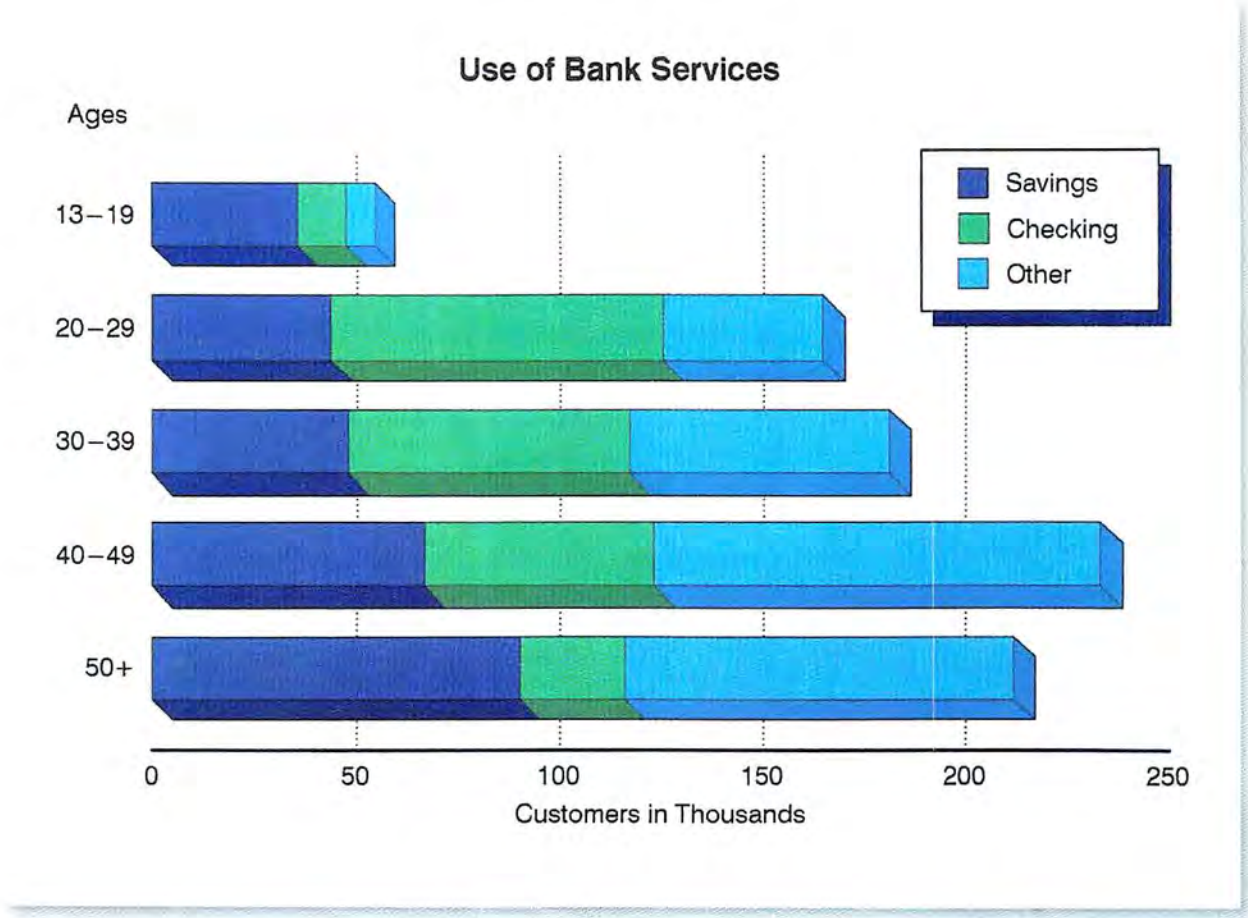

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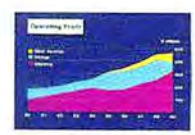

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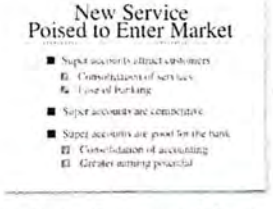

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and patches that software developers have to work around to produce something new and exciting.

The Presentation Manager is much newer, since it was only delivered in the last two months, but it also has to live with the history of Microsoft's *Windows* development (which started around the same time as Macintosh development), plus the compromises inherent in Microsoft's relationship with IBM and with IBM's insistence on developing for the limited memory handling capability and processing architecture of the 80286.

IBM, despite its commitment to OS/2 and the Presentation Manager as crucial elements of its strategic Systems Application Architecture, decided to implement NextStep on top of its UNIX-based operating system, called AIX, and then to implement AIX and NextStep together on top of its 80386-based PS/2s, the Models 70 and 80.

IBM will try to tell you that there's no particular significance to this decision, that it was merely an attempt to give customers more choices. But the reality is that, by the middle of 1989 (according to IBM's schedule), those of you who were farsighted and rich enough to acquire a PS/2 Model 70 or 80 will be able to install the world's leading-edge operating environment.

To be fair, you will need lots of memory and at least an 80387 math coprocessor to get things going. And it would help to have a bigger, crisper display than the existing PS/2 displays. And you won't get any of the great sound that Next is promising (although you will get color). And it will run fairly slowly compared to the Next machine.

But you *will* get the leading-edge PC environment made by the world's largest computer company. How's that for combining the latest and greatest with security and safety? That's what Next was saying in the joint ad: "We created NextStep to meet the needs of higher education. IBM, with its broad market appeal and global distribution, offers us the opportunity to make NextStep even more far-reaching."

Is it any wonder that Bill Gates of Microsoft spent the week before the Next announcement telling anybody who would listen that the Next box was insignificant and unworthy of Steve Jobs? Do you think he might have been worried about how OS/2 with Presentation Manager will measure up against AIX with NextStep? ●

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

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When you print a file with *XyWrite III or III Plus*, the printer won't automatically advance to the top of the next blank page. You can issue a formfeed from the *XyWrite* command line in several ways; the easiest is to add a formfeed line to the Start-up.INT file. Just type BC default FF=1 on any line in the file.

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Circle 108 on reader service card

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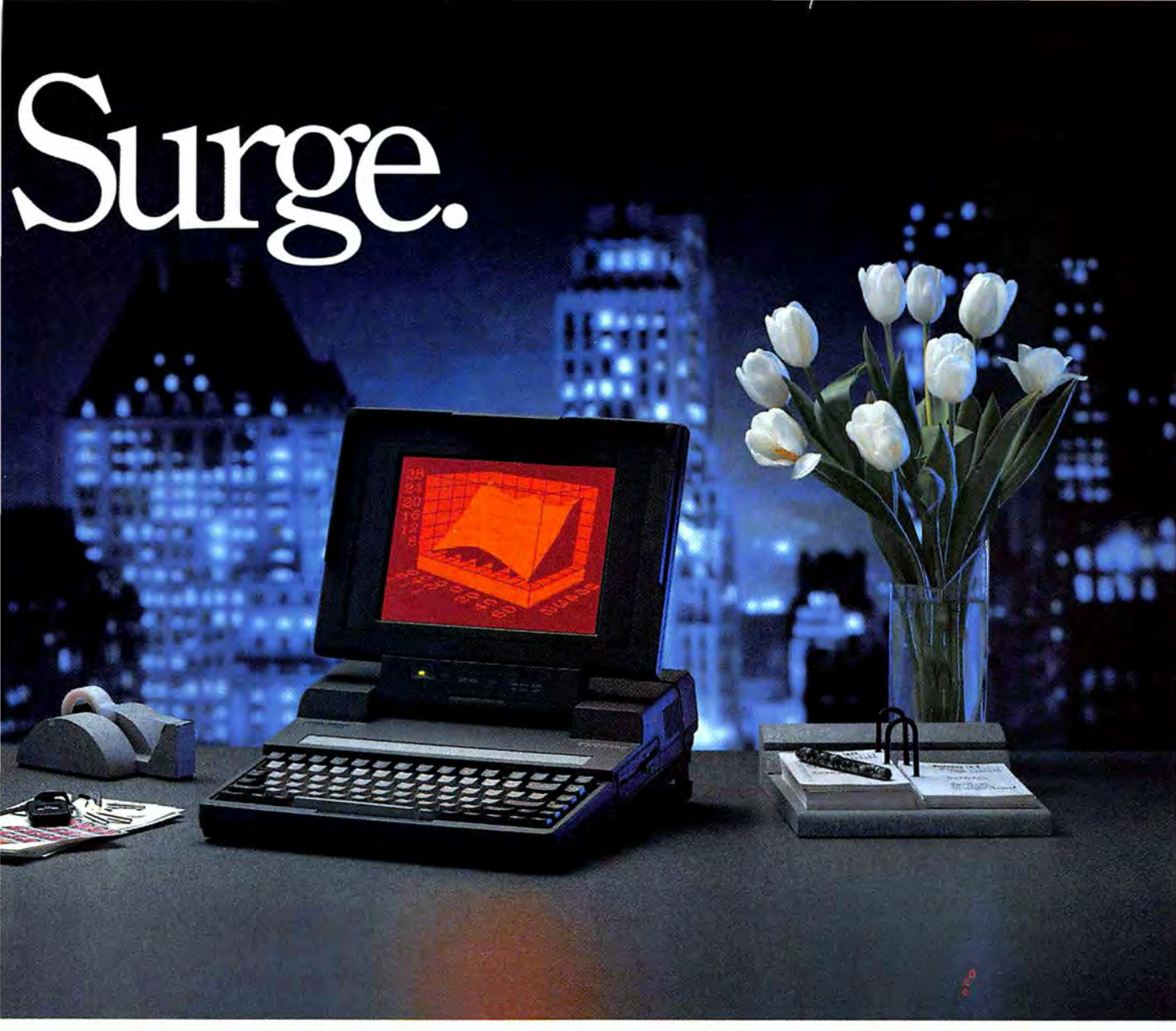

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Circle 236 on reader service card

Edited by ERIC BENDER

Is New Category Emerging?

Personal Information Managers Attack Data Chaos From All Sides

Lotus Blesses Third-Party Agendas

Creating a new type of application is a tall order, especially when the application's benefits are as amorphous as those touted by vendors of personal information managers (PIMs). But packages such as Lotus's *Agenda*, Symantec's *GrandView*, and Valor Software's *Info-XL* are taking on the personal challenge.

PIMs promise to relieve an individual's data overload by organizing disparate text-based information for operations ranging from project management to business analysis to document retrieval. The very diversity of products underscores the market's embryonic state: PIMs range from hypertext-like text-management systems to advanced outliners and scheduling programs.

PIMs aren't taking the world by storm—only now are they appearing at the bottom of best-seller lists—but vendors say they're encouraged nonetheless. "Building a new market takes time," says Rod Turner, executive vice president of Symantec in Cupertino, California. In a year, he adds, *GrandView* sales may match those of Symantec's flagship, *Q&A*.

Lotus's Andrew Hammond says the template market will drive Agenda sales.

Early users aren't short on enthusiasm, either. Lex Young, head of the TV production facility at DDB Needham Worldwide in Chicago, applauds *GrandView*'s ability to track projects by personnel. "It allows me to keep all these balls in the air without getting hit in the head," he says. "I'm wedded to it."

With its well-heeled parent and ambitious design, *Agenda* has gained the greatest exposure. Boosters refer to it as "the next *VisiCalc*." But while it offers unparalleled power for cross-referencing and sorting a data base entered in free-form text, it derives partly from veteran text-management packages such as askSam Systems' *askSam*. Similarly, the outline-based *GrandView* adds significant twists to approaches developed in Symantec's *ThinkTank*, while *Info-XL* expands upon the well-established genre of personal schedulers.

Selling such products is tough when they can do anything from planning a dinner party to examining legislation. "The PIM market is taking off slowly because people are having a hard time understanding what they're good for," says Maureen Fleming, editor of the *Software Industry Bulletin* in Stamford, Connecticut.

Andrew Hammond, *Agenda*'s product marketing manager, admits that the obstacles are great. "Whereas other software categories have a real-world metaphor, PIMs do not," says Hammond. He feels that *Agenda*'s benefits show up best when it's combined with third-party applications, and Lotus hopes for a *1-2-3*–style third-party industry.

Numerous *Agenda* templates are already available—22 of them from Bob and Lauren Flast, owners of The Agendaware Specialists in Westfield, New Jersey. Their offerings include restaurant guides, a pro-

(continues)

HENRY FEILIARD

Laptops Lift Off

Screens, Disks Lighten

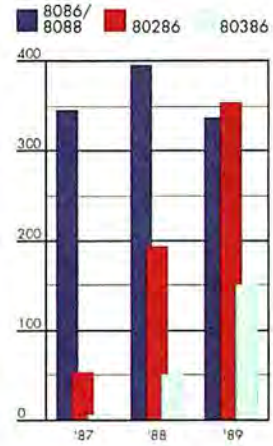
You're on the road. You may not want to carry another heavy bag and sabotage your last excuse for a work-free evening. But PC vendors think they can change your mind.

The three top laptop manufacturers—Toshiba, Zenith, and NEC Home Electronics—have recently revamped their product lines, emphasizing portability without skimping on performance. Long-

(continues on page 62)

U.S. Laptop Shipments: AT Compatibles Blossoming

(in thousands)



International Data Corp. predicts fast growth for 80286-based laptops, with U.S. deliveries exceeding those of 8086/8088 machines this year.

Digital Video Interactive Gathers Massive Backing

Intel Buys Display Technology

Intel's Digital Video Interactive will make multimedia displays easier to produce and deliver.

"Digital Video Interactive," says Intel senior vice president David House, "is the future of the PC industry."

Granted, Intel just bought the DVI venture from General Electric. But long before that, DVI spurred a broad outpouring of enthusiasm from developers.

DVI offers full-motion video, still images, computer animation, and CD-quality stereo on an AT compatible. As House remarks, "It's like putting a TV in your PC, under your control." The software comes on a handy CD ROM disk. And because DVI serves up everything in digital format, developers can achieve previously impractical feats of presentation.

DVI's greatest technical challenge lay in pulling full-motion video data off the CD ROM disk, because a single second of digital video normally requires about 18MB of storage. The secret is a unique compression/decompression method that shoehorns the data into less than 1 percent of its original space.

Since DVI's debut in March 1987, the quality of the video picture has marched steadily ahead. "We're approaching standard TV resolution and quality," reports Bob Brannon, general manager of Intel's Princeton Operation in Princeton, New Jersey. To achieve even greater quality, advocates hope to get a boost from upcoming higher density CD ROM designs.

In addition to slashing the time required to compress data, DVI researchers have built an "edit-level video" feature that takes just a second or two to compress images up to 25 times on the AT itself. This should aid product development and find fresh roles for the technology, such as teleconferencing.

"Every week, someone develops a new application idea," says Brannon. Seventeen firms have shown DVI prototypes, mostly in training, education, and customer information applications. "Within the next five years, we should see full-motion audio-visual products within the reach of the average PC customer's pocketbook," predicts Bill Gates, chairman of Microsoft.

DVI was born at the David Sarnoff Research Center, RCA's historic central lab. When GE bought RCA, and then sold off its consumer electronics business, DVI needed another backer. GE talked with Lotus, Microsoft, and others before inking a deal with In-

(continues on page 64)

ANDY FREEBERG

PIMs

(continued)

gram that filters and analyzes data downloaded from Dow Jones, an interviewing tool, a qualitative decision-making application, and a data base on the U.S. Senate.

Bob Flast, an *Agenda* beta tester, resigned as vice president for technology strategy at American Express to devote himself to the package. He identifies strongly with *Agenda*'s free-form approach. "The problem with outline-based products like *GrandView* is that not everybody approaches problems hierarchically," says Flast. "With *Agenda*, you can dump items in and suspend categorizing until you feel like it."

But not all users share this freewheeling approach, notes Nancy McSharry, a senior analyst at International Data Corporation (IDC) in Framingham, Massachusetts. "Free-form data bases such as *Agenda* are like a sixties education," says McSharry. "Most people require more structure."

Like McSharry, *Software Industry*'s Fleming says ease of use is key: "Most PIMs are difficult to use because they require total discipline in data entry," she says.

In addition, PIMs need to link more closely with other applications. Strategies include adding more file conversions, developing stronger memory-resident modules, and adding PIM features in integrated packages or systemwide user interfaces.

—Eric Brown

Bob and Lauren Flast spread the Agendaware gospel.

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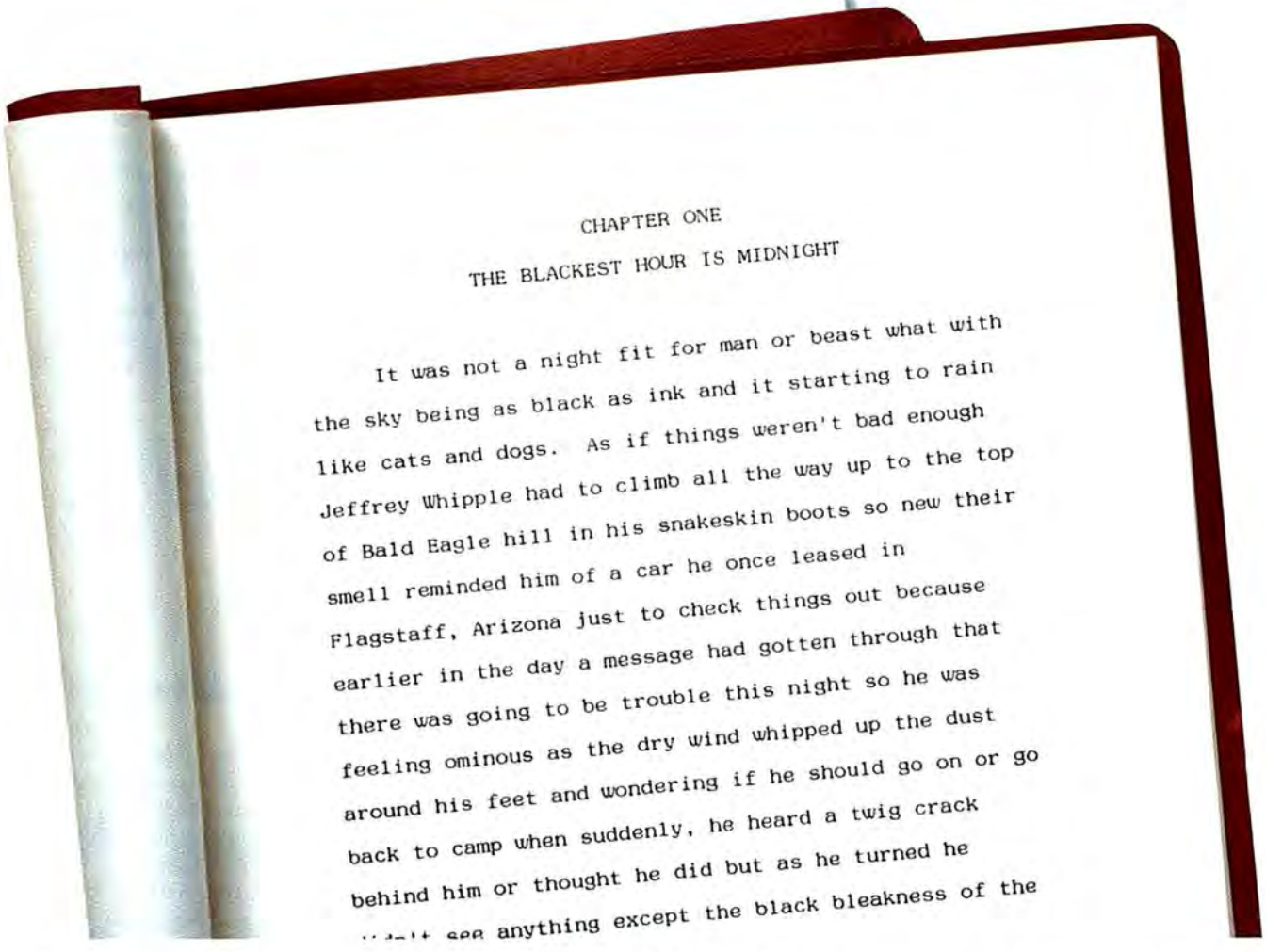

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C&C Computers and Communications

Laptops

(continued)

time laptop abstainer Compaq has signed on, and even IBM is expected to get into the swim.

This new wave builds on advances in screens, processors, hard disks, power-conserving techniques, and custom silicon. The most dramatic improvement comes from third-generation "compensated-supertwist, backlit" LCD screens, which provide excellent display quality. Some, like NEC's ProSpeed 286, offer crisp black on white; Compaq's SLT/286 offers a striking VGA-compatible screen with eight levels of gray.

Compaq's SLT/286 brings VGA to LCD screens.

These and several other 80286-based machines are designed to work for several hours away from a power source. New CMOS 80286 chips offer higher speed while demanding less power. The fast, inch-high hard disks draw only 2 watts, and systems provide clever schemes for temporarily shutting down components that aren't in use. Additionally, nickel-cadmium batteries are being tweaked to boost longevity.

"The laptop market has finally reached the stage of legitimacy," notes IDC analyst Bruce Stephen. The products are now complete PCs, with competitive processors, adequate storage, acceptable weight, and screens that "don't make you feel like you're looking at a muddy pond—or a crate of oranges," he explains.

NEC's ProSpeed 286 exploits a docking station.

Stephen expects the latest round of laptops to score a direct hit with current customers. "Most of the volume sales are still going to corporations that are equipping their sales forces and require at least a 20MB hard disk, the speed of an AT compatible, and a decent display."

But vendors hope that broader markets await, because they've created laptops to meet all user needs. And this year the new 286 "middleweights" should enter the mainstream of portable PCs, predicts Stephen. "They'll outstrip 8088s in unit shipments, although not by much."

Manufacturers are taking a different approach with systems on the high and low ends of the market. Most striking is NEC's UltraLite, which turns to ROM cards and a "silicon hard disk" (battery-backed RAM) to keep its 4.4-pound figure. However, the UltraLite starts at $2999, probably twice the price that would attract large numbers of customers.

Among the heavyweights, there's a proliferation of 20-MHz 80386s that can't wander far from an outlet. Zenith is promoting its battery-powered TurbosPort 386, but the 80386's greater power requirements curtail battery life.

Both 286s and 386s are turning up with desk-bound docking stations; the laptop lands and hooks up to exploit expansion slots and storage options. While that scheme is appealing, Compaq president Rod Canion acknowledges that "we don't think most people will buy the expansion unit." One reason is cost: The SLT/286 comes rather dear for an AT compatible, starting at $5399. Adding the expansion unit and a few other options can boost the price well over $8000.

Still, price is not always an obstacle to acquiring such small but glittering objects, and designs keep moving upscale. Within the next year and a half, analysts expect stronger batteries that employ gel cell or other alternative technologies. And screens will bloom even brighter with color LCDs based on Japanese pocket TVs.

—Eric Bender

The Next Promise

Software to Run on 80386 Machines

What's Next, and why should PC owners care?

After lying low for three years, the deposed founder of Apple Computer took center stage again in October, monopolizing media attention and capturing hearts and minds with the dazzling Next computer system. Steve Jobs's latest brainchild is a step beyond state of the art, equipped with Motorola's top-of-the-line 68030 processor, a unique digital signal processor for sound and music, high-quality PostScript output to both laser printer and screen, 8MB of memory, and an erasable optical drive with 256MB removable disks.

But while there's certainly nothing common about this box, its limited near-term commercial prospects made the frenzied national attention puzzling to people who missed the kickoff.

The Next machine won't run IBM PC or Macintosh software. Instead, it's a UNIX-based workstation whose avowed home is education. Still, with a $6500 price tag, it's hard to envision the system on many students' back-to-school shopping lists. That leaves it mostly to technically oriented, well-funded campus researchers and professors.

Beyond unique hardware, Next boasts dazzling software, beginning with Mach. This UNIX-derived operating system software, developed by Carnegie-Mellon Univer-

(continues on page 66)

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Circle 254 on reader service card

All Quiet in ComputerLand?

Planning for Growth as Other Chains Retrench

When a company announces plans to go public, then postpones the deal, then discloses that its president has resigned, you might expect further bloodshed.

But ComputerLand Corporation says it ain't so.

The ink was scarcely dry on the prospectus for the initial public offering last summer when the sale was shelved. The Hayward, California, reseller blamed the lousy stock market; analysts pointed to investor shock at the $80 million price tag for a 31.4 percent stake.

A month later, President and Chief Executive Kenneth Waters left the job he had held less than a year. Bill Tauscher, a member of the investment group that bought majority control from ComputerLand founder Bill Millard in September 1987, took over as chairman. Tauscher soon made his presence felt by paring corporate staff by 5 percent.

But anybody waiting for another big shoe to drop will wait in vain, says Executive Vice President Victor Leventhal. "The direction was put in place when the new ownership came in over a year ago," Leventhal says. "Now it becomes a matter of blocking, tackling, and implementation."

Linda Hardy White, an analyst with Future Computing/Datapro in Dallas, suggests Tauscher's takeover was meant to inspire confidence among franchisees. Tauscher met with lackluster success in his previous job as head of a Dallas pharmaceuticals company, and had no computer retailing experience before joining ComputerLand in July. But he is regarded as a superb salesperson, charismatic and aggressive.

White thinks ComputerLand urgently needs a defense against an onslaught of competitors. "Right now the important thing for them to do is hold on to what they've got," she says.

With ComputerLand, that traditionally has meant the walk-in retail buyer. Major corporate accounts, a strong growth area for other resellers, have been put off by a cost structure inflated by franchise fees as high as 8 percent of sales.

Still, ComputerLand cut the royalty rate in 1988 to 5 percent and will trim it again this year. "They've done what they needed to do to make their franchisees happy," says White. And with a lower cost structure, promises Leventhal, "we're going to see at least a doubling of our major accounts—without taking our eye off the ball on our small to midsize business customers."

"Our target customer is really everyone," maintains John Gibbs, vice president of a six-store ComputerLand chain owned by Small Talk Data Systems Inc. of Libertyville, Illinois. Gibbs says improving his firm's training courses, technical staff, and connectivity solutions has produced across-the-board growth in sales to individuals and businesses large and small.

Gibbs has received little technical help from headquarters, but the ten-year franchise holder doesn't complain. Instead, he'd like continued improvement in the distribution system, which caused delays when it was supplying all stores from one location in Hayward. Now there are four national distribution points, with more planned.

While analysts like White recommend retrenchment, ComputerLand is planning ambitious expansion. Domestically, ComputerLand seeks to reenter geographic markets it abandoned in recent years. Next year Leventhal envisions adding 50 stores to the 475 U.S. ComputerLands, along with 25 more stores in Europe and 10 in Australia.

None will be company-owned. "We learned our lesson on that one," says Leventhal. "We can't effectively run them and manage them as well as franchisees can." —*Mark Henricks*

DVI

(continued)

tel. The giant chip maker will keep the original development team together in Princeton.

Intel plans to release a three-board developer's kit in the second quarter. Next year comes a large-scale rollout for a low-cost single-board product for end users. "We expect to see the launch of a large and profitable industry," says House. By 1991, the hardware should be less expensive than the software. Then dedicated devices should begin to emerge, helping to move DVI into businesses, educational institutions, and the home.

Today, laser videodisks handle some tasks that DVI targets, but the analog video and audio formats can't match DVI's all-digital flexibility and integration. The compact disk interactive (CD-I) specification offered by Philips and Sony offers a rival digital approach, but many third parties say that CD-I is doomed by its brief video capability.

Competition looms from signal-processing–oriented offerings (like Next Inc.'s workstation) and from an alternate video-compression scheme proposed by several Japanese firms. But soon after buying the DVI technology, Intel found the best of all allies, IBM, which is expected to jointly develop and market DVI products. —*Eric Bender*

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Lotus Symphony 2.0

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Plus Development Deals More Hardcards

The Competition Dwindles

Dana Perkins: Hardcard sales haven't softened.

Anyone who has lived through the rigors of installing a hard disk drive can appreciate a hard drive on a card. You don't need to swap out the power supply, install a controller, or remove an existing drive. Just plug in the card, set the DIP switches, and presto, you're in business.

First shipped in 1985, drive cards proved highly attractive to owners of floppy-based PCs or XTs that had maxed-out their hard disks. David Vellante of IDC estimates that 20,000 drive cards were sold the first year, with the total zooming to 235,000 in 1986.

However, as PCs equipped with ever-larger hard drives rolled off manufacturing lines, the drive-card market flattened out in 1987, Vellante says. And Phil Devins, senior analyst at Dataquest, predicts that shipments will decrease this year, which he attributes to "a level of saturation in XT products that needed easy expansion."

But Plus Development, the subsidiary of hard disk supplier Quantum Corporation, which pioneered the drive-card business, still claims that sales are on the upswing.

By IDC estimates, the Milpitas, California, supplier currently enjoys an 85 percent market share, although its near monopoly is not due to lack of competition. Within six months of the Hardcard 20's debut, recalls Dana Perkins, Plus's director of business management, 35 competitors were on the scene.

Since then the ranks have thinned dramatically. Mountain Computer, the number two player, quit the business last year. The Campbell, California, firm, whose products started at $895, "found the market very price-competitive," says Mountain marketing director John Hagerman.

Rather than low prices, Plus emphasizes "a premium brand position," reports Perkins. The company has maintained the $795 sticker on the Hardcard 20, and Perkins says that most competitors succumbed to problems of reliability rather than pricing. Plus patented its Hardcard technology and claims an average of more than 60,000 hours between failures; warranties were recently doubled to two years.

At least as crucial is the Hardcard's 1-inch width, which lets the drive slip into a single slot. Perkins says Plus is committed to making one-slot drive cards because "people can't afford overlapping."

However, that 1-inch limit has kept Plus from surpassing the 40MB Hardcard 40, which debuted in 1987 for $995. "They're stuck in a low-capacity market," claims Vellante. He wonders if it's practical to add a third disk platter without violating the 1-inch width, and points out that as PCs get smaller, "soon a hard card won't fit in there."

IDC figures that Plus will sell $65 million to $70 million worth of Hardcards this year, and the firm aggressively pushes the Hardcard 40. The latest model incorporates caching for an fast "effective access time" of 28ms. "There'll always be a market for that kind of product," Devins observes. *—Edward Warner*

Next

(continued)

sity, is optimized for multitasking operations and speeds throughput.

More striking is NextStep, a window-based "object-oriented" programming environment that aims to simplify life for both programmers and end users. Object-oriented programming creates discrete classes of objects—independently developed and debugged modules that can be linked together easily even by novice programmers.

Object-oriented programming is attracting more attention partly because it's more appropriate for graphic interfaces and environments. Even more crucially, it represents a historic shift in software art and science, says Bill Joy, cofounder of Sun Microsystems. Joy remarks that object-oriented programming offers the software equivalent of integrated circuits—modular, compact, easily tested, and easily assembled components.

NextStep includes about 25 software objects—prewritten programming subroutines—for beginners to employ. Since such modules can be used over and over, object-oriented programs require fewer lines of code than most programs written in traditional languages. Additionally, they tend to be more portable across different machines.

IBM promptly licensed NextStep and its underlying components, and plans to offer a package for 80386-based workstations and the RT combining NextStep and AIX, IBM's UNIX derivative—so any hot Next software may one day run on high-end PCs as well. *—Mike Hogan*

Eric Brown is a PC World *associate editor, Mark Henricks is a Dallas business writer, Mike Hogan is* PC World*'s news editor, and Edward Warner is a freelancer based in Boston.* ●

TIM DAVIS

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Marek, 32

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OH, I BIN WORKIN' ON THE RAILROAD, ALL THE LIVE LONG DAY
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REWARD YOUR EMPLOYEES' WORK EFFORTS
Nice proposal, Bob
AW, GO AHEAD, TAKE A COUPLE STICKS. THEY'RE SUGAR-FREE.

NEVER HESITATE TO USE APPROPRIATE DISCIPLINE
...25, 26, 27...

MINGLE WITH THOSE OF LESSER PAY. ACT AS IF YOU WERE THEIR FRIEND. LAUGH AT THEIR JOKES.
Now, now. Tell it one more time. I'm sure it's funny.
Well... I mean... that was the 5th time. I... well... I...

BE FIRM WITH DEADLINES. LIKE CHILDREN, EMPLOYEES NEED TO KNOW WHO IS BOSS.
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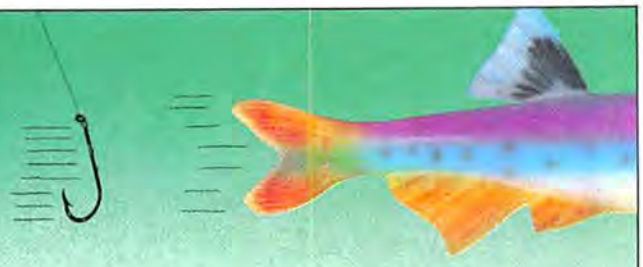

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Circle 258 on reader service card

PRODUCT OUTLOOK

70 PRODUCT OUTLOOK

PS/2 Model 30 286
IBM's AT is back: smaller, faster, cheaper than ever—and wearing a PS/2 label.

Turbo Assembler & Debugger, Turbo Pascal 5.0, Turbo C 2.0
If you like to program in Borland's Turbo tongues, here's a double-whammy cure for common code bugs, plus a worldly assembler/debugger combo.

Allways
Funk's printer utility endows *1-2-3* worksheets with *Excel*-quality pizzazz.

Adobe Illustrator
Desktop publishers, graphic artists, and CAD users—rejoice! The leading Macintosh graphics package is now available for the PC in a *Windows* environment.

Xerox Presents
Knock out presentations from imported graphics and text or design them from the ground up with a virtuoso package whose talents just don't stop.

Companion for WordPerfect 5.0, PowerMax 5.0, The Perfect Edition, Publisher's PicturePak
A quartet of add-ons for *WordPerfect* fans: 250 ready-to-run macros for occasional users and neophytes; 185 macros for power users; a customizable menu system to manage the macros; and a clip art library of images and borders to animate your documents.

FoxGraph
Showcase your *Foxbase +* data with 76 predefined graph types in up to four dimensions, and that's just for starters.

ClickArt Scrapbook +
No more need to catalog images with written descriptions. *ClickArt Scrapbook +* lets you see the contents of your image data bases—and transfer images to other programs.

78 BRIEFLY NOTED

DualPage, PS 2000
Monochrome monitors from Cornerstone and Ventek offer ultra-high resolution for desktop publishers.

FlexCache 25386DT
ALR puts proprietary memory caching and 25-MHz speed on the desktop with the 25386DT.

JT Fax PS/Q
Turn your PS/2 or compatible into a group III fax machine with Quadram's new fax board.

WY-3216-85T, WY-3216-150T
Wyse Technology's first multiuser systems—for 8 and 12 users, respectively—work in CAD and distributed processing environments or as network file servers.

TG-1140
A 40MB tape backup system that feels equally at home with PS/2s and the classic PC family.

Font Solution Pack
Add a desktop publishing dimension to *Microsoft Word* and *WordPerfect*, including bit-mapped fonts, special symbols, and special effects for creating letterheads, logos, and more.

Mini Tornado
Micro Logic gives its *Tornado* random-information manager a little brother; at half the price, it has a fraction of the muscle.

90 UPDATE

Premium/286 Model 140V
AST's Premium/286 gains VGA graphics and a memory board for its Fastslot architecture.

Fastback Plus 2.0
Backing up is easier to do with *2.0*'s smooth interface and enhanced restore functions.

PC-Outline Plus
Brown Bag's personal information manager gains a spelling checker/thesaurus and a customizable interface.

askSam 4.1
askSam now lets you build your own menus and search globally across multiple files.

MicroMan 1.1
MicroMan keeps you on top of multiple projects with graphic displays of allocated staff time and resources. You get plenty of reporting options and heavy-duty support for up to 100 users on a LAN.

IBM PS/2 Model 30 286

Classic AT Redux

They put the Mustang convertible out to pasture, turned off the tap on Classic Coke, and junked the good old IBM PC AT at the height of its popularity. But as we know, the pointy-headed market researchers who came up with these brainstorms have seen the error of their ways.

The near-audible moan emitted by the PC-buying public when IBM pulled the plug on the AT has turned to a sigh of relief. The IBM AT is back—smaller, faster, and cheaper than ever—although it now carries the clumsy moniker PS/2 Model 30 286.

If you're a dyed-in-the-wool IBM loyalist, you can again have your 80286 technology under an IBM label without having to clothe yourself in Micro Channel Architecture: The newest PS/2 sports an AT-compatible bus.

You get a bit more than classic 8-MHz AT performance, too. At 10 MHz and one wait state, the Model 30 286 offers up to twice the throughput of the original 8086-based Model 30, although it can't match the Model 50 Z announced last summer.

The Model 30 286 comes standard with a modest 512K RAM, compared to the Model 50-031's 1MB, but it can accommodate the same 16MB capacity through system memory upgrades. The Model 30 286 also provides the same VGA graphics, the same 3½-inch 1.44MB floppy drives, and the same three 8/16-bit add-on slots, plus a socket for an 80287 coprocessor.

The IBM AT is back: The PS/2 Model 30 286 sports an AT-compatible bus and a 10-MHz one-wait-state 80286 processor.

However, for stand-alone applications with a limited amount of multitasking and networking tie-ins—which is where the typical PC user lives—the Model 30 286 makes better sense than its pricier MCA-equipped siblings because it doesn't cut you off from the AT-compatible world.

The basic Model 30 286-E01 lists for $1995. Another $600 buys the 30 286-E21, equipped with an 80ns, 20MB hard drive. Comparably equipped versions of the Model 50 would cost $3995 and $4595, respectively. In light of those numbers, look for the Model 30 286 to become another classic.

—Mark Henricks

Reader service no. 620

Turbo Assembler & Debugger, Turbo Pascal 5.0, Turbo C 2.0

For Cleaner Code

Everybody makes mistakes; ask any programmer. Because programs rarely work correctly the first, or the 50th, time around, debugging is more than an exercise in good code housekeeping—it's a way of life. If you like to program in Borland's Turbo languages but aren't crazy about tracking down errant code, you're finally going to get some help. Borland has added long-awaited debugging capabilities to Turbo Pascal and Turbo C and introduced a full-featured debugger in its new *Turbo Assembler & Debugger.*

Versions 2.0 of Turbo C and 5.0 of Turbo Pascal pack integral source-level debuggers that let you step quickly through your code—monitoring, evaluating, and modifying variables and expressions and setting breakpoints. What's more, you can compile and link subroutines in Turbo C 2.0 30 percent faster than in the prior version. Turbo Pascal 5.0 accommodates libraries of prewritten procedures for modular programs and supports automatic overlays that enable you to run programs too large to fit into available memory.

But *Turbo Assembler & Debugger* is the real news in the latest round of announcements, delivering a one-two punch to problematic programs. *Turbo Assembler* lets you create fast-running modules that speak your computer's machine language, while *Turbo Debugger* offers source and data level debugging capabilities far beyond the integral debuggers in Turbo C and Turbo Pascal.

Turbo Assembler is compatible with Borland's leading competitor, *Microsoft Assembler*, even sporting a Quirks mode that duplicates well-known Microsoft idiosyncrasies. Meanwhile, *Turbo Debugger* provides source- and machine-level debugging for Turbo C and Turbo Pascal with a new breakpoint facility,

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

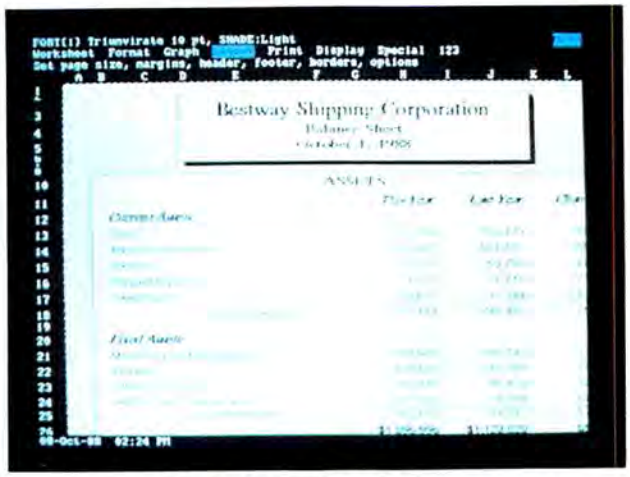
key-event logging, and the ability to test code in a variety of memory options.

Relying on the familiar Turbo Pascal and Turbo C interface, *Turbo Debugger* uses nested pulldown menus and point-and-shoot command selection. Overlapping windows give you up to 12 views of key program elements such as source modules, variables, breakpoints, active functions, and machine register values.

The key to *Turbo Debugger*'s error-tracking prowess is its ability to set global breakpoints and use conditional statements to set an unlimited number of local breakpoints. *Debugger* pins down breakpoints, defining them by locations, conditions under which they are triggered, and the results.

To further aid the debugging process, the program's key-event logger records all or portions of debugging sessions on disk for easy return. *Debugger* also records responses to command prompts for reuse in other sessions. Compatible with EMS 3.2, *Turbo Debugger* also can run in extended memory on an 80386 machine or even on a remote machine connected via serial cable, enabling you to debug large programs.

Both Turbo Pascal 5.0 and Turbo C require 448K of memory; *Turbo Assembler & Debugger* needs 384K. All require DOS 2.0 or a later version and sell for $149.95. Borland Int'l, 1800 Green Hills Rd., P.O. Box 660001, Scotts Valley, CA 95066-0001, 800/543-7543.
—Wes Nihei
Reader service no. 621



Allways is a "spreadsheet publisher" that Funk Software claims will bring Excel-quality output to your 1-2-3 worksheets.

Allways

Spiffy Spreadsheets

You may have a good spreadsheet, but is it a good-*looking* spreadsheet? That question has sent more than a few presentation-conscious *1-2-3* users fleeing into the arms of *Microsoft Excel*.

But there's no need to stray if you don't want to, says longtime Lotus enhancer Funk Software, which was the first to tip worksheets over *Sideways*. Now you can turn your spreadsheet printout every which way but loose with *Allways*, a "spreadsheet publisher" that Funk claims brings *Excel*-quality output to *1-2-3* worksheets. Lotus must agree, because a copy of *Allways* is now given away with every copy of *1-2-3*.

If you're among the significant minority who don't need a polished printout of your work, *Allways* isn't for you. But if you happen to be an accountant showing work to clients, a small-business person seeking loans, or a number juggler in any size organization who wants to score points during presentations, your printouts can benefit from multiple fonts, single and double underlining, boldface, shading, boxes, and lines.

As if it weren't enough that *1-2-3* users get these goodies without having to switch files and work styles over to *Excel*, Funk goes Microsoft a few better by providing eight bit-mapped typeface fonts instead of four and three shading levels instead of just one. *Allways* does lack *Excel*'s added graph and color choices, relying instead on *1-2-3*'s selection. But it enables you to spruce up your *1-2-3* graphs with borders, fill-in colors, and 20-point headlines. And unlike *Excel*, *Allways* lets you mix graphs and worksheet ranges on the same page, even putting a graph behind a range.

Longtime *1-2-3* users will find it easy to get up to speed on this add-in, whose menus sport the familiar Lotus interface. Command selections are made from dialog boxes in point-and-shoot fashion.

Since *Allways* requires 100K of linear memory (50K if you put the remaining 50K in expanded memory), you may choose to work in *1-2-3* character mode, bringing up *Allways* graphics mode when it's time to format your worksheets (by pressing an <Alt>–*function key* combination of your choice). Swap fonts or add shading, and the screen will show you what you'll get.

Allways doesn't touch your *1-2-3* files. It keeps all its formatting in a parallel file, which loads automatically with the file to which it is attached.

The $149.95 *Allways* requires *1-2-3* release 2.0 or a later version and includes drivers for the HP LaserJet and compatibles, Apple's LaserWriter, and the Epson, Toshiba, and Okidata dot matrix printers. Funk Software, Inc., 222 Third St., Cambridge, MA 02142; 800/822-3865, 617/497-6339.
—Mark Henricks
Reader service no. 622

Adobe Illustrator

Art for the Mac-less

Many a PC graphics user's innards have twisted with envy over the easy-to-use visual tools available on the Macintosh. No more. *Adobe Illustrator*—the leading

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"...customers and dealers alike are
WordPerfect 5.0 to be a perfect 10."
- Bill Yurdin, Micro D's Cor

"WordPerfect 5.0's colossal
improvements recommend it to
power users of all stripes."
- Eric Alderman, PC World

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WordPerfect is the most feature-lade
processin
ve ever seen."
Personal Publishin

"Beyond any question,
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ly the best in the worl
- W
nal Law

"I must candidly reveal that
product is nothing short of awesom
Stone, Federal Computer W

"WordPerfect 5.0 offers strong incentives to switch.
WordPerfect 4.2 was already the most comprehensive
word processing program on the DOS market, but the
latest incarnation raises the performance and expectation
levels in this category to new highs."
- Christopher O'Mal - Personal Computing

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The question is whether
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WordPerfect 5.0 is a wordproce
terpiece." - Jon Pepper, PC Week

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- Jim Seymour, PC Computin

"Flexible, strong, and quick,
WordPerfect is *the* office/profes-
sional word processor...the program
is a superior value." - InfoWorld

Introducing the most highly acclaimed word processor since WordPerfect 4.2.

At WordPerfect Corporation, we viewed the release of WordPerfect 5.0 with a lot of excitement and a little trepidation. After all, we took WordPerfect 4.2, the world's favorite word processor, and changed it.

And even though we made WordPerfect 5.0 easier to use, more powerful, and more feature rich than 4.2, we wondered if loyal users would agree with us.

Today, we're glad to say that the response has been incredible. People everywhere are discovering that WordPerfect 5.0 has replaced 4.2 as the world's best word processor.

Ask your dealer about 5.0, or talk to someone who is using it. We're confident that once you've tried it, you'll never go back to your old word processor. Even if it's WordPerfect 4.2.

For more information, call or write WordPerfect Corporation, 1555 North Technology Way, Orem, Utah 84057, (801) 225-5000. (In Canada, call 1-800-267-2499.)

WordPerfect
for IBM Personal Computers

WordPerfect
CORPORATION

WordPerfect is a registered trademark of WordPerfect Corporation

Circle 175 on reader service card

Mac graphics package—is now available on a PC platform under *Windows*.

Almost everything desired by desktop publishers, graphic artists, and even CAD draftspersons is here. Artists and technical illustrators who like to draw on the screen will find *Adobe Illustrator* accommodating; its freehand drawing mode turns the mouse into a highly responsive pen. A toggle moves you from freehand drawing to a graphics tool capable of producing precise Bezier curves. Thanks to floating point math, *Illustrator* gives you nine levels of zoom capability and editing at a resolution of 1/1000th of an inch. You can rotate any object in fractional increments of 360 degrees.

If you lack drafting skills or are banging up against a deadline, you may prefer to scan in images and then use *Adobe Illustrator*'s auto-tracing tool to convert them to *Illustrator* format for further manipulation.

Illustrator's ability to open and edit any file created on a Macintosh will come in handy if your shop has a mix of PCs and Macs. In fact, Mac users may demonstrate a little jealousy of their own over the *Windows* edition's file converter, which lets you bring CAD files into *Illustrator* format.

Also new for the *Windows* version are more than 300 graphic shapes that can be used like clip art and easily edited; a selection of borders and two typefaces are thrown in for good measure. Text can be added to newsletters, reports, and other documents neatly and in balance, thanks to kerning and leading control.

The PC version of *Adobe Illustrator* carries a greater work load than the Mac model, and the *Windows* interface makes it manageable. But it requires an 80286 or 80386 computer with 640K of standard memory and 512K of expanded memory. You'll also need a hard disk and a VGA, EGA, or Hercules Monochrome interface and monitor.

The suggested list price, $695, includes a video demonstration tape and a newsletter subscription. Adobe Systems Inc., P.O. Box 7900, Mountain View, CA 94039; 415/962-2000.

—Mark Henricks

Reader service no. 623

Xerox Presents

Import Expert

It's been said that originality is the art of concealing your sources. No one need know where you got the great-looking text charts, clip art, and graphs for your business presentations, unless you choose to tell about *Xerox Presents*.

The package lets you serve up a great presentation by simply throwing together word charts and graphics you may already have on hand from other presentations. Alternatively, you can put together a great show starting from scratch.

Xerox Presents includes a full-featured word processor with which to build bulleted lists, outlines, and columns using eight Bitstream fonts. A graph creator and a table-generation tool add impact and clarity to your messages. You can also enhance your object-oriented clip art with an array of hues from the 256-color palette. And for true originality, *Xerox Presents* packs drawing tools for creating everything from straight lines to polygons.

On those rare occasions when a creative challenge exceeds your artistic capabilities, it's nice to know that you can fall back on imports of ASCII text as well as files from most spreadsheet programs and graphics in *Windows* Metafile, Encapsulated PostScript, TIF, and .PCX formats.

You don't have to be satisfied with the state of your current artwork, either; you can achieve consistency through style sheets. Choose from among more than 200 style sheets and let *Xerox Presents* mold your show into a coherent format and design. Each style sheet has preset colors, fonts, and layouts for charts, graphs, and images. If your creative nature won't be denied, you can modify the existing style sheets or design your own from the ground up.

The software requires 640K of RAM and an 80286 or 80386 machine; you'll also want a mouse and a hard disk. The package ships with a runtime version of *Microsoft Windows/286* and an installation kit for the Bitstream fontware. Along with the more than 100 printers and other imaging devices supported by *Windows*, *Xerox Presents* supports the Autographix remote slide generation service.

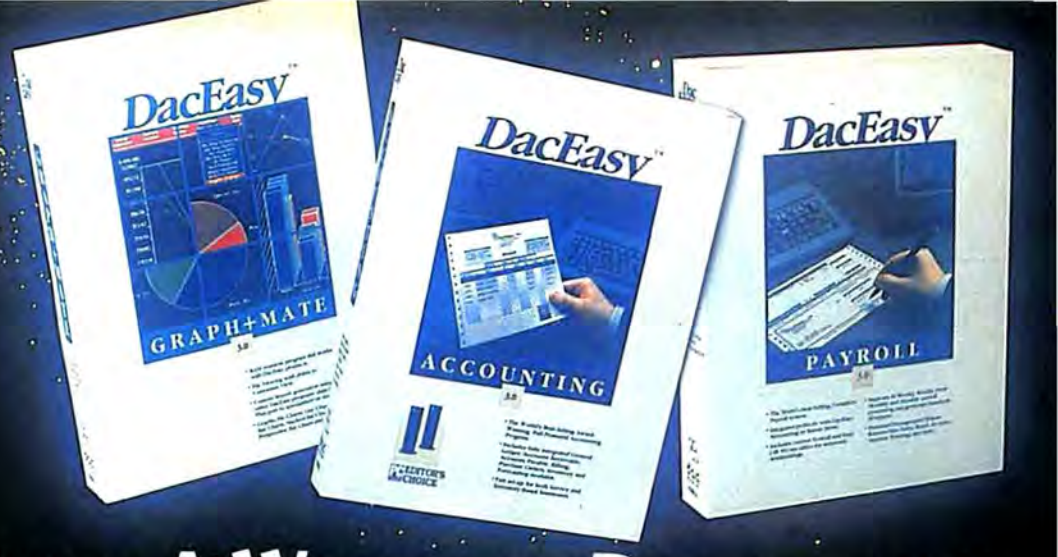
Xerox Presents retails at $495. Xerox Corp., P.O. Box 24, Rochester, NY 14692; 800/832-6979, ext. 125E.

—Mark Henricks

Reader service no. 624

Xerox's draw/graph/text editor lets you start from scratch or use preexisting charts and graphics to create a great presentation.

New Version 3.0



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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.

INFO WORLD 1987 PRODUCT OF THE YEAR

InfoWorld 1985 PRODUCT OF THE YEAR

PC EDITOR'S CHOICE 1985-1987

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

DacEasy Accounting's strength is its capability for generating reports that provide you with fast information and ultimately better management decisions. In fact, it provides you with more than 700 reports and "what if" forecasting scenarios based on three-year historical information — great for projecting expenditures and revenue. And, in addition to the program, you'll find the 460-page documentation is written for ease of understanding with helpful hints, screens and examples.

The only accounting software to win all four readers' contests in the past three years!

1986 PC WORLD WORLD CLASS AWARD

1987 PC WORLD WORLD CLASS AWARD

1988 PC WORLD WORLD CLASS AWARD

The DacEasy™ 3.0 Series. A World of Difference in Business Software. Naturally, out of the best-selling accounting program grew the need for related business programs such as DacEasy Payroll. The 3.0 version also features a new intuitive design, pull-down menus, flexible pay periods, current federal and state tax tables, automatic withholdings, printing of checks, W-2's and 1099 forms, and much more. It's no wonder DacEasy is the world's best-selling payroll and personnel management program!

Also new for 1988 is DacEasy Graph+Mate, a RAM-resident program that interfaces with DacEasy Accounting or Payroll. Its easy graphic reporting features pie charts, line charts, bar charts, stacked-bar charts and perspective bar charts. Plus custom file viewing, macros, pop-up calculator and notepad, and more make it the ideal companion.

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30-Day Money Back Guarantee: Unconditional guarantee on all products bought directly from Dac Software (less shipping charges). Minimum Hardware Requirements: IBM PC or 100% compatibles, 2 disk drives, MS-DOS or PC-DOS 2.0 or later, 80 column printer able to print 132 column in compressed mode, color or monochrome monitor, 256K memory (512K for Graph+Mate). Trademarks: IBM, PC-DOS, MS-DOS. DacEasy is a trademark of Dac Software, Inc., 17950 Preston Road, Suite 800, Dallas, TX 75252-5740. 5.25" & 3.5" disks available. Copyright © 1988, by Dac Software, Inc. All rights reserved. CODE #204

Insilco

Spice up WordPerfect documents with Publisher's PicturePak's clip-art library of 565 images and borders.

Companion for WordPerfect 5.0, PowerMax 5.0, The Perfect Edition, Publisher's PicturePak

Perfection Plus

After years on the best-seller lists, the package can't be too far from perfect. But sharp-eyed add-on vendors have found room for improvement even in *WordPerfect 5.0*, if only to add custom features for its many different users. Whether you're just starting out or already crunch words like popcorn, this gaggle of gofers has something to offer.

Begin at the beginning, by learning the complexities of this word processor. Although there's really no substitute for memorizing the basic navigating commands, *Companion for WordPerfect 5.0* can give you a hand with the less common functions. PsyBorne offers a disk of 250 ready-made *WordPerfect* macros, invoked via intuitive, mnemonic command substitutes that will save you considerable fumbling through the *WordPerfect* manual.

For example, <AH>-ZBUP<Enter> will boldface and underline a paragraph in only five strokes, half the number required by *WordPerfect 5.0*. Fewer keystrokes means seconds saved, which turn into minutes when you're involved in a complicated procedure like creating a table of contents. PsyBorne claims that *Companion* can cut training time in half for new *WordPerfect* users. It's also a hand-up for attorneys, salespeople, and others who don't spend day-in and day-out with a word processor.

Companion for WordPerfect 5.0 lists for $65. PsyBorne, 10941 Badger Ct., Penn Valley, CA 95946; 916/432-3771.
Reader service no. 625

A library of 185 *WordPerfect* macros awaits buyers of *PowerMax 5.0*. If you've ever changed the margin settings of a long *WordPerfect* document, then gone back to change the margins of all the footnotes, you'll appreciate the *PowerMax* macro that automatically updates footnote and endnote margins to match those of the document. For power users only, *PowerMax 5.0* has 50 percent more of these keystroke savers than do previous versions, which are renowned for such accomplishments as cutting from 20 to 1 the number of keystrokes required to copy an address onto an envelope.

The latest release also includes room for twice as many one-key commands, with 26 <Ctrl>-*key* macros to go with 26 <Alt>-*key* macros. If you find you use a particular command frequently, you can make it a one-key operation and avoid *WordPerfect*'s thicket of menus.

At $19.95 *PowerMax 5.0* is a no-risk proposition for budget-minded users. PowerMax, 15840 Ventura Blvd. #845, Encino CA 91436; 818/905-5919.
Reader service no. 626

Once you're loaded up with auxiliary macros, you'll need a way to find them. If you're an infrequent macro user or don't want the *WordPerfect* template on your keyboards, you've got a problem. *The Perfect Addition* from Applause Software gives you a hand with a pop-up, pulldown customizable menu system to manage those macros. Name them with up to 25 characters and describe them at length with pop-up reference windows.

You can include in the reference window the commands you'll need to bypass the menu next time or clear the decks of little-used *WordPerfect* macro commands by relocating or deleting them as easily as you add them.

The Perfect Addition sells for $54.95. Applause Software, P.O. Box 952, Wheat Ridge, CO 80034; 800/544-2049.
Reader service no. 627

Finally, *Publisher's PicturePak* can bring you pretty pictures to enliven your witty words—even if the best that you can draw is a blank. This clip-art library from Marketing Graphics consists of 565 images and borders for trimming your newsletters, memos, and business presentations.

Split into three editions—executive and management, sales and marketing, and finance and administration—*PicturePak*'s prettiest feature is its usability: These are real-world business images on the themes of time, speed, and money. You can frame and highlight your headlines or dress up *WordPerfect* graphs with dynamic icons like streamlined arrows.

PicturePak files use *WordPerfect*'s native .WPG file format, but you can quickly convert them to the more widely compatible .CGM Metafile format by simply changing file name suffixes. (These are vector images, so you can enlarge or reduce them without sacrificing output quality, but otherwise they're not as amenable to modification as raster graphics.)

Each edition lists for $99.95; the whole 565-picture group is $250. Marketing Graphics Inc., 4401 Dominion Blvd. #210, Glenallen, VA 23060-3379; 804/747-6991.
—Mark Henricks
Reader service no. 628

TI's OmniLaser™ 2115. The network printer you need when your application needs are demanding.

The high-speed laser printer for shared-resource environments that can handle many people performing many tasks.

TI's OmniLaser 2115 printer provides the flexibility you need in multi-application environments. Especially where you have several different hardware systems attached to a network.

Built-in emulations mean an OmniLaser can satisfy the needs of virtually any application. It can produce desktop publishing output using the Adobe PostScript® page description language. It can emulate a dot-matrix printer for spreadsheets and draft text. Or an HP LaserJet® for word processing and business graphics. Even a plotter for advanced graphics.

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

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

Trouble-free paper handling.
The OmniLaser 2115 prints beautifully on a variety of paper stocks and sizes. Its two 250-sheet paper trays let you load stationery, letter- or legal-size paper, and select the size you need through its easy-to-use front control panel.

The right printers for right now, and in the future.
With the OmniLaser 2115, you have the flexibility you need for today's sophisticated printing applications. You also have the confidence of knowing that your OmniLaser offers a safe path to the applications of the future.

The OmniLaser family also includes the 2106 workstation printer and the 2108 small-cluster printer. So whatever the demand of your application, there's a multipurpose OmniLaser that's right for you.

To find out more, call Texas Instruments toll-free **1-800-527-3500.**

TEXAS INSTRUMENTS

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LaserJet is a registered trademark of Hewlett-Packard.

FoxGraph

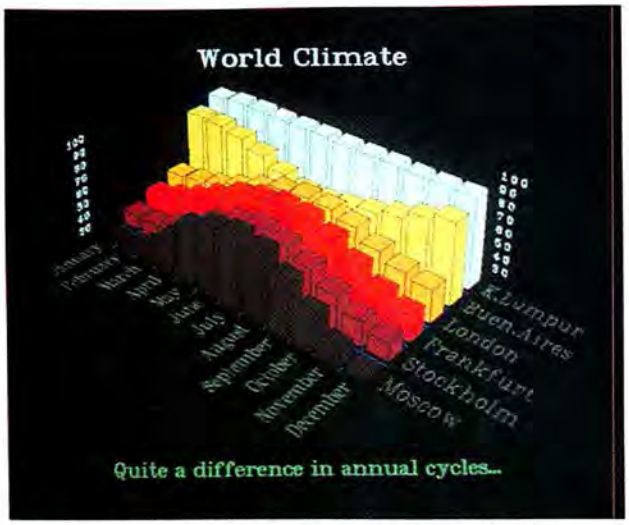
Data Design

Data base programs often help you put your facts into perspective, but a new add-on for *dBASE* look-alike *Foxbase+* 2.10 lets you put still more perspective on your facts. *FoxGraph* jumps out ahead of the pack with 2-D, 3-D, and even 4-D graphics capabilities that showcase your data as never before.

In *FoxGraph*, you can display your *Foxbase+* data in one of 76 predefined graph types: 16 for 2-D, 40 for 3-D graphs, and 20 for 4-D, a unique format that adds a fourth axis. But that's just the starting point. *FoxGraph* also lets you design graphs of your own; you can even mix primary colors to create your own hues.

The program is elegant in its simplicity: Your keyboard's five leftmost function keys serve as *FoxGraph*'s "menu system" and reflect the current design procedure. The five rightmost function keys (whose functions remain constant) give you a quick way to execute basic tasks like file saving and menu return. The <Space> bar toggles pictures of the function keys on and off screen; inscriptions on each picture describe what the key does, so you never get lost.

Each function key calls forth a full screen of menu choices; you can move among these easily using the cursor keys. From one screen you choose a 3-D *x-y* graph, a 2-D pie chart, or a combination of both. Go to the next screen to choose your viewing angle, to the next to mix your colors, and so on until you've customized your own presentation.



FoxGraph's 76 predefined 2-D, 3-D, and even 4-D graphs help put dBASE-clone Foxbase+ 2.10's reports into the proper perspective.

FoxGraph offers a selection of nine text fonts, with continuous control over size, slant, and width. Graph-shape adjustment commands let you rotate, zoom, pan, and distort 3-D and 4-D graphs.

FoxGraph offers full plotter, slide-making, and desktop publishing facilities. IMG format files interface with *Ventura Publisher*, and TIFF files with Aldus's *PageMaker*. *FoxGraph* currently does not accept *dBASE III Plus* files, but Fox Software promises *dBASE* compatibility in the next version.

FoxGraph requires DOS 2.0 or a later version, 640K of memory, a hard disk, and a CGA, EGA, or VGA board. Fox Software, Inc., 118 W. South Boundary, Perrysburg, OH 43551; 419/874-0162.

—Ronnie Gunnerson

Reader service no. 629

ClickArt Scrapbook+

Visual Data Base

One picture is worth a thousand words, and no one knows it better than desktop publishers who try to catalog images with written descriptions. Sometimes even a thousand words aren't enough to convey what something looks like.

ClickArt Scrapbook+ comes to the rescue and lets you actually see your image data bases, rather than just read about them. An image can be artwork—like one of the 50 professionally drawn pictures that come with the software—or it can be a page of text, complete with formatting and graphics. *ClickArt Scrapbook+* lets you create tiny pictures of the images you want saved. Retrieving them is as easy as scrolling through this image data base and picking the ones you want. Traditionalists can still tag their images with written descriptions.

Once you've found the right image in *ClickArt Scrapbook+*, you use the *Windows* clipboard to transfer it between applications. For example, you can move an image from your data base to your word processing document. Or you can send it from a scanner or another application to the clipboard and then into the data base.

ClickArt Scrapbook+ runs under *Windows/286* and *Windows/386* and is compatible with Aldus's *PageMaker*, Microsoft's *Windows Paint* and *Windows Write*, Micrografx's *In-a-Vision*, and all other *Windows* applications. Priced at $129.95, the software runs on 80286- and 80386-based computers with at least 512K, a mouse, and a hard disk. T/Maker Co., 1973 Landings Dr., Mountain View, CA 94043; 415/962-0195.

—Jennifer Beaver

Reader service no. 630

BRIEFLY NOTED

DualPage, PS 2000

Cornerstone Technology's DualPage and Ventek's PS 2000 are two monochrome monitors ideal for desktop publishing and other applications requiring high-resolution graphics.

The DualPage has a 19-inch display, big enough not only for detailed com-

"Daddy says he owes his success to who he met in college, who he met in business and whoever told him to save his information on Sony data cartridges."

Since producing the first tape recorder in Japan, Sony has been perfecting magnetic media.

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Circle 54 on reader service card

Ventek's PS 2000 is one of two new monochrome monitors for desktop publishers who need the clarity of its 1280 by 1024 resolution.

puter-aided design work but also for showing two pages side by side in desktop publishing applications. Designed for classic PCs, the DualPage monitor offers a resolution of up to 1600 by 1280 pixels, a 67-Hz refresh rate to reduce flicker, and a 200-MHz video bandwidth that puts graphics on screen about four times as fast as the standard AT monitor does.

The DualPage comes bundled with its own graphics controller card, which fits in an 8-bit slot, and *Truefonts*, Cornerstone's PostScript-compatible gray-level font software for near typeset quality display. The DualPage is available for $2395 with 4 levels of gray; with 16 levels of gray, the price rises to $2795. You can buy the less expensive model and upgrade it later with a memory daughterboard. Cornerstone Technology, 1883 Ringwood Ave., San Jose, CA 95131; 408/279-1600.
Reader service no. 631

Ventek's PS 2000 offers slightly lower resolution and slower screen painting than the DualPage but in a Micro Channel Architecture form for the IBM PS/2. The PS 2000 provides up to 1280 by 1024 resolution and a video bandwidth of 120 MHz.

Standard PS/2 VGA monochrome displays limit the viewing area to about one-third of a page —a major drawback for desktop publishing applications. The PS 2000 comes with a 20-inch screen and costs $2495. Ventek Corp., 31336 Via Colinas #102, Westlake Village, CA 91362; 818/991-3868.
Reader service no. 632

FlexCache 25386DT

Advanced Logic Research has introduced a top-of-the-line desktop counterpart to its floor-standing FlexCache 25386 computer. The FlexCache 25386DT is built around the same 25-MHz Intel 80386, so it runs 25 percent faster than the vendor's former desktop leader, the 20-MHz FlexCache 20386DT. Moreover, ALR has added a proprietary memory-caching feature that further accelerates throughput.

Competitors Compaq and IBM employ an industry-standard Intel 82385 memory controller with a 32K cache; so did ALR for its earlier desktop computers. This time, ALR emulates the 82385 with a proprietary scheme featuring a 64K cache of 25ns static-column RAM, which eliminates wait states 95 percent of the time by keeping frequently needed data close at hand. The 25386DT continuously writes from 60ns main memory to cache so that cache RAM is constantly refreshed.

The hard disks are also built for speed. Both the 66MB and 100MB drives feature a controller with a 28ms average access time and a 1:1 interleave that transfers data at 650 megabits per second. Also available is a 28ms 120MB ESDI drive with a 1:1 interleave, a 10-megabit-per-second transfer rate, and full track buffering.

The FlexCache 25386DT comes with 1MB of 32-bit 60ns dynamic RAM on the main system board, expandable to 14MB overall with memory cards. It has seven slots, one of them dedicated to 32-bit memory, with three slots filled by a graphics controller, a serial/parallel/floppy controller, and a hard disk controller. The ALR FlexMem card with 1MB costs $1450. The Model R66 with a 66MB hard disk costs $6490; the Model 100 with a 100MB hard disk, $6990; and the Model 125E with a 120MB drive sells for $7590. Advanced Logic Research, 9401 Jeronimo, Irvine, CA 92718; 714/581-6770.
Reader service no. 633

ALR's desktop version of its 80386 tower offers the same CPU and proprietary cache scheme featuring 64K of 25ns static-column RAM.

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Breakthrough graphics technology.
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The first PC that puts true
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function PC this small, for compromise.

80C286 microprocessor that drives software 20% faster than most 10-MHz 80286-based PC's. You get the capability to run the world's largest library of software with MS-DOS® Plus Microsoft® Operating System/2.

Internal 2400-baud modem optional.

Flexibility is built in. You can choose a high-speed 40- or 20-MB fixed disk drive to complement the standard 3 1/2" 1.44-MB diskette drive. Plus you can easily expand the 640K of standard memory to 3.6 megabytes internally.

Its footprint is small enough to fit on an airline tray table, with room to spare.

You'll find our keyboard is just your type. It has full-size keys, spaced just like the keys on a desktop PC. The keyboard is removable, so it adjusts to the way you work. You get all 12 function keys and an embedded numeric keypad. Or if numbers are your life, add a separate numeric keypad as an option.

Other creature comforts are also on board. Like an optional internal 2400-baud modem. Room for two internal storage devices. Ports for a printer, external VGA monitor and other peripherals. You can even add a 12-MHz 80C287 coprocessor as an option to speed number crunching.

At this point you may be thinking that the COMPAQ SLT/286 does everything a desktop can do. You're right. In fact you can even do more at the office with its optional Desktop Expansion Base.

Unlike competitive expansion units, ours wasn't an afterthought. Its integrated design gives you two industry-standard expansion slots along with duplicate interfaces for your peripherals. The expansion unit even recharges the battery for you.

Battery included for over three hours of power.

Best of all, the COMPAQ SLT/286 just snaps right into the Desktop Expansion Base. No cord. No wires. No hassle.

With all these innovative features, you can see that the new COMPAQ SLT/286 leaves absolutely no room for compromise. It's simply high-performance personal computing in its most concentrated form.

COMPAQ

When you build a full-
there's no room

Before now, choosing a laptop PC meant choosing what you could live without. A manageable size. Battery. Power. Speed. Screen quality. Full-size keys.

We've changed that, with the new COMPAQ SLT/286. It's the first laptop from the company that set the standard in portable computing. And the first laptop to give you everything you want. Without compromise.

Creating a new high-performance PC this small was no small feat. It took a series of engineering breakthroughs to build a smaller laptop that delivers the performance of a desktop—on battery power.

The COMPAQ SLT/286 snaps into an optional Desktop Expansion Base for office use.

A removable keyboard offers your fingers full-size keys, with standard spacing.

From its compact size to its high-performance components, you'll see that your needs shaped our thinking.

The first laptop from the company that set the standard for portable PC's.

First of all, we knew you wanted to wield a lot of power, without throwing around a lot of weight. The new COMPAQ SLT/286 weighs in at just 14 lb., with a space-saving footprint. That means it fits on an airline tray table with plenty of room to spare.

When you're on the road, we won't leave you stranded, either. The COMPAQ SLT/286 uses innovative new battery technology that gives you over three hours of power. The battery is small, so carrying a spare is no problem. Replacement and recharging are fast and easy.

But what's amazing about the battery is everything that runs on it. Every component is optimized to save battery life. So you can work longer.

The COMPAQ SLT/286 has VGA graphics with 640x480 resolution with eight shades of gray. New backlit screen technology produces text and graphics with higher contrast on a 10" diagonal screen. So things are easy to read.

Now let's take an inside look. The COMPAQ SLT/286 is powered by a 12-MHz

A small wonder. Compared to other laptops, the COMPAQ SLT/286 gives you more PC in less space.

It simply works better.

We have the world's best handle on portable computing.

In 1982, Compaq introduced the world to the power of portable personal computing with the COMPAQ Portable.

Since then we've consistently delivered new levels of performance in consistently smaller packages.

Today we offer the world's highest-performing portable personal computers. COMPAQ products consistently earn the industry's highest ratings for quality and user satisfaction. And that's an achievement that stands unchallenged.

You'll find that we've built these same uncompromising standards into the new COMPAQ SLT/286.

To get a handle on more information, including a free brochure and the location of your nearest Authorized COMPAQ Computer Dealer, call 1-800-231-0900. Ask for Operator 71. In Canada, 1-800-263-5868, Operator 71.

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COMPAQ

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Circle 245 on reader service card

JT Fax PS/Q

Quadram has developed a version of its facsimile board for Micro Channel–equipped IBM PS/2s and compatibles. JT Fax PS/Q turns a PS/2 or compatible into a group III facsimile machine. Equipped with a 4800-bps modem chip, JT Fax PS/Q allows you to convert and send information in a single step without making you first convert a file into ASCII format, then into fax format, and then store it before you're finally able to transmit.

JT Fax PS/Q comes with menu-driven software that can be configured as a memory-resident program with a quick-exit feature. Logos, signatures, and other graphics can be scanned into a graphics file, merged into a word processing document, and transmitted as part of a fax file at near letter quality. A compressed mode allows transmitting 132-column spreadsheets to standard 8½-by-11-inch paper.

Outgoing documents can be transmitted from disk or screen with one command. JT Fax PS/Q has a broadcast capability that automatically sends documents to predetermined locations, a transaction log of all incoming and outgoing calls, and an unattended transmission feature for sending files during off-hours.

JT Fax PS/Q's phone directory can store thousands of fax phone numbers and provides search, update, and auto-dial capabilities. The board supports Hewlett-Packard, Princeton Graphics, and Canon scanners. It also supports HP, Epson, and Brother printers or any printer with an Epson-compatible mode. JT Fax PS/Q will retail for $695. Quadram, One Quad Way, Norcross, GA 30093-2919; 404/923-6666.
Reader service no. 634

WY-3216-85T, WY-3216-150T

Wyse Technology has expanded its PC line with two high-capacity multiuser systems based on the Intel 80386 processor. The WY-3216-85T supports up to 8 users and includes an 85MB ESDI drive with an average access time of 23ms. The similarly configured WY-3216-150T is equipped with a 16ms, 150MB ESDI drive and supports up to 12 users.

Both models come with 1MB of 32-bit memory, a 1.2MB 5¼-inch floppy drive, and a 60MB ¼-inch tape backup subsystem with Sytos backup software for DOS environments. A control program such as DRI's Concurrent DOS is needed for multiuser implementation; Wyse has licensed The Santa Cruz Operation's SCO Xenix operating system and offers it as an option.

Intended for use in computer-aided design, as network file servers, or in multiuser/multitasking distributed processing, both models offer nine expansion slots. The WY-3216-85T sells for $7999; the WY-3216-150T is $8599. Wyse Technology, 3571 N. First St., San Jose, CA 95134; 408/433-1000.
Reader service no. 636

TG-1140

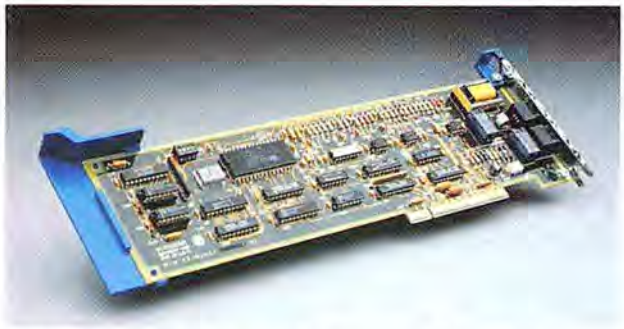
Tallgrass Technologies brings IBM PS/2s and classic PCs a step closer with a tape backup subsystem that works with both groups. The Tallgrass TG-1140 is a 40MB system that adapts to both IBM PS/2 models and the IBM PC, XT, AT, and their compatibles. The $495 unit's standard configuration serves the latter machines; PS/2 users must pay an additional $79 for a "personality module" that snaps on to the floppy pin connector inside PS/2 machines. The tape backup also supports the high-performance PS/2 models 50 Z and 70. Installation kits are available for machines with either 3½- or 5¼-inch bays. An external, dealer-installable cabinet costs $179.

The TG-1140 automatically adjusts to the speed of the computer's data transfer rate—typically 500K per second on PS/2s and 200K per second on PCs. Menu-driven software and context-sensitive help screens guide you through backup and recovery. Once data is backed up, high-speed searches locate individual files on the tape for updating or restoration in about 18 seconds. Automatic and unattended backup can be scheduled up to eight times a day.

The unit accepts pocket-size DC 200 QIC-40 digital tape cartridges and will accommodate 60MB tapes without software or hardware modification when they are introduced later this year. Tallgrass Technologies Corp., 11100 W. 82nd St., Lenexa, KS 66214; 913/492-6002.
Reader service no. 637

Font Solution Pack

SoftCraft has released an add-on product that brings the bit-mapped font capabilities of a desktop publishing package to *Microsoft Word* and *WordPerfect*. *Font Solution Pack* includes a type foundry–quality bit-mapped typeface library; a full-featured graphics font editor to create special symbols and characters; and utilities for making special-effect fonts, circular text images, logos, and graphics images.



JT Fax PS/Q turns a PS/2 or compatible into a group III fax machine with a 4800-bps chip that converts and sends in a single step.

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Hardware Specifications: Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory (512K required with DOS 5.5) and a minimum 10 MB hard disk. For use with the IBM® PC, PC XT, PC AT, Personal System/2™ and compatibles. 3½" media optionally available. Not copy protected.

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You can create quality printer fonts in sizes from 3 to 120 points using the Bitstream outlines included in the package or up to 160 other typefaces available from SoftCraft and Bitstream. You can add special effects such as drop shadows, contours, outlines, shades, and patterns to existing soft fonts and create special characters. You then use the quick and easy installation program to install your fonts in *Word* or *WordPerfect*, where they appear on an extended font list in the word processor's pop-up dialog box.

Font Solution Pack is not memory resident and doesn't require embedded codes or special function keys. But on the HP LaserJet and compatibles you can produce PostScript-quality letterheads and other designs with curved, rotated, or slanted logos. You also can enhance and import *1-2-3* charts and graphs, scanned images, and graphics generated by *PC Paintbrush*.

Priced at $595, the program requires DOS 3.1 or a later version, 512K of memory, a hard disk, and at least a CGA-quality graphics card. SoftCraft, Inc., 16 N. Carrol St. #500, Madison, WI 53703; 800/351-0500, 608/257-3300.
Reader service no. 638

Mini Tornado

Micro Logic Corporation has introduced a limited version of *Tornado*, its random information manager. Priced at $49.95—half *Tornado*'s $99.95 price—*Mini Tornado* stores 600 windows in up to three stacks, compared to 20,000 in up to 50 window stacks with regular *Tornado*. A *window* in both *Tornado* versions is the equivalent of a data base record or document; you enter information in free-form fashion and then retrieve it with a text-string search that is narrowed as more letters or numbers are entered.

Best suited for tracking random notes, *Mini Tornado* can display multiple windows and documents. Although data entry is generally unstructured, you can interrelate similar windows by storing them in the stack. To speed data entry, you can design a single data entry form per window stack; regular *Tornado* offers unlimited forms.

Mini Tornado, which can be made memory resident, requires DOS 2.0 or a later version and 57K of memory plus whatever you allocate for data. Micro Logic Corp., 100 2nd St., Hackensack, NJ 07602; 800/342-5930, 201/342-6518.
Reader service no. 639

UPDATE

Premium/286 Model 140V

AST Research has released a model of its Premium/286 computer line that includes VGA graphics and a memory board that takes advantage of the line's Fastslot bus architecture.

The $4095 Premium/286 Model 140V comes standard with the AST-VGA Plus adapter, which offers compatibility with MDA, CGA, EGA, VGA, and Hercules graphics. Other features of the Model 140V include a 10-MHz 80286 processor, a 40MB hard drive, and seven expansion slots, two of which are Fastslots.

AST's new Advanced FastRAM memory board takes advantage of a Fastslot's extra connection to gain direct access to the processor and zero-wait-state operation. The board comes with 2MB of memory for $1745, expandable to 8MB using 1MB memory modules. The Model 140V will accept up to two of these boards, yielding 16MB of memory. AST Research, 2121 Alton Ave., Irvine, CA 92714; 714/863-1333.
Reader service no. 640

Fastback Plus 2.0

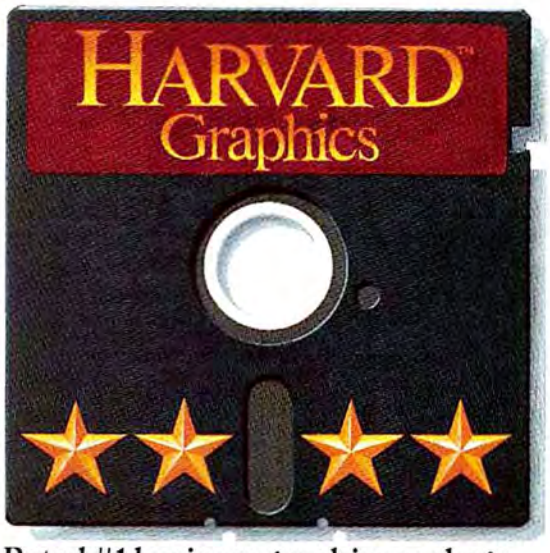
Version 2.0 of *Fastback Plus* features enhanced backup and restore functions and improvements to the interface. (For a review of the package, see "Fast Floppy Backup" in this issue.) The program now lets you append incremental backups to an existing backup set and warns you if a previously written disk is inserted into the computer. Version 2.0 also backs up hidden directories and files.

A Restore Estimate command lets you estimate the number of files and volumes and the amount of time needed to complete a restore operation, as well as providing the names of the proper backup sets. When you want to restore only part of your backup, Smart Restore prompts you for the exact backup disk needed and warns you if the wrong disk is used.

Fastback Plus, which retails for $189, requires DOS 2.1 or a later version and 320K of memory. Owners of version 1.01 can upgrade for $20; upgrades of earlier versions cost $50. Fifth Generation Systems, 11200 Industriplex Blvd., Baton Rouge, LA 70809; 504/291-7221.
Reader service no. 610

PC-Outline Plus

Brown Bag Software has upgraded its personal information manager, *PC-Outline*, into *PC-Outline Plus*. The software includes an integrated 80,000-word Merriam-Webster spelling checker and thesaurus. It also lets you customize its interface to match the editing commands of *Microsoft Word*, *WordStar Professional*, *MultiMate*, and



Rated #1 business graphics package second consecutive year. –Software Digest

"They (Harvard Graphics)...made the best even better."

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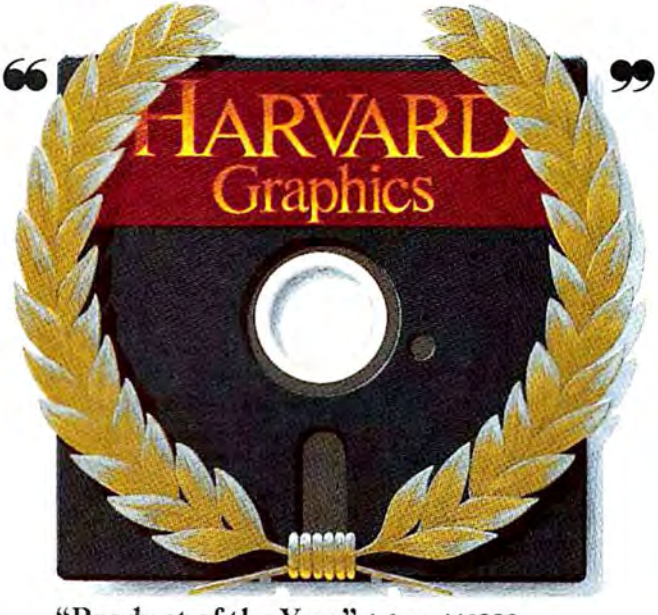
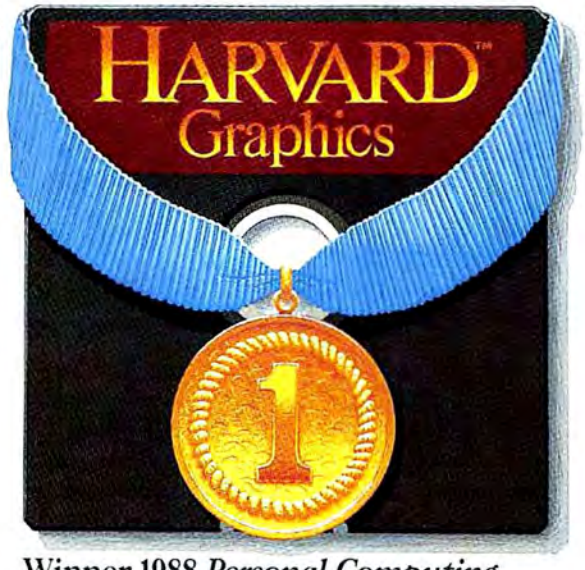


"Product of the Year"–Infoworld 1988



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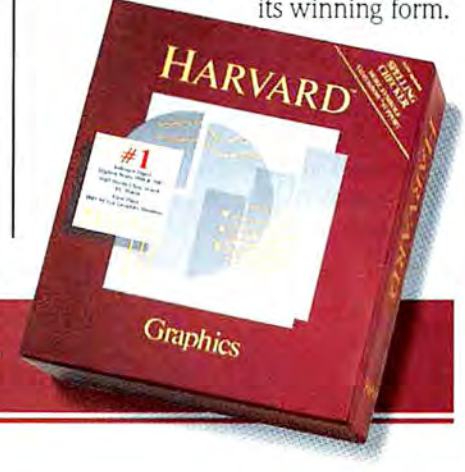


Graduate to New Harvard Graphics 2.1 with Spelling Checker.

For a free trial disk call 1-800-345-2888, Operator 53.
For upgrade information call 1-800-255-5550.

© 1988 Software Publishing Corporation, 1901 Landings Dr., Mt. View, CA 94039-7210. Runs on IBM PC and MS DOS compatibles.

The Premium/286 Model 140V comes standard with VGA graphics, a 10-MHz 80286 processor, a 40MB hard disk, and seven expansion slots.

WordPerfect. Additionally, it supports the familiar *PC-Outline* commands such as Category View and Context Sensitive Help.

PC-Outline Plus is $195 plus $7.50 for shipping and handling. Upgrades are free to registered *PC-Outline* users who purchased the program between July 23 and October 1, 1988; otherwise, upgrades cost $50 plus a $7.50 shipping and handling charge.

PC-Outline Plus requires DOS 2.0 or a later version and 256K of memory; a hard disk is recommended. Brown Bag Software, 2155 South Bascom Ave. #114, Campbell, CA 95008; 800/523-0764, 408/559-4545.
Reader service no. 642

askSam 4.1

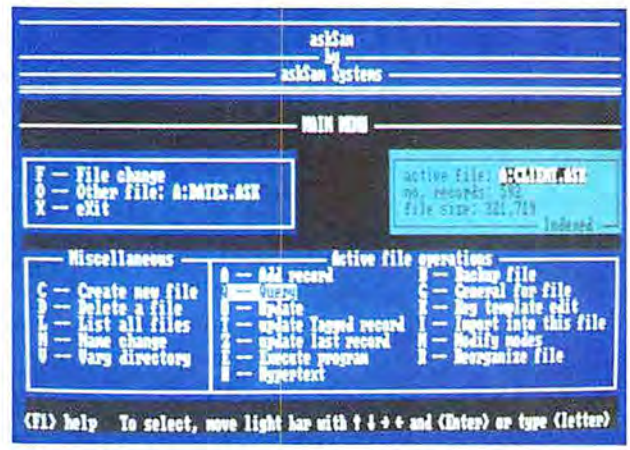
The veteran personal information manager *askSam* now offers bolstered information-retrieval features. These include global search across multiple *askSam* files and a dialog box in which to build your own options within an *askSam* program without altering the original program. With the dialog box and the *askSam* command language, you can make a predefined set of menu prompts appear at runtime and respond to user selections.

askSam 4.1, permitting free-form entry of data to which structure may or may not be added later, retrieves data quickly because of its ability to search across file boundaries.

The package retails for $295 and requires DOS 2.0 or a later version and 256K of memory. Upgrades from version 4.0 are $15; upgrades from earlier versions are $85. askSam Systems, P.O. Box 1428, Perry, FL 32347; 800/327-5726.
Reader service no. 643

MicroMan II Release 1.1

POC-IT Management Services has enhanced its *MicroMan II* project management package by adding the ability to alter Gantt charts in the Gantt mode and to list data elements in the order you choose. The software also features resource histograms and increased local area network support. Particularly useful for management information system departments, *MicroMan II* release 1.1 is designed to be a complete system including staff management and executive information services as well as project management. It lets you schedule staff, resources, and multiple projects, and produce numerous management reports. Histograms of resource assignments graphically illustrate project participants' time commitments by day, week, and month for both active and projected tasks. On a network, it supports full record and file locking for up to 100 concurrent users, the ability to direct output to individual and networking directories, and improved routing of work to network printers. *MicroMan II* release 1.1 requires 512K of memory, a hard disk, and DOS 3.0 or a later version for a single user. It retails for $2895. The network version is available with a sliding discount depending on the number of users licensed. POC-IT Management Services, Inc., 606 Wilshire Blvd. #512, Santa Monica, CA 90401; 213/393-4552. ●
Reader service no. 644



askSam makes information retrieval easier with global searches across files and a dialog box for building your own program options.

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Fast Floppy Backup

Backing up your hard disk is simple when you have a good tool, and drudgery when you don't.

A comparison of six floppy-based backup programs emphasizes a key feature: ease of use.

Art Wilcox

You know you should back up your hard disk frequently. But of the several methods available, which one is right for you? If you regularly update large data base, graphics, or desktop publishing files, you should consider WORM drives, removable hard disks like the Bernoulli Box or Sysgen's Passport 40, or tape. However, if the number and size of files you edit is small, software that backs them up onto floppy disks is your most economical solution.

We tested six hard disk backup utilities: *Fastback Plus*, *Corefast*, *Back-It*, *Point-And-Shoot PC-Fullbak*, *BackEZ*, and *DS Back-up +*. Priced from $80 to $189, they represent a smart, economical investment in data security.

How Friendly, How Flexible?

Because hard-to-use programs usually go unused, ease of use is crucial in backup software. All six menu-driven programs reviewed are significantly better than DOS's BACKUP and RESTORE commands. Still, users will master the concise interfaces of *Fastback Plus*, *Back-It*, and *Point-And-Shoot PC-Fullbak* faster than *Corefast*'s logical but complex system; *DS Backup +* and *BackEZ* require the longest learning periods.

Another key to a program's usefulness is the flexibility it allows in defining a backup set. You should be able to select either the entire hard disk or only those files modified since the last backup or within a given range of dates. You should also be able to specify combinations of directories and individual files for backup or restoration. All the programs reviewed offer such flexibility; some even let you tag individual directories and files from a tree-structured display. All six allow you to include or exclude specific groups of files using DOS's * and ? wild cards. *Fastback Plus*, *Corefast*, *Point-And-Shoot PC-Fullbak*, and (with some difficulty) *BackEZ* let you select files by using wild cards on a directory-by-directory basis; the others apply wild cards globally, limiting the specificity of your backups.

Even the best-designed interface, however, is just a hindrance when you need to back up the same files over and over. Fortunately, all the reviewed programs let you automate frequently repeated backups by saving program settings and file selections to configuration files that you may later run from the menu or a batch file. In addition, all six programs let you invoke menu functions at the DOS command line and from batch files. Both methods let you bypass menus and begin inserting disks almost immediately.

Shuttling floppies in and out of the disk drive is one task that can't be automated. However, backups run more smoothly if the program tells you ahead of time how many disks will be required, and if it formats them for you automatically during the backup. Only *BackEZ* supplies no disk estimate; *Corefast*'s better-late-than-never guesstimate appears only *after* you've started the backup. Neither *BackEZ* nor *DS Backup +* can format disks on the fly.

The way a backup program formats and writes to the disk may make a difference to you. Of the tested programs, all but *BackEZ* write the data to disk in a proprietary format unreadable by DOS. *BackEZ*'s DOS format allows its archived files to be restored with the DOS COPY command—handy if you should lose (or corrupt) the backup program itself. On the other hand, proprietary formats make for quicker and more compact backups.

Speed, Safety, and Size

Speed is an important measure of backup performance, especially during time-consuming full backups and frequent incremental backups. NSTL testing revealed *Fastback Plus* as the hands-down winner, with *Point-And-Shoot PC-Fullbak* running a respectable second. In the middle of the field come *Corefast*, *Back-It*, and *DS Backup +*; *BackEZ* lags behind.

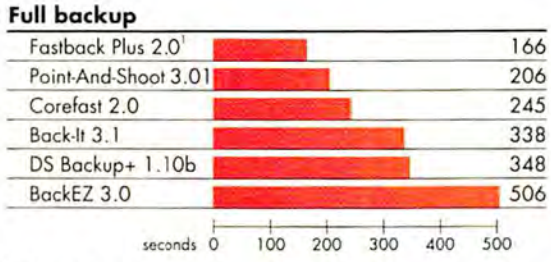
Juggling disks is the most burdensome part of floppy-based backup. Only *BackEZ* and *Point-And-Shoot PC-Fullbak* lack data compression—a feature that can halve the number of disks required. More critical than data compression, however, is data integrity. All six programs skip over bad sectors during backups, but not all help you restore files from disks that suffer damage subsequently.

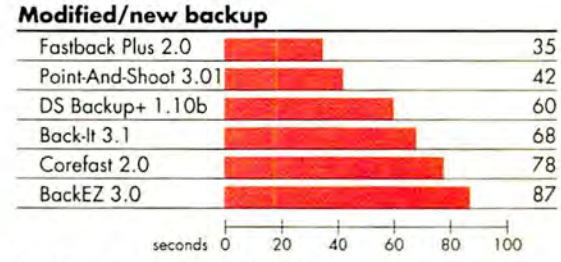
RICHARD SALA

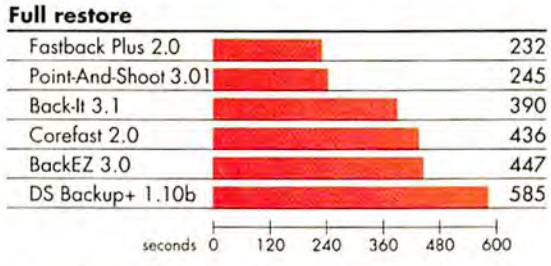
NSTL TEST REPORT

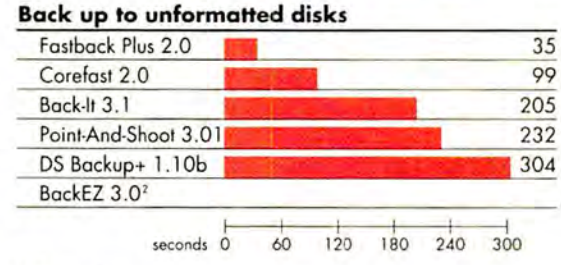
Backup Software

One thing is clear: Fastback Plus earns its name with nearly unsurpassed speed. Backing up a single directory onto unformatted disks, the program is nearly three times faster than its closest competitor.









[1] Fastback Plus's Save Time compression feature was used.
[2] Program could not complete this test without the DOS FORMAT command, which was not included.

All tests were run on an IBM PS/2 Model 50 with 1MB of RAM and a 20MB hard disk.

Full backup
This test measured the time required for each program to back up 5MB of hard disk data distributed over 400 files in 40 directories to floppy disks. Program options that would slow performance (such as error correction) were eliminated.

Full restore
This test measured the time required for each program to fully restore the data backed up in the first test to a formatted hard disk.

Modified/new backup
This test measured the time required to back up 1.5MB of data representing files modified or created since a previous backup.

Back up to unformatted disks
This test measured the time required for each program to back up a single directory containing 1.6MB of data using unformatted disks. The hard disk contained 15MB of data in eight files.

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

Back-It, *Corefast*, and *Fastback Plus* write additional error recovery instructions to your archive disks that enable you to recover data from damaged disks. However, this increases backup time and the number of disks required by about 10 percent.

In Case of Crash

Although you'll use these programs mostly for backup, they show their true colors at restore time. A program should offer flexible file selection, good cataloging of backed-up files, and safeguards against Homo sapiens' penchant for deleting the wrong file. All the reviewed programs' file-restore options mirror those offered during backup, with two exceptions: *DS Backup +* and *Back-It* can't restore files by date. All six programs keep a catalog of archived files and directories that you can view or print to help monitor your backups.

A good program will warn you before it overwrites an updated file with an obsolete archived version. *Back-It*, *Corefast*, and *Fastback Plus* let you choose between overwriting older files only, all files, or no files at all, while *Point-And-Shoot PC-Fullbak* flags

only same-name file overwrites and doesn't check dates. *BackEZ* and *DS Backup+* provide no overwrite safeguard.

Fastback Plus 2.0

Fastback Plus wins the speed crown and top honors for ease of use, versatility, and power. Though it's premium priced at $189, the program's excellent error recovery, data compression, and automation facilities more than justify the high tariff.

The program's pulldown menus can be configured in one of three difficulty levels. File and directory selection is first-class, letting you use wild-card characters to specify up to 20 groups of files for inclusion in, or exclusion from, the backup set. You can also tag directories and files from the program's tree display.

Fastback Plus informs you of the number of disks and the time required, and displays a listing of the selected files. Reports are comprehensive, providing an index of file size and attributes and, more important, the number of the archive disk where each file resides. The program lets you recoup data from archive sets missing a disk, and the manufacturer, Fifth Generation Systems, claims the program can recover data from floppy disks suffering up to 13 percent damage.

EXECUTIVE SUMMARY

Fastback Plus 2.0

Hard disk backup utility

BEST BUY

Fastback Plus has state-of-the-art backup features and such extras as a keystroke macro recorder and menu-selectable novice and advanced interfaces. The program is *fast*.

	POOR	FAIR	GOOD	EXCELLENT
Speed				●
Backup selectivity				●
Security				●
Floppy disk handling				●
Overall value				●

FEATURES EVALUATION

Backup Software Compared

It seems there's nothing Fastback Plus can't do. Corefast and Back-It offer nearly complete feature sets, but neither program forewarns you of the time required for a given backup.

	Fastback Plus	Corefast	Back-It	PC-Fullbak	BarkEZ	DS Backup+
Backup selectivity						
Includes/excludes files from backup by name and date	●	●	●	●	●	●
Allows directory tagging from tree display	●	●	●	●	○	●
Allows file tagging from tree display	●	●	○	●	○	○
Security						
Byte-by-byte file comparison	●[1]	○	●	●[1]	○	●[1]
Recovers files from damaged disks	●	●	●	○	○	○
File-overwrite warning during restore	●	●	●	◒[2]	○	○
Floppy disk handling						
Formats target disks during backup	●	●	●	●	○	◒[3]
Uses data compression	●	●	●	○	○	●
Estimates time required for backup	●	○	○	○	●	○
Estimates number of disks required	●	●[4]	●	●	○	●

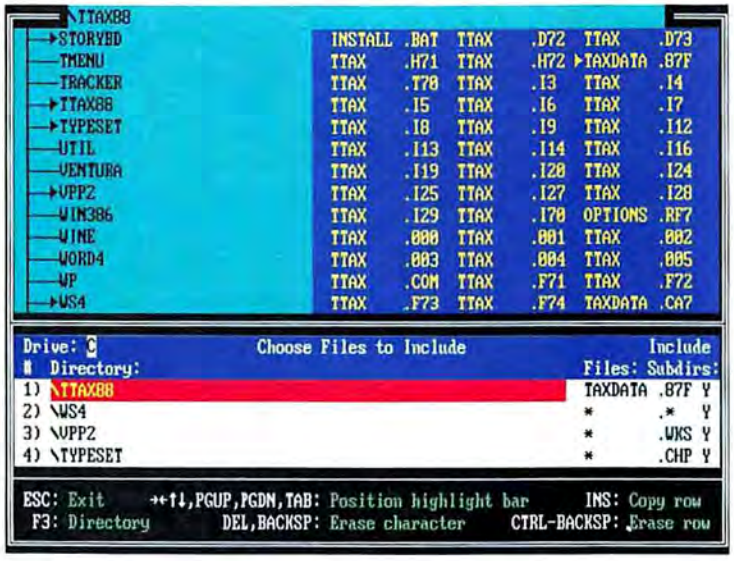
● Yes ○ No ◒ Deficient

[1] Requires additional command after backup.
[2] Doesn't warn against overwriting newer files with archived versions.
[3] Feature provided in Speedbak program.
[4] Only after backup has begun.

You can automate repeated backups by using saved configuration files or by enlisting a snazzy macro recorder that records your keystrokes as you type, and then replays them from either the menu or a batch file. More than just a make-over of the speedy original *Fastback*, *Fastback Plus* is now the backup utility of choice.

Corefast 2.0

Corefast proffers speed, file-selection flexibility, and such extras as error correction and file management functions. The program's menu structure, though not as intuitive as *Fastback Plus*'s, is logically structured and has two user levels. Nonetheless, scanty cataloging and a labor-intensive file-restore routine deny this program first-place ranking.



Fastback Plus lets you tag files and directories in the listing at the top of its screen. Tagged items are displayed in the window at the bottom, which also accepts typed input.

Corefast's file and directory selection is at least as flexible as that of *Fastback Plus*. You can tag a combination of files and directories from within a directory display, apply wildcard selectors to individual directories, and preview the backup set. As an extra, *Corefast* adds a file manager that lets you create and rename directories as well as rename, copy, delete, and view files.

Corefast's data compression, error correction, and backup automation are also on a par with those of *Fastback Plus*, but *Corefast*'s price tag is smaller by $40. If you can live without *Fastback Plus*'s phenomenal speed, *Corefast*'s respectable wealth of features makes it a powerful yet economical second choice.

EXECUTIVE SUMMARY

Corefast 2.0

Hard disk backup utility

With nearly all the features of *Fastback Plus* and a built-in file manager to boot, *Corefast* makes a smart, economical second choice—as long as you can live with mediocre speed.

	POOR	FAIR	GOOD	EXCELLENT
Speed			●	
Backup selectivity				●
Security			●	
Floppy disk handling			●	
Overall value			●	

Back-It 3.1

Back-It offers adequate speed and file-selection functions in a package that equals *Fastback Plus* in overall ease of use and data security. Its easily mastered opening screen provides quick access to program functions via a *1-2-3*–like menu, and it displays several lines of context-sensitive help that you can toggle off and on. Backups can be automated with configuration files or DOS-prompt commands run from batch files. *Back-It* also supplies excellent report and status information.

Like *Fastback Plus* and *Corefast*, *Back-It* offers exemplary safeguards against human and machine error: avoiding bad sectors during formats, automatically performing byte-by-byte file comparison (in which the program reads the file just backed up and compares it to the archived version), and warning against file overwrites. *Back-It* also lets you restore data from disks in nonsequential order as well as from sets missing an archive disk, and its claimed ability to withstand 22 percent damage to archive disks is tops among the programs reviewed.

Compared to *Fastback Plus* and *Corefast*, however, *Back-It*'s file-selection abilities are only passable. You can tag directories from

EXECUTIVE SUMMARY

Back-It 3.1

Hard disk backup utility

Back-It's easy interface and data security are top-notch. Despite so-so speed and incomplete file selection, the program is a good deal at $130—$60 less than *Fastback Plus*.

	POOR	FAIR	GOOD	EXCELLENT
Speed			●	
Backup selectivity				●
Security				●
Floppy disk handling				●
Overall value				●

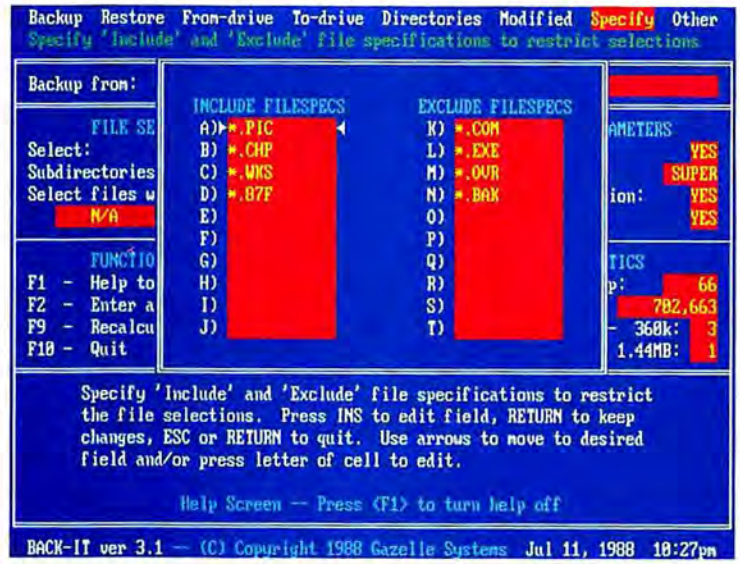
its display but not individual files, and you can't apply wild cards to individual directories. Still, though it's not quite as swift as *Corefast*, *Back-It*'s excellent error correction and data compression make it a capable program well worth the $130 price tag.

Point-And-Shoot PC-Fullbak 3.01

Point-And-Shoot PC-Fullbak withholds such amenities as data compression and error correction in favor of swift and easy backups. And what it does, it does well, performing most tasks with limited fuss at speeds second only to *Fastback Plus*. However, limited data security and a lack of extras knock this medium-price program from the top ranks.

The program presents a sparse, clear interface: Only seven commands and descriptions appear at the top of the screen. If that's not straightforward enough, the manufacturer includes another program, PC-Fullbak EZ, which offers just two choices: full or appended backup.

True to its name, *Point-And-Shoot PC-Fullbak* provides easy file selection. From a tree display, you can quickly tag directories and files; you can also include or exclude groups of files from backup at the directory level by using wild cards. The program also estimates the disks needed for each task and presents good status information.



Point-And-Shoot PC-Fullbak matches the best programs in automating frequently repeated tasks. You can either save current parameters in configuration files or replicate any menu function at the DOS prompt. However, some important functions, such as date-range operations, are available only via the DOS command line, limiting the convenience of the menu interface.

File restores are clear and quick, and reports include each file's disk location. But the program doesn't automatically do byte-by-byte file comparisons during backup (a capability, among the programs reviewed, unique to *Back-It*). And though *PC-Fullbak* prompts you before overwriting a file of the same name, it doesn't check file dates, which three of the tested programs do.

If speed is a must, you may choose *Point-And-Shoot PC-Fullbak* over *Corefast* in the midprice range. What you'll trade is security—the reason you decided to back up in the first place, and a corner that you may not want to cut.

Back-It's easy-to-understand interface may keep you away from the user manual and promote frequent backups.

BackEZ 3.0

Though it performs most necessary backup tasks well, if slowly, *BackEZ* lacks data compression and error correction, and its menus are often uninformative; only *DS Backup+* is more difficult to master. *BackEZ*, however, is the only program of the six reviewed that writes files in DOS format, letting you restore files—even those split across two disks—using only DOS commands.

EXECUTIVE SUMMARY

Point-And-Shoot PC-Fullbak 3.01

Hard disk backup utility

This program's name says it all: *Point-And-Shoot PC-Fullbak* lets you dive right into your backup, and places a minimum number of warning messages in your path. The question is, do you feel lucky?

	POOR	FAIR	GOOD	EXCELLENT
Speed				●
Backup selectivity				●
Security			●	
Floppy disk handling			●	
Overall value				●

You can be precise about selecting files for backup with BackEZ. However, the program doesn't make it easy, requiring you to type in text scripts according to its syntax rules.

BackEZ offers precise, though labor-intensive, file and directory selection. Although it doesn't permit file or directory tagging from its display, you can save current program settings in a configuration file, and you can type any combination of file-include or file-exclude parameters into a text file that the program consults at backup time.

Though *BackEZ* offers good report information, it falters in matters of convenience and overall safety. It won't format disks during backup or estimate the number of disks required. Also, it provides no warning during restores before overwriting hard disk files newer than the archived versions.

BackEZ stumbled in the speed tests and further suffers from unindexed, skimpy documentation. For a few dollars more, you can buy a program close to the state of the art.

DS Backup + 1.10b

DS Backup +'s windowed interface looks inviting initially, but closer inspection reveals that commands aren't intuitive or logically structured. For example, it doesn't offer a 'back up modified files only' option, instead calling this oft-repeated operation 'archive only'. In the end, it's the hardest to learn of the six programs reviewed.

File selection, speed, and security methods are also second-rate. You can view and sort files and directories from a display, but you can't tag files there, only directories. Although *DS Backup +* performed well in the modified backup test, only *BackEZ* was slower overall. And *DS Backup +* can't restore any files from an incomplete set of archive disks.

Data compression and the ability to search archive set catalogs for individual files are among the program's pluses. You can also forgo the menu and use configuration files and DOS-prompt commands. However, *DS Backup +*'s overall sluggishness, unintuitive design, and lack of security make it a poor choice, despite the low price.

EXECUTIVE SUMMARY

BackEZ 3.0

Hard disk backup utility

Although *BackEZ* offers some useful features, the program requires more effort than its competitors. However, it is the only program reviewed that writes files in a DOS-compatible format.

	POOR	FAIR	GOOD	EXCELLENT
Speed		●		
Backup selectivity			●	
Security		●		
Floppy disk handling		●		
Overall value			●	

NSTL BENCHMARK TESTING

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

EXECUTIVE SUMMARY

DS Backup + 1.10b

Hard disk backup utility

With little to recommend it in the way of speed and features and an interface that is hard to learn, *DS Backup +*'s low price presents a false economy.

	POOR	FAIR	GOOD	EXCELLENT
Speed			●	
Backup selectivity				●
Security		●		
Floppy disk handling			●	
Overall value			●	

You Get What You Pay For

This group of products is an almost clinical example of economy versus performance. At the top of the curve, *Fastback Plus* is quick and provides every conceivable amenity. Its combined speed and flexibility make it the most likely of all the programs to be used with regularity.

But if $189 strikes you as too much for a utility, you have three choices: You can forfeit some of *Fastback Plus*'s speed but none of its features and go with *Corefast*. You can give up some flexibility in file selection and choose *Back-It*. Or you can stay fast and flexible but increase the risk of losing data with *Point-And-Shoot PC-Fullbak*. *DS Backup +*'s and *BackEZ*'s inadequate speed, flexibility, and security make these programs unacceptable despite their low price. Even the cheapest software, if it goes unused, is a bad investment. ●

Art Wilcox is a contributing editor for PC World.

WHERE TO BUY

Fastback Plus 2.0
Fifth Generation Systems, Inc.
11200 Industriplex Blvd.
Baton Rouge, LA 70809
504/291-7221
List price: $189
Requirements: 448K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 7–7, Sat 10–4
Other support services: none
For more information, circle 610 on reader service card.

Corefast 2.0
Core Int'l
7171 N. Federal Hwy.
Boca Raton, FL 33487
407/997-6055
List price: $149
Requirements: 256K, DOS 2.0 or later version
Not copy protected
Technical support: 90-day free phone support, toll-free number for registered users, M–F 8–6
Other support services: bimonthly newsletter
For more information, circle 611 on reader service card.

Back-It 3.1
Gazelle Systems
42 N. University Ave.
#10
Provo, UT 84601
801/377-1288
List price: $129.95
Requirements: 320K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, toll-free number, M–F 8–5
Other support services: bimonthly newsletter $2; 13-month upgrade/support contract including updates, newsletter, and priority telephone support $50
For more information, circle 612 on reader service card.

Point-And-Shoot PC-Fullbak 3.01
Westlake Data Corp.
P.O. Box 1711
Austin, TX 78767
512/328-1041
List price: $130
Requirements: 384K, DOS 2.0 or later version
Not copy protected
Technical support: 90-day free support, no toll-free number, M–F 9–5
Other support services: yearly support contract including minor program updates and quarterly newsletter $50
For more information, circle 613 on reader service card.

BackEZ 3.0
EZ-Logic, Inc.
315 S. El Monte
Los Altos, CA 94022
800/635-6442, 800/544-4353 California, 415/949-2834
List price: $99
Requirements: 256K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, toll-free number, M–F 8–6
Other support services: none
For more information, circle 614 on reader service card.

DS Backup + 1.10b
Design Software, Inc.
1275 W. Roosevelt Rd.
#104
West Chicago, IL 60185
312/231-4540
List price: $79.95
Requirements: 256K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5
Other support services: none
For more information, circle 615 on reader service card.

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ASHTON·TATE*

104 **Intel Connection CoProcessor**
Intel's entry sets a blistering pace for fax boards and supports CAS, the spec that promises to jazz up the telecommunications of tomorrow.

107 **NEC PowerMate 386**
NEC's fully loaded 386 machine costs top dollar—too bad it doesn't give you your money's worth.

108 **Mitsubishi MP 286**
The MP 286's trim 15-by-15-inch footprint may entice users with crowded desktops, but in light of its average performance the computer is pricey.

110 **Microscience HH-3120**
A SCSI interface, a healthy 112MB of storage, and a low price add up to a great value among hard drives.

112 **ThumbScan PCBoot**
Need to guard sensitive data? An inexpensive hardware/software combo does the job easily and effectively—it even secures the data of several individuals using the same machine.

Intel Connection CoProcessor

PC fax board

BEST BUY

PROS: Fast, unobtrusive background mode, CAS protocol, five-year warranty

CONS: Limited file conversion modes

Like all PC fax boards, Intel's 9600-bps Connection CoProcessor converts disk files to fax format and sends them to any group III fax machine or compatible fax board; it receives faxes as well. But the similarity ends there: This unit stands out from the crowd. Its 10-MHz 80188 coprocessor allows it to work in the background without freezing the computer or delaying keystrokes. Its built-in 9600-bps modem (non-Hayes-compatible) can send nonfax files to similarly equipped remote computers. Most important, it supports the DCA/Intel Communicating Applications Specification protocol (CAS), which promises to bring PC telecommunications to a new level of sophistication. Despite its limited file conversion modes the Connection CoProcessor flashes to the finish line to collect a well-earned Best Buy.

CAS is a programmable, public domain communications protocol that will soon be supported by such vendors as Microsoft, Lotus, Symantec, and Borland. Once written into an application, CAS permits direct access to the coprocessor, enabling users to send and receive faxes without leaving their current application and even perform wizardry like updating remote spreadsheets via a background telecom link. CAS should have a major impact by the end of the year (see *Industry Outlook*, *PCW*, November 1988).

For now, though, the $995 Connection CoProcessor must hold its own in an expanding field of PC fax boards, including the highly rated 9600-bps GammaFax (see "Fax Times Seven," *PCW*, October 1988), which now sells for $300 less than the Intel board.

The Connection CoProcessor does not rely on a TSR program (which taxes system RAM and must share the use of your PC's

PHIL ANDERSON

FEATURES EVALUATION

Intel Connection CoProcessor Versus GammaFax

The Connection CoProcessor delivers numerous facsimile features, but its list of file conversions suffers in comparison with GammaFax.

● Yes
○ No

	GammaFax	Connection CoProcessor
Standard features		
Price	$695	$995
bps rate	9600 [1]	9600
Slot size required	one-half	full
Requires TSR installation	○	○
Setup and installation		
Installation software	●	●
Complete documentation	●	●
Mouse support	○	●
Scanner support		
Canon IX-12	●	●
HP ScanJet	●	●
Princeton LS-300A	○	●
Microtek MS-300	○	●
Chinon N-205	○	●
Monitor support		
CGA	●	●
EGA	●	●
VGA	●	●
HGC	●	●
Genius VHR	●	○
Wyse-700	●	○

	GammaFax	Connection CoProcessor
File conversion, outgoing		
ASCII	●	●
80-column	●	○
132-column	○	○
WordStar	●	○
PC Paintbrush	●	●
Dr. Halo	●	○
AutoCAD	●[2]	○
Windows	●	○
File conversion, incoming		
OCR	●[2]	○
PC Paintbrush	●	●
Dr. Halo	●	○
AutoCAD	●[2]	○
File transfer		
On-screen help	●	●
Background mode		
Sends	●	●
Receives	●	●
Permits PC to be used	●	●
Coprocessor	○	●
On-the-fly text-file conversion	○	●
Built-in 9600-bps modem	●	●
Speaker	●	●

[1] With ATs and compatibles only; 4800 with PCs and XTs.
[2] Available at extra cost.

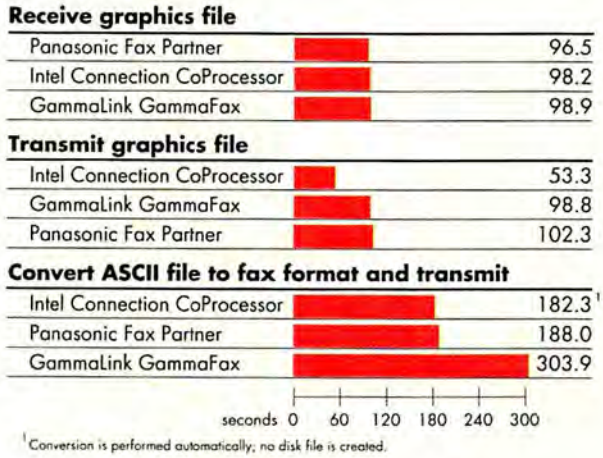
processor) to perform its background tricks. Instead, the board's 80188 processor, backed with 256K of on-board RAM, frees your system from the communications chore. And having a processor devoted to the task boosts throughput tremendously. As NSTL's test results indicate, the Connection CoProcessor outgunned other top 9600-bps fax boards such as Panasonic's Fax Partner and GammaLink's GammaFax, transmitting bit-mapped fax files almost twice as fast as the speedy Fax Partner.

When you get down to file conversion, however, the Connection CoProcessor doesn't do as well. Unlike the GammaFax, which supports six outgoing and two incoming modes, the Connection CoProcessor is limited to converting ASCII and *PC Paintbrush* files for outgoing fax transmission; incoming conversion is restricted to *PC Paintbrush*. On the other hand, the built-in 9600-bps modem enables you to send and receive

NSTL TEST REPORT

Intel Connection CoProcessor

The Connection CoProcessor may be the fastest fax board around. Intel's board triumphs over the speedy Fax Partner in two of the three tests, transmitting graphics files almost twice as fast as the Panasonic.



[1] Conversion is performed automatically; no disk file is created.

Selected files were transmitted between an 8-MHz IBM AT Model 339 equipped with a 30MB hard disk, a monochrome monitor, and a GammaFax board, and another 8-MHz IBM AT Model 339 equipped with a 30MB hard disk, an EGA board and monitor, an HP LaserJet Series II laser printer, and the fax board being tested. Before testing began, the first computer's hard disk was formatted, FILES and BUFFERS were both set to 20 in CONFIG.SYS, and then a graphics file (created by sending a graphics image from a standard group III fax machine to a fax board in a PC) was copied to the hard disk. The hard disk of the second computer was reformatted prior to the installation of each board and its software; FILES and BUFFERS were also set to 20 in CONFIG.SYS. An ASCII file was then copied to the second system's hard disk. Times were measured from the command to initiate the test until control was returned to the keyboard. Files received by either computer were deleted before subsequent tests were performed.

Receive graphics file
This test measures the time required for the test board to receive a one-page graphics file.

Transmit graphics file
This test measures the time required for the test board to send the one-page graphics file received in the previous test.

Convert ASCII file to fax format and transmit
This test measures the time required for the test board's software to convert a four-page ASCII file to fax format ready for transmission and then send the converted file.

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

any kind of file you like—but not in fax format. Because the modem uses a nonstandard protocol, however, the remote computer must also contain a Connection CoProcessor. (A 2400-bps Hayes-compatible add-on modem is available as well.)

The software interface is excellent. Accessible by mouse or keyboard, the menus and pop-up dialog boxes are logically organized and easily navigated. Sending a fax is a matter of selecting files from a directory on your hard disk, picking a recipient from the built-in phone book, and pressing a key. When you receive a fax, a helpful utility lets you view it and magnify, crop, and edit images. For more exhaustive image manipulation, you can use the included Intel version of *PC Paintbrush*.

Like other fax systems, the Connection CoProcessor lets you schedule unattended transfers, broadcast mail to multiple addresses, and poll remote stations to pick up waiting mail. The phone book feature is powerful yet easy to use, letting you save phone books and mailing lists.

Hardware support is excellent. The Connection CoProcessor supports VGA graphics, as well as EGA and CGA, and imports and manipulates files from any scanner that generates PCX files, including the Canon IX 12, the HP ScanJet, and the Panasonic FX-RS505.

If you're in the market for a 9600-bps PC fax board, need a wide range of file conversions, and can't wait for CAS, you're probably better off buying a $695 GammaFax (recently reduced from $995) right now. For anyone else, the $995 Connection CoProcessor is highly recommended. It's good now, and with CAS software on the way, it can only get better. —*Eric Brown*

WHERE TO BUY

Intel Connection CoProcessor
Intel Corp.
Mail Stop C03-08
5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124
800/458-6231, 503/681-8080
List price: $995, 2400-bps Hayes-compatible modem $295

Warranty: five years parts and labor
Extended warranty: none
Technical support: toll-free number, M–F 9–5
Other support services: BBS (503/645-6275)
For more information, circle 650 on reader service card.

NEC PowerMate 386

20-MHz 80386 system

PROS: Integrated design, dual coprocessor support, includes Windows/386

CONS: Expensive, mediocre performance, skimpy documentation

On the surface, the NEC PowerMate 386 looks like an 80386 screamer: 20 MHz (switchable to 8 MHz), zero wait states, interleaved memory access, and a fast hard drive. But this system is a surprisingly poor performer compared with other 20-MHz 386 machines. Not only does it run significantly slower than an IBM Model 80-111, it loses even worse to comparable systems (like the Dell 310) costing thousands of dollars less.

With 2MB of RAM, a 1.2MB floppy drive, a 130MB ESDI hard drive, a healthy 237-watt power supply, one parallel and two serial ports, a 101-key keyboard, a MultiSync II monitor, an EGA video adapter with mouse port, and DOS 3.3, the system retails for a hefty $9295. It sports an AT-size case with drive bays to accommodate four half-height or two full-height devices.

The motherboard has two 8-bit slots (one of which is occupied by the video board) and five AT-compatible 8/16-bit slots (one of which holds the ESDI hard disk controller). All of the system's 32-bit RAM is socketed on a memory board that goes in a proprietary 32-bit slot. Up to 16MB of 80ns RAM can be installed: 8MB on the memory board and 8MB more on a piggyback unit.

The PowerMate uses a memory interleaving scheme rather than memory caching (the memory access technique common to top-performing systems). NEC claims that operating systems like UNIX and OS/2, which require access to large amounts of memory, run faster with interleaving than with caching.

Be that as it may, NEC's interleaving method leaves a lot to be desired when running DOS. In National Software Testing Laboratories (NSTL) tests, the PowerMate did quite badly, trailing both the speedy Compaq Deskpro 386/20 (not shown in the Test Report) and the PS/2 Model 80-111, which is generally considered one of the slowest 20-MHz systems. It did pass the NSTL Crash Test without any problems.

The PowerMate is not without thoughtful touches: Two serial ports, one parallel port, and the floppy controller are built into the motherboard, saving slots, as are sockets for both 80387 and 80287 math coprocessors. NEC has designed the CPU and coprocessor sockets with a handy lever-operated pin clamp mechanism that permits effortless chip removal and insertion.

The video adapter is NEC's Advanced Graphics Board Plus, the company's equivalent of an EGA; it even has a mouse port. Teamed with a MultiSync II monitor, it produced a bright, clear image. The monitor comes with an adapter allowing it to be used with a VGA.

Two of the PowerMate's weakest spots are its keyboard and documentation. The keyboard touch is uncomfortably mushy. The skimpy documentation contains just enough information to allow a user to set up the unit, but nothing more.

NEC's promising 386 is overpriced and underpowered.

FRED STANSON

FEATURES EVALUATION

Two New Machines Meet the Competition

The 20-MHz NEC Powermate 386 and the 12-MHz Mitsubishi MP 286 go up against the competition. Both systems put ports and a floppy controller right on the motherboard. The Powermate boasts a healthy 16MB CPU-speed RAM ceiling, but it's pricey. The MP 286 is a small-footprint system, but its CPU-speed RAM tops out at a measly 1.6MB.

● Yes
○ No

Standard features	NEC Powermate 386	Compaq 386/20	Mitsubishi MP 286	Compaq Deskpro 286
Price	$9295[1]	$11,366[2]	$3895[3]	$5617[4]
CPU	80386	80386	80286	80286
Clock speed	20	20	6/8/12	8/12
Built into motherboard				
Parallel ports	1	0	1	0
Serial ports	2	0	1	0
Floppy disk controller	●	○	●	○
Video adapter	○	○	○	○
Mouse port	●[5]	○	○	○
Coprocessor support	80287, 80387	80387, Weitek 1167	8-MHz 80287	8-MHz 80287
Memory capacity				
With basic unit	2MB	2MB	640K	640K
Memory bus capacity	16MB	16MB	1.64MB	2.1MB
Expandability				
32-bit expansion slots/number free	1/0	1/0	n/a	n/a
8/16-bit expansion slots/number free	5/4	5/3	4/3	6/4
8-bit expansion slots/number free	2/1	2/2	2/1	2/2
Half/full-height storage device bays	4/2	4/2	2/0	4/2
120MB or larger hard disk available from maker	●	●	○	●
Ergonomic design				
Switchless installation	○	○	○	○
Compact footprint	○	○	●	○
Complete documentation	○	●	●	●
Tilt-and-swivel monitor	●	●	●	●
Front-panel reset button	●	○	●	○
Front-panel on/off switch	○	○	○	○

[1] Price based on 2MB RAM, 1.2MB floppy, 130MB hard disk, ESDI controller, one parallel port, two serial ports, EGA video board and monitor, 101-key keyboard, DOS 3.3.
[2] Price based on same configuration as footnote 1, except with one serial port.
[3] Price based on 640K RAM, 1.2MB floppy, 40MB hard disk, parallel port, serial port, EGA video board and monitor, 101-key keyboard, DOS 3.2.
[4] Price based on same configuration as footnote 3, except with VGA and DOS 3.3.
[5] Built into video board.

A generous software package is bundled with the PowerMate: *Windows/386*, system diagnostics, setup and utility software, GW BASIC, and NEC's own version of DOS 3.3. NEC DOS allows the user to partition the 130MB hard disk as a single volume.

Still, the PowerMate 386 is not a machine anyone needs to run out and buy. Given its high price and poor performance, users expecting a top-notch 386 will be disappointed *and* out a lot of money. —*Lewis Perdue*

WHERE TO BUY

NEC PowerMate 386
NEC Information Systems
1414 Massachusetts Ave.
Boxborough, MA 01719
508/635-6000
List price: with 2MB RAM, 28ms NEC 42MB hard drive, 1.2MB floppy drive, one parallel port, two serial ports, 101-key keyboard, DOS 3.3 $5795
Accessories: 2MB daughterboard $1100, 8MB daughterboard $4000; 1.2MB floppy drive $275, 1.44MB floppy drive $225; 28ms NEC 42MB hard drive $1000, 23ms NEC 130MB hard drive $3600, 18ms NEC 300MB hard drive $3900; 40MB internal tape backup $695; Advanced Graphics Card $450, VGA video adapter $495; MultiSync II monitor $950, MultiSync 20-inch high-resolution XL monitor $3195; 10-MHz 80287 $795, 20-MHz 80387 $1195
Warranty: one year limited, parts and labor, repair or replace
Extended warranty: none
Technical support: through dealer only
Other support services: BBS
For more information, circle 651 on reader service card.

Mitsubishi MP 286

12-MHz AT-compatible system

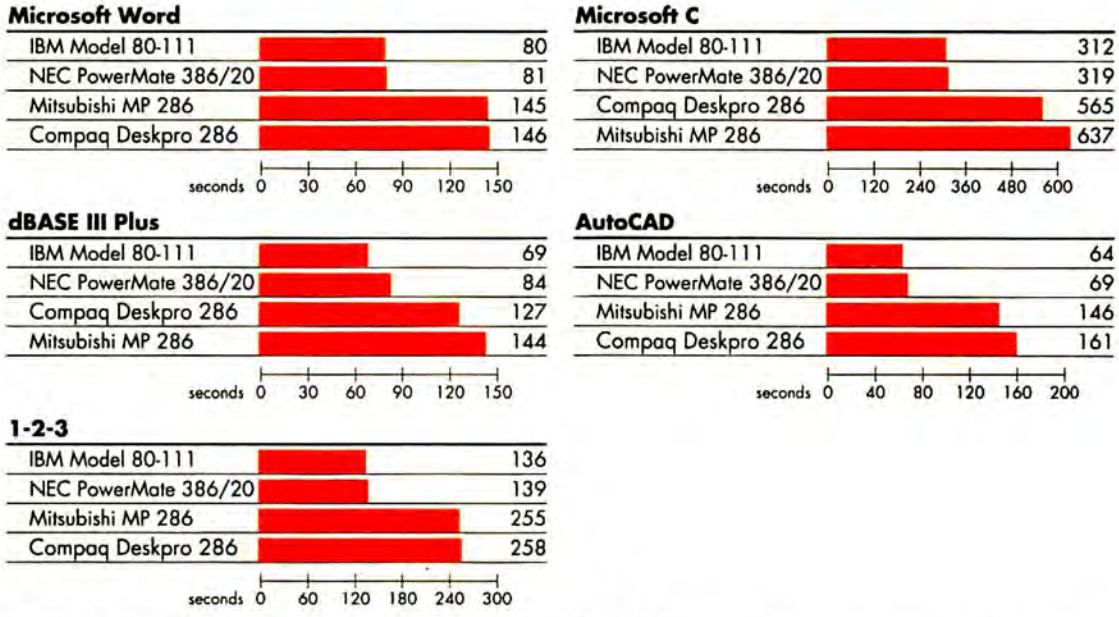
PROS: Small footprint, integrated design

CONS: Expensive, limited expandability

Mitsubishi Electronics, long known as a vendor of home electronics, has sold PC compatibles in America since 1983—but only with other vendors' nameplates. Recently,

Two New Systems Versus Two Standbys

Two new systems, NEC's PowerMate 386/20 and Mitsubishi's MP 286, go up against comparable PCs.



The NEC PowerMate was configured with a 144MB hard disk, 1.66MB of RAM, and a 20-MHz 80387 coprocessor. The IBM Model 80-111 was configured with a 60MB hard disk and 5MB of RAM. The Mitsubishi MP 286 was configured with a 42MB hard disk and 4.6MB of RAM. The 12-MHz Compaq Deskpro 286 was configured with a 42MB hard disk and 2.1MB of RAM.

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

dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

1-2-3 2.01
In this benchmark, a *1-2-3* macro executes a series of recalculations using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and no screen access is required, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0
The Microsoft C benchmark measures the time required to compile and link XLISP, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

AutoCAD 9
In this benchmark, a three-dimensional sample drawing is retrieved and displayed using *AutoCAD*'s EGA driver. The zoom function is used to display the drawing from various perspectives; then the full drawing is printed. The results of the benchmark depend primarily on the speeds at which the processor and coprocessor operate and at which memory is accessed. The performance of the display adapter and the hard disk also have some effect.

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

the Japanese conglomerate has come out of the shadows with its own system: a 12-MHz, one-wait-state AT compatible called the MP 286.

Thanks to a slot-saving design that places a serial port, a parallel port, and the floppy controller on the motherboard, the MP 286 checks in at a sylphlike 15 by 15 inches. However, at $3895 it seems overpriced for its performance. While it's cheaper than a Compaq Deskpro 286, comparable 12-MHz machines are available for around $1000 less.

The MP 286 comes in no fewer than nine varieties, starting as low as $2210 for a floppy drive, monochrome system. The Model

340-E reviewed here costs $3895 (when bought as a package) and comes with a 12-MHz CPU (switchable to 6 or 8 MHz), a stingy 640K of RAM (most 286 systems start at 1MB), a 40MB hard drive, a 1.2MB floppy drive, an EGA board and monitor, a 101-key keyboard, one parallel and one serial port, and MS-DOS 3.2.

Mitsubishi employs both memory paging and interleaving techniques to speed performance, but relatively slow 120ns RAM chips force the CPU to throttle down to one-wait-state operation. As a result, the MP 286 turned in only average performance on NSTL tests. It performed a hair faster than a 12-MHz Compaq Deskpro at *AutoCAD*, *Microsoft Word*, and *1-2-3*, and it lost at *dBASE* and C. On the brighter side, the Mitsubishi passed the NSTL Crash Test with nary a glitch.

With a 12-MHz system like the MP 286, the more RAM that runs at full CPU speed, the better. Unfortunately, system RAM can be expanded to only 1.6MB via a 1MB daughterboard that plugs into the motherboard and runs at a full 12 MHz; further expansion requires plugging memory boards into the expansion bus (which runs at an AT-compatible 8 MHz). Four 8/16-bit and two 8-bit slots are provided. With a hard disk controller and a graphics board in place, one 8-bit and three 8/16-bit slots are still free, thanks to the integrated ports and floppy controller.

The MP 286's small frame offers less than stellar drive support. The MP 286 includes only two externally accessible 5¼-inch half-height drive bays. A 3½-inch half-height 20MB hard drive stows inside, but if you want the 5¼-inch 40MB hard drive and 5¼-inch floppy that came with the review unit, there's no room for a second floppy or a tape drive.

While the Key Tronic keyboard is excellent, the 13-inch Mitsubishi EGA monitor, with its relatively coarse .40mm dot pitch, is a bit fuzzy. Furthermore, the power switch is awkwardly located at the rear of the system unit. The CPU speed can't be toggled with software or hot keys but may be set via DIP switches housed under a trapdoor on the front panel (which is better than DIP switches on the motherboard). A reset button is located under the trapdoor too, but you need a pointed object to push it.

The Mitsubishi MP 286 includes comprehensive documentation and an optional on-site service contract with TRW. Nonetheless, its high price, unimpressive performance, and expansion trade-offs may inspire price-and-power-conscious buyers to look elsewhere. —*Art Wilcox*

WHERE TO BUY

Mitsubishi MP 286
Mitsubishi Electronics America, Inc.
991 Knox St.
Torrance, CA 90502
213/515-3993
List price: with 640K RAM, 1.2MB floppy disk drive, one parallel and one serial port, 101-key keyboard, MS-DOS 3.2 $1895
Accessories: Control Data 28ms 40MB 5¼-inch hard drive $1054; 360K floppy drive $147, 1.2MB floppy drive $185; Western Digital 1003 WAH hard drive controller $208; 1MB memory board $298, 2MB memory board $614; 8-MHz 80287 math coprocessor $410; Monochrome Kit: Mitsubishi UCC monochrome board and 12-inch green Samsung monitor $315; EGA Kit: Paradise Autoswitch 480 and Mitsubishi XC1410C 13-inch EGA monitor $900; BASIC user guide $36
Warranty: one year limited, parts and labor
Extended warranty: on-site service and extended warranty available from TRW
Technical support: toll-free number, M–F 6–6
Other support services: none
For more information, circle 652 on reader service card.

Microscience HH-3120

112MB SCSI hard drive

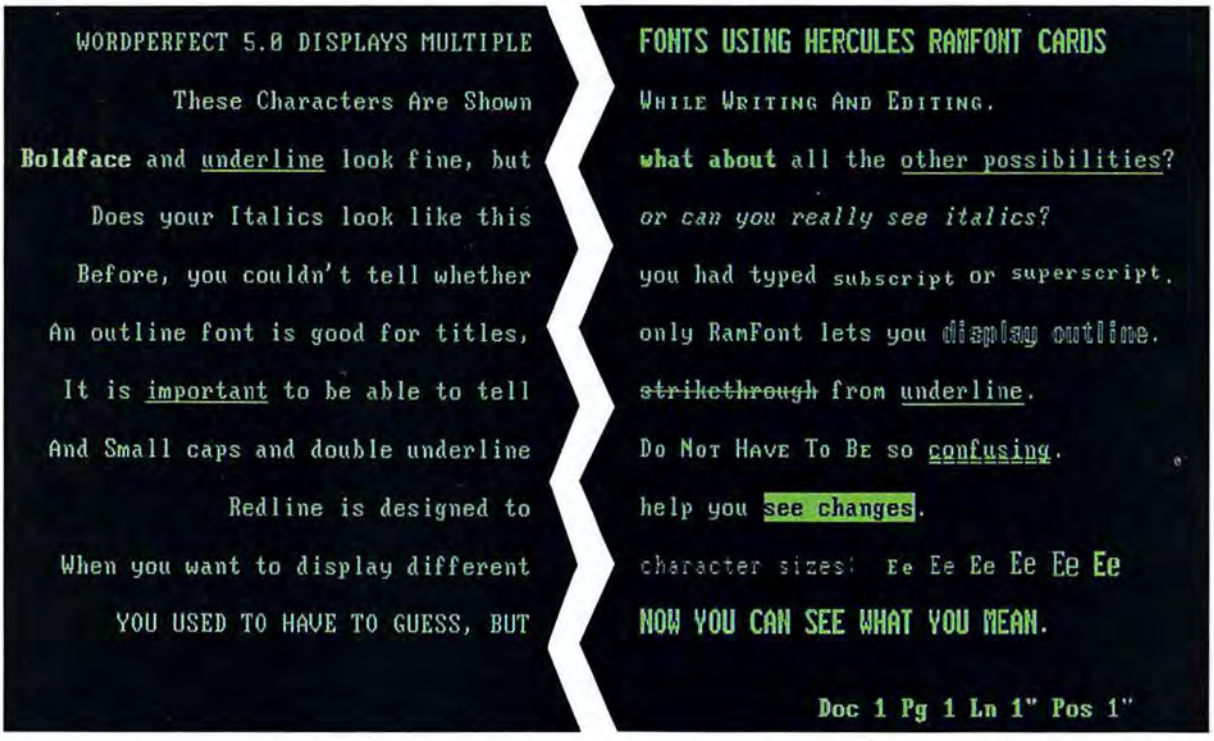
BEST BUY

PROS: Low cost, high capacity, automatic error correction

CONS: Complex formatting procedure

Multimegabyte desktop publishing data files and LAN operating systems have reduced the once-mighty 40MB drive to Munchkin proportions. The only answer to

WordPerfect 5.0 Users...Choose Sides



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Only Hercules video cards with RamFont allow WordPerfect 5.0 users to display multiple type styles and attributes while writing and editing. No other video cards offer these advanced capabilities. Add Hercules graphics for WordPerfect's new page preview and you've got the best display anywhere for WordPerfect 5.0.

Hercules RamFont and graphics are available only on the Hercules family of video cards: The Hercules Graphics Card Plus, monochrome video with a parallel port. The Hercules Network Card Plus, monochrome video with a TOPS "FlashCard" compatible network port. And the Hercules InColor Card, featuring the Hercules graphics and RamFont modes in 16 colors.

Improve your system where you'll see it the most–on-screen. Hercules, the inexpensive upgrade.

For more information about how Hercules improves WordPerfect 5.0 and other favorite programs, call toll-free 1-800-532-0600, ext. 903 (U.S.) or 1-800-323-0601, ext. 913 (Canada).

Circle 228 on reader service card

Hercules.
The RamFont Advantage.

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the problem is higher capacity and faster throughput.

Among the leading contenders is the $1195 Microscience HH-3120. With a hefty 112MB capacity, the speedy HH-3120 boasts a 26ms access time, a 1:1 interleave, and a half-height form factor. It belongs to a new generation of PC peripherals that use the Small Computer System Interface (SCSI, pronounced "scuzzy") standard.

SCSI drives differ from standard ST506 and Enhanced Small Disk Interface (ESDI) drives in several respects—all of them good. One is a notably lower price; while the HH-3120 boasts a data throughput rate of 1.5 megabits per second, which puts it on par with most ESDI drives, it may cost up to $1000 less than an ESDI (with a controller included).

Another difference is that most of the control electronics traditionally found on the AT-style ST506 controller board have been moved onto the drive itself. The SCSI "controller," then, is less a controller than a data traffic cop; you can use one SCSI board with up to seven SCSI peripherals, including printers, scanners, CD ROMs, and multiple disk drives.

As with all large capacity drives, when you install the HH-3120 you can divide its 112 megabytes into multiple DOS-standard 32MB-or-smaller logical drives. Alternatively, you can use optional software (free, but you have to ask for it) to divide the disk into two partitions, allocating up to 32MB for the first drive and assigning the remaining 80MB or more to an "oversize" second drive that is still fully compatible with all versions of DOS.

The HH-3120 offers automatic error correction and bad-sector handling. If stored data is corrupted, an error-correcting algorithm will reconstruct it. If the data error is due to a bad disk sector that's developed since the disk was formatted, the sector is locked out so it won't be used again. File and sector-by-sector write protection are also available.

Installation and formatting are a bit more complicated than with "standard" drives, but not outlandish. First you mount the drive and controller board in the system unit. Then you must install a device driver in the CONFIG.SYS file. Then you answer a series of questions, such as whether or not you want error correction, and the software takes it from there. If you elect to use the data-protection features, disk access will be a little slower, and disk files will be slightly larger to accommodate the error-correction data.

Given its flexible SCSI interface, large capacity, error correction features, and low $1195 price, the Microscience HH-3120 is one of today's best hard disk buys. It should meet your data storage needs for a long time to come. *—TJ Byers*

WHERE TO BUY

Microscience HH-3120
Microscience Int'l Corp.
305 N. Mathilda Ave.
Sunnyvale, CA 94086
408/730-5965
List price: with installation software $1195
Accessories: 32MB-and-larger formatting software free on request
Warranty: one year limited, parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 8–5
Other support services: none
For more information, circle 653 on reader service card.

ThumbScan PCBoot

PC security system

BEST BUY

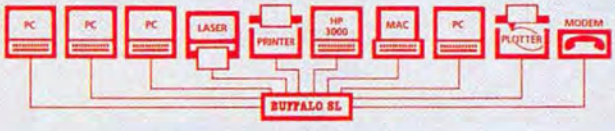
PROS: Easy to use, virtually unbeatable

CONS: TSR software may cause conflicts

Those who face the unending struggle of keeping computer data secure have become all too familiar with tedious tasks like nightly removal of hard drives and endless file encryption. Now, a product from ThumbScan called *PCBoot* ($210) promises to end this drudgery with system security that's fast, safe, and cost-effective.

BUFFALO® SL

ONLY $500 PLUS $100 PER 256KB MEMORY



When you can't afford to buy a laser for each PC, the **Buffalo SL**™ is the inexpensive way to let everyone share - not just your lasers, but printers, plotters and modems as well. If you don't need simultaneous access to shared files, the **SL** is also an alternative to a LAN at a fraction of the cost.

The **SL** has four parallel and six serial channels, with all ten being user configurable as either an input or an output, so you can share 1 PC with 9 peripherals, 9 PCs with 1 peripheral, or any combination in between. If you need more than ten channels, you can link several **SL**s together. All channels can be in use at the same time and can rapidly transfer and queue data. The SL even allows your PC to send data at 19,200 baud. All memory (user upgradeable up to 4MB) is dynamically allocated and shared as needed.

The **SL** comes with software for menu-driven installation and pop-up menu control selections, but you don't have to be a programmer to use it. Of course, the **SL** works just fine without our software too! The **SL** has many other features so ask us to send you more information.

MORE™ MEMORY

The Memory Extension System™ Board

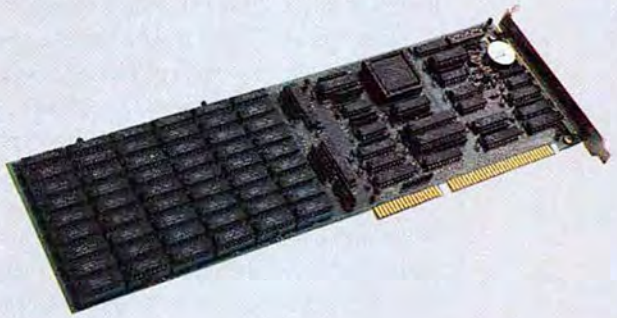
2MB-$1200, **4**MB-$2100, **6**MB-$3000, **8**MB-$3900

When 640K just is not enough, you need to add **MORE™ MEMORY**. This **Memory Extension System™ Board** uses only one slot in any 8 or 16 bit bus and can be used as expanded, extended and/or conventional memory (EEMS/EMS version 4.0 software).

MORE MEMORY is compatible with PC/XT/AT computers and supports PC-DOS, MS-DOS, PC-MOS, OS/2, Unix, Xenix, etc. It is easy to install **MORE MEMORY** and it comes with a **5 YEAR WARRANTY**.

MORE MEMORY has built-in DRAM protection that corrects for any memory errors when you reboot, so you will never have to replace a faulty memory chip. No downtime or costly repairs will ever occur due to a failed memory chip on the **MORE MEMORY** board.

HYPERWARE™ PC productivity boosting software is included **FREE** with each unit. **HYPERDISK**™ enables disk drive read/write intensive programs to run 3-10 times faster. **HYPERKEY**™ enhances the responsiveness of your keyboard. Sold separately, $49.95.



Buffalo Products also makes other smaller buffers, automatic switches, and interface conversion devices. All of our products come with a **45 DAY MONEY BACK GUARANTEE**. Call us **TOLL FREE** and talk to one of our friendly application technicians for solutions to your connectivity problems.

(800) 345-2356

Buffalo Products, 2805 19th Street SE, Salem OR 97302 (503)585-3414

Circle 215 on reader service card

PCBoot consists of a half-slot adapter board, TSR software, and a special "key"—a 2½-inch-long plastic device that looks a bit like a robotic thumb. The tip of this "thumb" contains an array of optical sensors; the "nail" consists of a liquid crystal display (LCD).

When you turn on the computer, *PCBoot*'s adapter board interrupts initialization and displays a pattern of flashing lights on the monitor. When you hold up your key to the screen, the thumb's optical sensors read data coded into the flashing light pattern, and after a few seconds a six-digit alphanumeric password appears on the key's LCD. Type it in correctly, and the boot-up process continues.

Several security safeguards are built in. Since *PCBoot* generates a different password every time it's used, there's no way someone can "learn" your password. And any attempt to physically tamper with the key destroys its innards.

PCBoot even permits multiple users to work on the same computer while preserving each person's data security. If the system administrator restricts access to certain files and subdirectories, any attempt to use them produces another sequence of flashing lights. For authorized users, the key produces a correct ID number and password; otherwise, access is denied.

For the deeply cautious, *PCBoot* provides file encryption and decryption based on the United States military standard Data Encryption System (DES). Using this system, individual users can encrypt files or groups of files and assign access only to authorized individuals. Anyone attempting to decrypt them must use the key first.

PCBoot lets you secure access to disk drives and ports, limit hours of computer use, and specify the number of times someone can try unsuccessfully to enter before the system prohibits additional attempts. It even produces an audit trail listing all logons and what applications were used.

This sophisticated system is easy to install and easier to administer. It only takes about half an hour to put the adapter board in a vacant expansion slot and install the menu-driven software. Setting up passwords, ID numbers, and individual access requirements takes only a little longer.

PCBoot is one of the simplest and most effective methods of keeping your data secure, and it's all the more impressive considering its low price. Three words of caution: First, *PCBoot*'s TSR software requires about 16K of RAM and may conflict with other memory-resident applications. Second, for full protection *PCBoot* requires a PC with a locking case, or a determined data spy will simply remove the board. Third, if you're prone to misplacing the keys to your car or house, order a second *PCBoot* key now. If you lose *this* key, a coat hanger is not going to help.
—*Paul Meyers*

WHERE TO BUY

PCBoot
ThumbScan
Two Mid-America Plaza #800
Oakbrook Terrace, IL 60181
312/954-2336
List price: $210
Accessories: additional keys $75
Requirements: DOS 2.0 or later version, 256K of RAM
Warranty: one year limited, parts and labor
Extended warranty: none
Technical support: no toll-free number, 90 days, M–F 8–F
Other support services: none
For more information, circle 654 on reader service card.

Eric Brown is an associate editor for PC World. *Lewis Perdue is the editor and publisher of* PC Management Letter. *Art Wilcox and TJ Byers are contributing editors for* PC World. *Paul Meyers is a San Francisco–based video producer and freelance writer specializing in science and technology.* ●

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Circle 212 on reader service card

116 **AlphaWorks 1.0**
Alpha Software's easy low-end integrated package welcomes *1-2-3* and *dBASE* users with open arms.

118 **WordStar Professional 5.0**
Desktop publishing tricks, windows, improved mail merge, and pulldown menus will please *WordStar* veterans, but bugs and the lack of graphics may put off newcomers for now.

121 **Windows/286 2.1**
Microsoft upgrades—and renames—*Windows 2.03*. *Windows/286* boosts conventional memory, but the speed gain is slight.

124 **Norton Commander 2.0**
Peter Norton's DOS shell and hard disk manager adds more directory trees and now displays *1-2-3* and *dBASE* files in proper format.

126 **SpinRite 1.2b**
Reformat your hard disk without disturbing the data. Gibson Research's hard disk utility can also reset the disk's interleave ratio, netting PC and XT owners a big boost in performance.

AlphaWorks 1.0

Low-end integrated package

BEST BUY

PROS: Uses dBASE III and 1-2-3 file formats, hot-key switching between processes, full-featured modules, easy to learn

CONS: Document files limited to 64K, word processor can't merge text and graphics, doesn't support plotters or coprocessors

Alpha Software's *AlphaWorks* is a high-class, low-end integrated package with the signal virtue of using industry-standard file formats. Where proprietary formats initially hobbled such otherwise worthy packages as *Microsoft Works* (see *The Software Shelf*, *PCW*, March 1988), *AlphaWorks*'s native data base format is the same as *dBASE III*'s, and its spreadsheet uses the .WK1 format of *1-2-3* release 2.0. Moreover, you can import and export DIF or ASCII files in either the data base or the spreadsheet, and the word processor will produce and read ASCII files.

AlphaWorks is laudable in other ways, too. Its full-featured word processing, data base, spreadsheet, and telecommunications modules share a sensible command structure and powerful macros. You can keep as many as nine files open at once, with two of them on screen in separate windows. And if you run out of conventional memory, *AlphaWorks* can swap chunks of data to a hard disk, or use expanded or extended memory. *AlphaWorks*'s few drawbacks include lack of plotter and coprocessor support, and spreadsheet graphics that are limited to the usual skimpy *1-2-3* selection.

For ease of use, *AlphaWorks* deserves a gold medal. Its pulldown menus can be activated three different ways, and extensive context-sensitive help makes the *AlphaWorks* learning curve short and sweet. Coming from the makers of *Keyworks*, it's no surprise that *AlphaWorks* includes impressive keyboard macro capabilities. Each application can have up to 26 keyboard macros. You can pick a macro to execute automatically whenever a new module is opened and use up to 12 global macros in any of the applications.

SUE LLEWELLYN

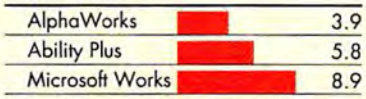
NSTL TEST REPORT

AlphaWorks and Its Integrated Competition

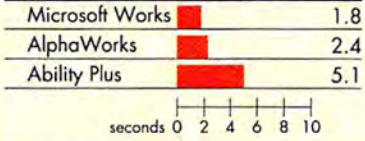
Pitted against Microsoft Works and Ability Plus, AlphaWorks is a fair-to-middling performer, placing second in most tests.

Word processor

Print a file

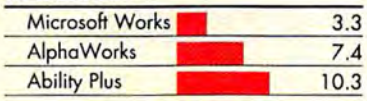


Global search and replace

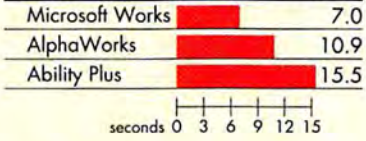


Spreadsheet

Recalculate

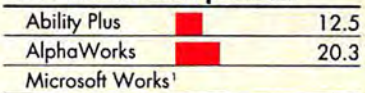


Insert, copy, and delete columns

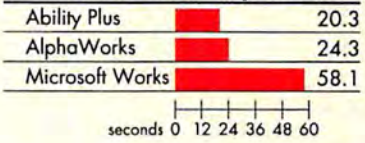


Communications

Transmit file with protocol

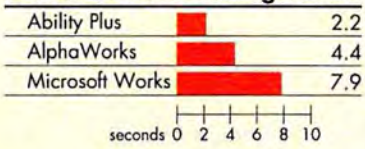


Transmit file without protocol



Data base

Print one-across mailing labels



[1] Microsoft Works doesn't support the CRC XMODEM protocol.

The following versions were tested: *AlphaWorks 1.0, Ability Plus 1.01,* and *Microsoft Works 1.05.* All tests were performed on a 12-MHz Compaq Deskpro 286 with 1.15MB of RAM and a 20MB hard disk. A disk cache consisting of 256K of extended memory was used for all but the spreadsheet tests.

Print a file
An 8-page (480-line) document was "printed" to a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement.

Global search and replace
With the cursor positioned at the beginning of the text file, the program was instructed to automatically replace all 238 instances of *aaaa* with *AAAA.*

Print one-across mailing labels
This test measured the time required to print mailing labels consisting of six fields to a null printer. The fields were taken from 200 records ordered by part number.

Recalculate
With the cursor positioned at cell B18, a new value was entered and the spreadsheet recalculated. Recalculation was set to automatic.

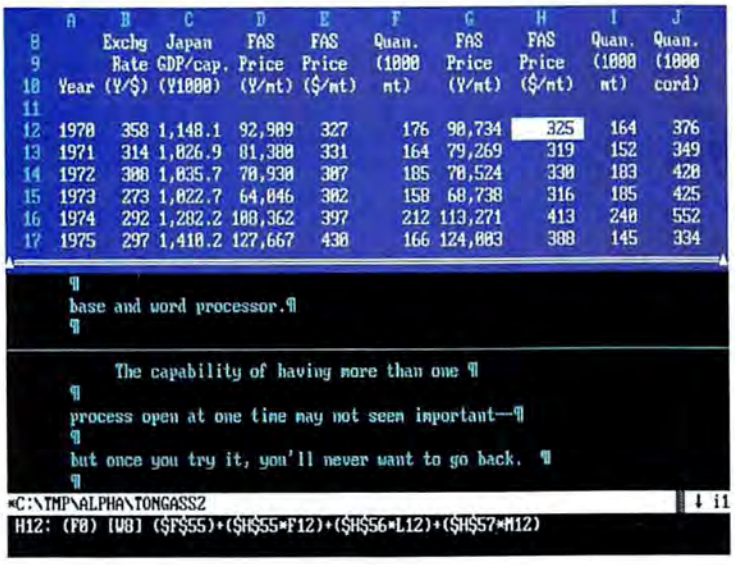
Insert, copy, and delete columns
This test measured the time required to insert blank columns (P1..AD1), copy other columns into the new columns (AE1..AR204 to P1..AD1), then delete the copied columns. Each step was timed separately; then the times were added.

Transmit file with/without protocol
A 10K text file was transmitted at 9600 bps with and without the CRC XMODEM protocol to an identically configured Compaq Deskpro 286 running the software being tested. The Deskpros were directly connected by a null modem.

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

The *AlphaWorks* word processor has such standard features as automatic text reformatting, mail merge, a spelling checker, a thesaurus, and search and replace, plus good printer support. In addition, *AlphaWorks* lets you use normal, bold, italics, bold italics, and superscript/subscript. You can also use multiple rulers in a single document, number tables and figures automatically, and count words in a document. The word processor lacks an outliner, however, and can't handle columns or merge graphics with text. Individual document files are limited to 64K or 2000 lines, but you can daisy-chain an unlimited number of documents for printing.

AlphaWorks's flat-file data base is compatible with *dBASE III* and *III Plus,* and its forms-oriented interface is reminiscent of *Alpha/three.* Data can be displayed in either form or table layout, and you can switch between them with a keystroke. You can verify data as to type (character, numeric, date,



AlphaWorks can display two active applications, such as the spreadsheet and word processor, on screen at the same time.

true/false, or memo) and define calculated fields. Record-search expressions can include any type of field, not just indexed fields. You can restructure a data base at any time, redefining field types and lengths or adding and deleting fields as you wish. Finally, the data base includes a flexible report generator.

While nobody will mistake *AlphaWorks*'s spreadsheet for *1-2-3*, the feel of the two programs is very similar. *AlphaWorks* produces full-size worksheets (8192 rows by 255 columns) in .WK1 format; the module can also read .WKS files, but not write them. Curiously, *AlphaWorks* doesn't immediately recalculate a worksheet when you load it. If you have a worksheet that contains @ functions that need to be updated—such as @DATE—you must force recalculation by pressing <F9> or entering a new number in a cell. The spreadsheet does offer both automatic and manual background recalc, however. Graphics are typical, rudimentary *1-2-3* charts: line, *x-y*, bar, stacked bar, and pie.

The communications module is simple but adequate. It is limited to XMODEM, XMODEM-CRC, and a proprietary protocol, and lacks predefined scripts and background file transfer. But the on-line text editor offers the capabilities of the *AlphaWorks* word processor, and dialogue can be saved in an autocapture buffer or sent to a disk file or printer.

Where speed is concerned, *AlphaWorks* yields silver-medal performance: In nearly every NSTL test, it ran a solid second to either *Microsoft Works* or Migent's *Ability Plus*.

Microsoft Works may produce fancier graphics, and *Ability Plus* can wrestle bigger worksheets, but *AlphaWorks*'s combination of ease of use and similarity in function and formats to such stand-alone business programs as *1-2-3* and *dBASE* make it an outstanding value. —*Dennis Dykstra*

WHERE TO BUY

AlphaWorks 1.0
Alpha Software
One North Ave.
Burlington, MA 01803
617/229-2924, 617/229-2915 (BBS)
List price: $195
Requirements: 512K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9:15–5
Other support services: 60-day money-back guarantee, company BBS
For more information, circle 601 on reader service card.

WordStar Professional 5.0

Word processor

PROS: New desktop publishing and formatting features, windows, streamlined mail merge with direct data import, optional pulldown menus

CONS: Clumsy file conversion routines, no graphics import, buggy initial release

In a nimble leap forward, MicroPro's workhorse, *WordStar*, has gained an array of new features that includes page preview, pulldown menus for novices, and direct importing from many spreadsheets and data bases. Mail merge is so enhanced that setting up a mailing list is a snap. Desktop publishing features, automatic paragraph reformatting, and the ability to open a second on-screen window further enhance *WordStar 5.0*. It's too bad MicroPro didn't provide a cleaner initial release and give more consideration to the file-conversion process.

Beneath the pulldown menus (which vets can jettison by changing Help levels), the classic *WordStar* interface is largely intact. But some changes will take getting used to: For example, you now press <Esc> to back out of the print menu and <F10> to accept defaults and print. A bigger problem concerns file compatibility. Like *WordPerfect 5.0*, *WordStar 5.0* is upward-compatible only; you have to convert its files before an officemate can edit them with *WordStar 4.0*. Conversion is a simple job (you print to a *WordStar 4.0* driver), but you'll drum your fingers while you wait for long files to convert.

For report specialists, *WordStar 5.0* may be a better choice than *WordPerfect 5.0* because of its ability to pull in data from *1-2-3*, *Symphony*, or *Quattro* worksheets and *dBASE* data bases without import/export routines or ASCII conversions.

Unlike *WordPerfect* and *Microsoft Word 4.0*, *WordStar 5.0* can't import graphics, but its excellent page preview affords a clear view of font styles, italics, and other special effects. (The number of fonts displayed depends on your printer driver; advanced users can edit the drivers with *WordStar 5.0*'s PDFEDIT utility to add up to 255 fonts.) If you're laying out pages on a manuscript, the page preview is exceptionally handy. You can see up to 18 thumbnail pages on an EGA display and use *WordStar 5.0*'s 2x and 4x zoom options for greatly enlarged views of the text. (A VGA display can show 32 pages, and a 1600-by-1280-pixel display can show up to 144.) Other worthy desktop publishing attributes include expanded font support, landscape printing, PostScript and color-printer support, and enhanced proportional spacing.

WordStar veterans will welcome the arrival of line sorting and automatic paragraph reformatting. A word count is automatically tendered after every global spelling check, and a single command will yield a quick word and byte count of a marked block or document. Finally, release 5.0's 100,000-word Microlytics spelling checker is quicker and more capable than its predecessor and offers accurate, automatic hyphenation.

FEATURES EVALUATION

WordStar 5.0: Still in the Running

By adding excellent mail merge and page preview features, MicroPro keeps improving its flagship word processor.

● Yes
○ No
◒ Deficient

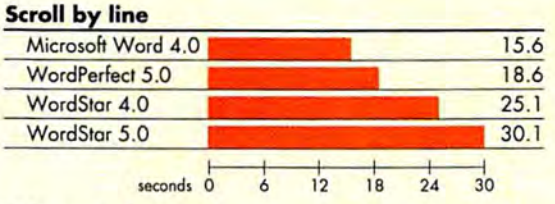
	WordStar 5.0	WordStar 4.0	Microsoft Word 4.0	WordPerfect 5.0
Editing				
Reads spreadsheet/data base files	●[1]	○	●[2]	○
Mail merge	●	●[3]	●[3]	●[3]
Maximum number of windows	2	1	8	2
Undo command	●	●	●	◒[4]
Jumps to bookmark	●	●	○	○
Searches control characters	●	●	●	●
Spelling checker/thesaurus	●	●	●	●
Cross-referencing	○	○	○	●
Redlining	○	○	●	●
Outliner	●	○	●	◒[5]
Creates index/table of contents	●	●	●	●
Macro learn mode	○	○	●	●
Macro editor	●	●	●	●
Macro programming language	○	○	●	●
Formatting				
Style guides	●	●	●	●
Style sheets	○	○	●	●
Widow/orphan control	●	●	●	●
Leading control	○	○	●	●
Decimal tabs	●	●	●	●
Snaking columns	●	○	●	●
Side-by-side columns	○	○	●	●
Graphics				
Imports graphics	○	○	◒[6]	●
Page preview	●	●	◒[7]	●
Sizes, crops, rotates graphics	○	○	◒[7]	●
Automatic text flow around graphics	○	○	○	●
Line draw	●	●	●	●
Text boxes/borders	●	●	●	●
Printing				
Proportional spacing	●	●	●	●
Queues documents	○	○	●	●
Prints in background	●	●	●	●
Landscape printing	●	○	●	●
Supports PostScript	●	○	●	●

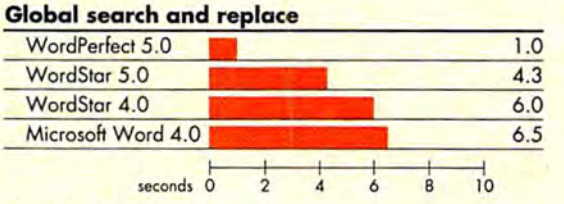
[1] Reads 1-2-3, Symphony, Quattro, dBASE II, and dBASE III files.
[2] Reads and links to Excel, Multiplan, and 1-2-3; doesn't read dBASE files.
[3] Can't directly access dBASE, 1-2-3, Symphony, or Quattro files.
[4] Recovers deleted text but does not reverse other actions.
[5] Outliner doesn't support collapsible headings.
[6] Graphics can be imported at printout but not viewed or manipulated.
[7] With separate PageView utility, included in package.

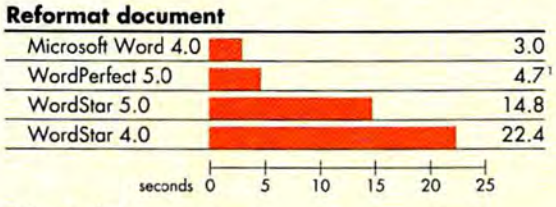
NSTL TEST REPORT

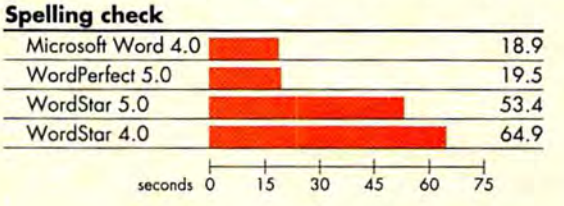
WordStar 5.0

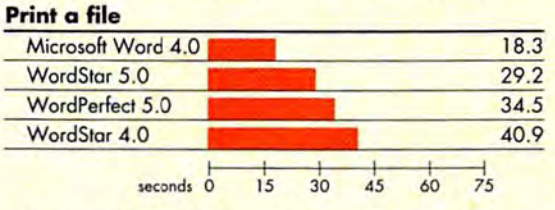
WordStar 5.0 outperforms its predecessor and makes a good showing against Microsoft Word and WordPerfect.











[1] This test measured the time required to issue the reformatting command and move to the end of the document. This command sequence compensates for WordPerfect's background reformatting.

All benchmarks were performed on an 8-MHz IBM AT with 640K of RAM and a 30MB hard disk running under DOS 3.2. All tests except the spelling check used an 8-page (480-line) text file consisting of groups of 4 characters separated by spaces (e.g., *aaaa bbbb cccc*). The file was formatted at 60 lines per page with margins set at 1 and 60. Two carriage returns followed every 9 lines of text. This pattern was repeated throughout the document. Times were measured from the keystroke initiating the test until control was returned to the user.

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

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

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

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

Spelling check
This benchmark recorded the time a program's spelling checker required to proof a 28,051-character ASCII file (thirty 14-line paragraphs) after the file had been read into each program and saved in that program's format.

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

WordStar's speed has never been outstanding, but this version shows definite improvement over *WordStar 4.0*. In NSTL tests, *WordStar 5.0* beat release 4.0 in four of five categories and made a fair showing against the generally faster *Word* and *WordPerfect*.

MicroPro has hung some tinsel on the *WordStar* tree as well. The free add-ons include a text-entry tool to help automate merge mailings, a file manager with text-search capabilities, a basic communications program, and an outliner. And believe it or not, you can now use a mouse with *WordStar!* MicroPro says a Logitech driver is in the works, and Microsoft is already shipping a *WordStar* driver with its mouse.

Considering the thoughtful preparation of most of the *5.0* package, it's a shame MicroPro didn't swat some annoying bugs in the release version. For instance, a bug in the *WordStar 4.0* driver ate the final character in every file lacking a hard return at the end, some printer drivers didn't work, and the conversion process peppered documents with .pa commands that fell a line beyond the normal page break. Although MicroPro promises to fix these problems, even dyed-in-the-wool *WordStar* faithful should wait before making a purchase.

MicroPro's previous upgrades have mostly been catch-ups, but this time out *WordStar* is a credible alternative to *WordPerfect* and *Word*. *WordStar 5.0* still lacks their graphics features and it can't match their macro power and formatting options, but it edges out the market leaders in mail merge and data import. Whether it will attract new users is an open question, but release 5.0 makes real sense as an upgrade. —*Rex Farrance*

WHERE TO BUY

WordStar Professional 5.0
MicroPro Int'l
33 San Pablo Ave.
San Rafael, CA 94903
800/229-5609
List price: $495, upgrade $119
Requirements: 384K (512K for page preview), DOS 2.0 or later version
Not copy protected
Technical support: unlimited for the life of the release plus six months, toll-free number, M–F 7–4, S–S 8–1
Other support services: quarterly newsletter free to registered users
For more information, circle 602 on reader service card.

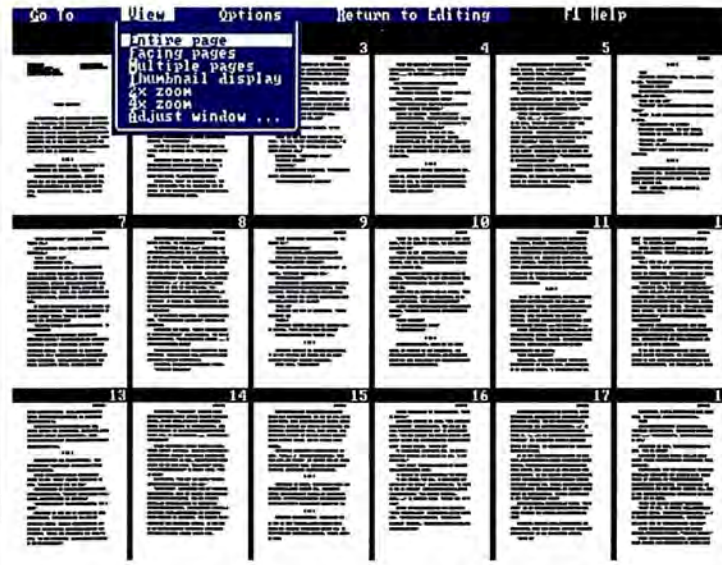
Windows/286 2.1

Operating environment

PROS: Improved memory management and installation, more display and printer support, inexpensive upgrade

CONS: Insignificant speed boost

Microsoft Windows is like the weather in New England: If you don't like it, just wait a minute. Well, Microsoft has upgraded (and renamed) *Windows 2.03* to *Windows/286 2.1*, but users are still waiting. *Windows/286* magically boosts conventional memory by 59K to 699K and offers better hardware support. But despite promises of significant speed gains, the upgrade ran only marginally faster than its predecessor in NSTL tests. And although *Windows/286* comes with a middling paint program, a word processor, and a set of desktop utilities, the number of full-featured *Windows* applications on the market is growing slowly (see the Special Report on *Windows* in this issue).



WordStar 5.0's exceptional page preview feature can display up to 18 pages on an EGA monitor. For a closer look, 2x or 4x zoom options make text bigger than life.

Windows/286 needs extended memory to reap the extra 59K of conventional memory. For example, on an AT with 1MB of RAM, the split won't be the usual 640K of conventional and 384K of extended memory, but 699K and 325K. In addition, like *Windows 2.03*, *Windows/286* supports Expanded Memory Specification 4.0. So if you install a memory board to give *Windows/286* some headroom, make sure it supports both extended memory *and* EMS 4.0 expanded memory (see "Buyers' Guide: EMS 4.0 Memory Boards" in this issue).

Installation has gotten simpler with *Windows/286*, since it can detect a system's memory configuration and attached peripherals. The program includes new drivers for the AboveBoard (to EMS 4.0 specifications), AST Rampage for the AT (AST has a PS/2 driver available), and IBM PS/2 Memory Expansion Option boards. Note that Microsoft

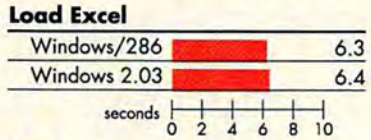
NSTL TEST REPORT

Microsoft Windows/286: Barely Faster Than 2.03

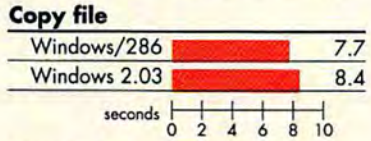
Despite Microsoft's claims, Windows/286 wasn't much faster than version 2.03 in NSTL tests.

Conventional memory

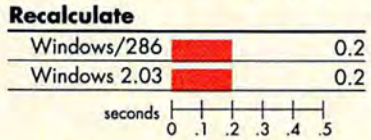
Load Excel



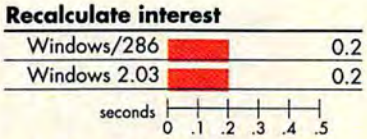
Copy file



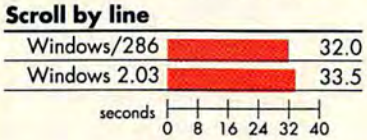
Recalculate



Recalculate interest

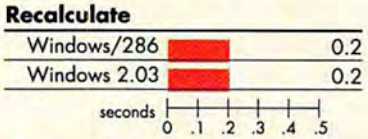


Scroll by line

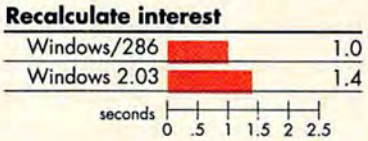


Expanded memory

Recalculate



Recalculate interest



Benchmarks were performed on a 12-MHz Compaq Deskpro 286 with 1.15MB of RAM and a 40MB hard disk. Expanded memory tests used an Intel AboveBoard with 2MB of EMS 4.0 memory. The conventional memory spreadsheet tests were performed on a worksheet containing a three-year business plan. For the expanded memory spreadsheet tests, the business plan was enlarged to include data for eight years. For all speed tests, time was measured until control was returned to the user.

Load Excel
This test measured how long it took to load *Microsoft Excel*.

Copy file
With *Excel* loaded, this test measured how long it took to copy a 600K file.

Recalculate
This test measured how long it took the *Excel* worksheet to recalculate after a new value was entered into cell B18. The benchmark was repeated on a computer using expanded memory.

Recalculate interest
The worksheet's interest rate was changed and the spreadsheet recalculated. The test was performed three times and the scores averaged. The benchmark was repeated on a computer using expanded memory.

Scroll by line
A 14,972-character document was created using Windows Write. The benchmark measured the time required to scroll line by line from the top of the file to the end.

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

has received reports of conflicts between *Windows/286* and some older disk-partitioning software, so check before you buy.

Next to speed, the biggest complaint about *Windows 2.x* was its lack of hardware support. *Windows/286* has some new display drivers (including one for the IBM 8514/A) and a host of new printer drivers that includes the IBM Quietwriter III, the 24-pin Proprinter, and the HP DeskJet.

Unlike *Windows/386*, *Windows/286* won't let you multitask most DOS applications. Opening a DOS-supported application suspends any *Windows* programs; switching to a *Windows* program freezes the DOS application but not any other *Windows* application.

As far as speed goes, the picture is mixed. Microsoft claims that certain *PageMaker* and *Excel* functions run between 30 and 70 percent faster under *Windows/286* than under version 2.03. But in the particular performance tests run by NSTL, *Windows/286* showed only a 10 to 20 percent speed gain at best.

For current *Windows* users, *Windows/286* is well worth the $25 upgrade cost if you own

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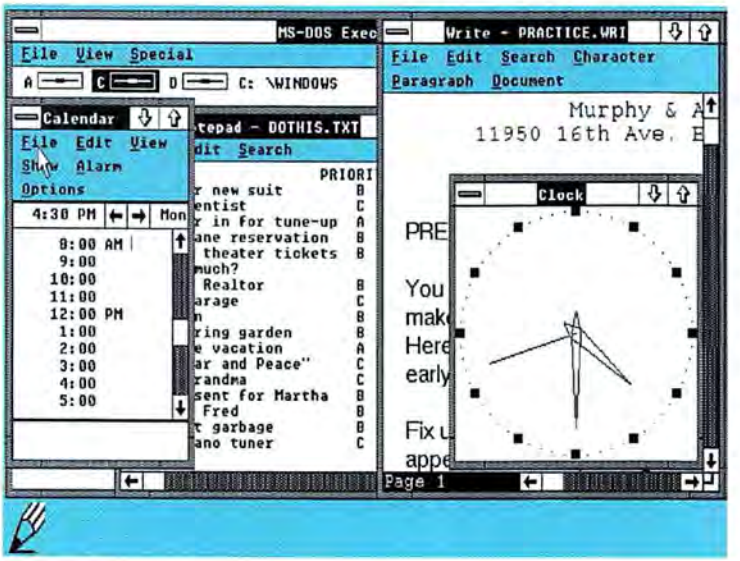

With the same interface as release 2.03, Windows/286 displays a familiar set of desktop utilities: clock, calendar, notepad, and calculator.

a printer or monitor that *Windows/286* supports and *Windows 2.03* doesn't. But if you aren't yet a *Windows* user, this release isn't reason enough to take the plunge. —*Ralph Soucie*

WHERE TO BUY

Windows/286 2.1
Microsoft Corp.
16011 N.E. 36th Way
Redmond, WA 98073-9717
206/882-8088
List price: $99; upgrade from 2.0 or later version $25 (free if 2.03 was purchased on or after June 1, 1988)
Requirements: 512K (640K recommended), hard disk, DOS 3.0 or later version, graphics monitor and adapter
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–5
Other support services: CompuServe forum (GO MSOFT), quarterly newsletter on Microsoft products
For more information, circle 603 on reader service card.

Norton Commander 2.0

Hard disk manager

BEST BUY

PROS: Displays 1-2-3 and dBASE files, great mouse support, directory trees

CONS: No word wrap when viewing files, no global operations, can't display WordStar files properly, incompatible with older versions of Desqview

The first time Peter Norton's *Commander* set sail, it was just one of a flotilla of DOS shells and hard disk managers—and neither the swiftest nor the most powerful among them (see *From the Software Shelf, PCW,* January 1987). But with version 2.0, the utility has gained a few large-bore cannons. In particular, when you view a *1-2-3, Symphony,* or *dBASE* file, *Commander 2.0* displays it nicely formatted. Try that with Executive Systems' *Xtree* and you'll get a scattering of hieroglyphs. And while DOS 4.0's new shell makes it much handier, it can't compare in power or convenience with *Commander.*

The program looks different, too. In version 1.0 half the screen was reserved for DOS, leaving little room for file listings. Version 2.0's two panels can be opened to fill the screen, with the DOS prompt relegated to a line at the bottom. And *Commander* now offers twin directory trees, which you access directly or via a pulldown menu. The only drawback to *Commander*'s trees is that the program scans directories only when you order it to. If you create or rename directories in DOS, *Commander* won't find them. Rescanning takes just a few keystrokes, but you have to remember to do it.

In addition to the usual utilities for creating directories and copying, deleting, and renaming files, *Commander* provides a zippy file-search function that allows wild cards. The utility still has its own editor, but you can now replace it with the editor of your choice. *Commander* was among the first disk managers to offer mouse support, and version 2.0's menu system is designed with a mouse in mind. Once you've scampered through *Commander*'s directory trees with a mouse a few times, *Xtree*'s foliage starts to wilt.

Of course, *Commander* does have a couple of weak spots. There's no word wrap in the text viewer, and unlike *Xtree, Commander* still doesn't display *WordStar* files properly. Finally, you can't perform global operations across a disk. Instead, you're limited to working in one directory at a time.

While not as concise as *Xtree* or as powerful as the more expensive *Xtree Pro, Commander* is a powerful ally for all but *Word-*

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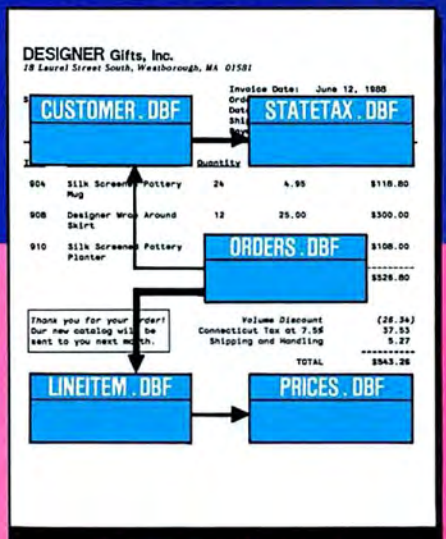
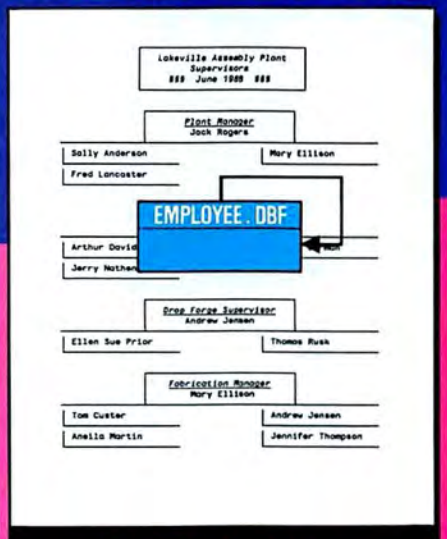
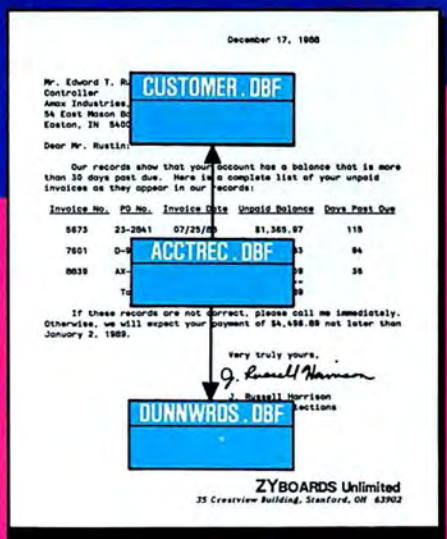


Complex Reports



Simple Reports



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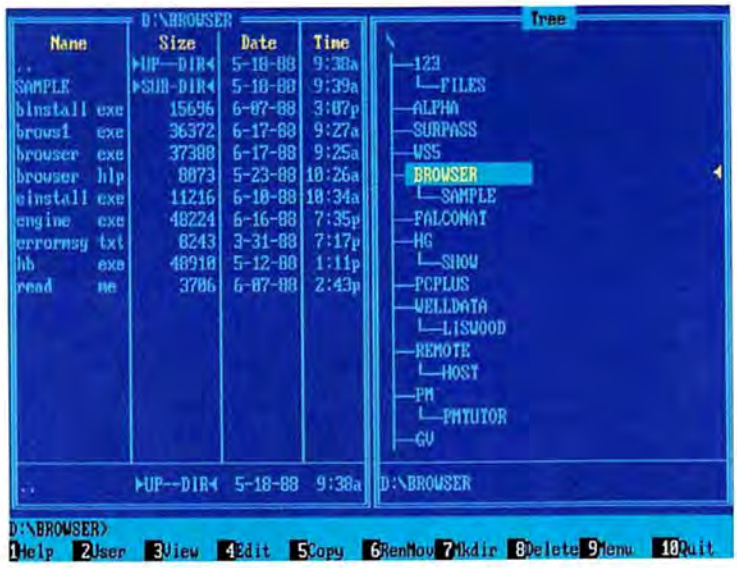


The Norton Commander lets you peek into 1-2-3 and Symphony worksheets and see them properly formatted. You can also view dBASE files in their proper format.

Star users. If you need to view *1-2-3* or *dBASE* files, or if you love your mouse, *Commander* has to be your choice. —*Patrick Marshall*

WHERE TO BUY

Norton Commander 2.0
Peter Norton Computing
2210 Wilshire Blvd. #186
Santa Monica, CA 90403-5784
213/453-2361
List price: $89
Requirements: 192K, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5
Other support services: none
For more information, circle 604 on reader service card.

SpinRite 1.2b

Hard disk formatting utility

PROS: Excellent protection for hard disk data, markedly improves XT disk performance, easy to use, inexpensive

CONS: Initial reformat takes 4 to 10 hours, no optimizing or other utilities

If you just *know* that a hard disk crash will eventually ruin your day, take heart. Gibson Research's $59 *SpinRite* can keep your hard disk spinning in top shape. *SpinRite* reformats a hard disk without disturbing its data, resets its interleave ratio for optimum operation, and recovers unreadable sectors that CHKDSK can't. *SpinRite* won't improve AT performance much—because AT disk drives are usually set to the correct interleave—but it can be a blessing for the owner of a vintage PC or XT.

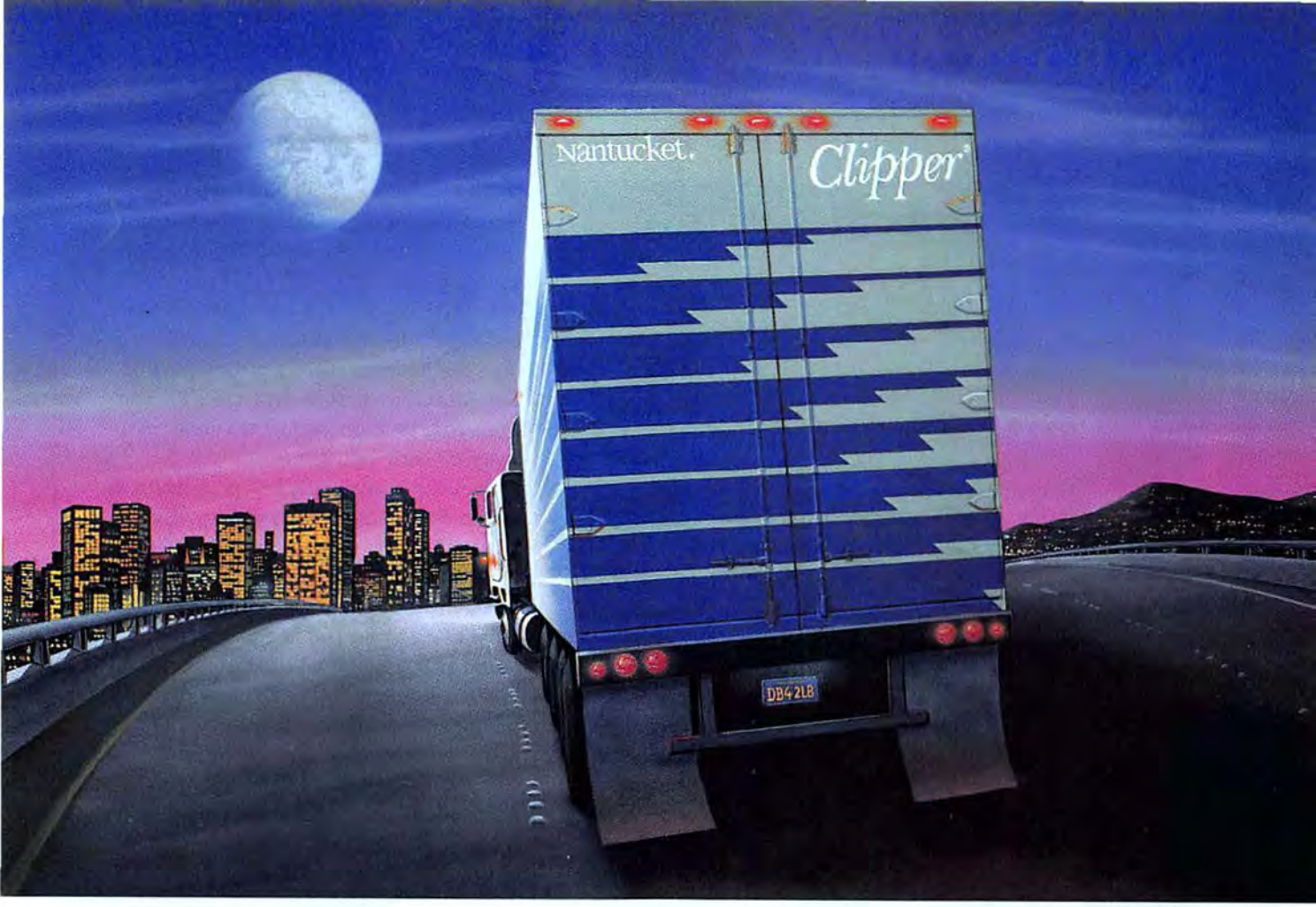
When you format a hard disk for the first time, DOS gives the disk's sectors ID numbers for referencing where data will be written. But this information can degrade through time and gradual demagnetization; if you've ever experienced a DOS 'sector not found' error, this was most likely the cause. Routinely reformatting your drive keeps the information fresh, but it's a laborious task, since you first have to back up all the data. *SpinRite* eliminates the need for a backup: It copies data to RAM a sector at a time, reformats the sector, and returns the data to the newly formatted sector.

If you like, *SpinRite* can also reset your disk's interleave ratio to a recommended setting. Adjusting a drive to the correct interleave is important; if it's set too tight or too loose, more disk revolutions are needed to read a track of data.

Informal tests on an AT with a 40MB drive at a 3:1 interleave (too loose) yielded a 5 to 10 percent increase in drive performance after *SpinRite* reset the interleave to the proper 2:1 ratio. When the test drive was reset from 1:1 (too tight) to 2:1, performance improved approximately 100 to 150 percent. Since the interleave on older PCs and XTs is often less than optimum, adjusting it can yield significant gains.

No matter what your level of technical proficiency, you'll find little fault with *SpinRite*. Installing the program shouldn't take more than a few minutes, and a simple menu system makes it easy to run.

First-time users will want to perform what Gibson calls a Quick Surface Scan to make sure your hard disk and controller are healthy enough to withstand a good scrubbing. If your drive has already deteriorated to the point of no return, however, *SpinRite* won't take the rap. When it detects a problem between the controller card and drive, for example, *SpinRite* refuses to reformat.



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A true compiler	Yes (1984)	No	???
User-defined functions	Yes (1984)	No	Limited
Arrays	Yes (1985)	No	Just Intro'd
VALID function	Yes (1985)	No	Just Intro'd
Improved Execution Speed	Yes (1984)	No	No
Link in Other Languages	Yes (1984)	No	Limited
Null Character Support	Yes (1987)	No	No

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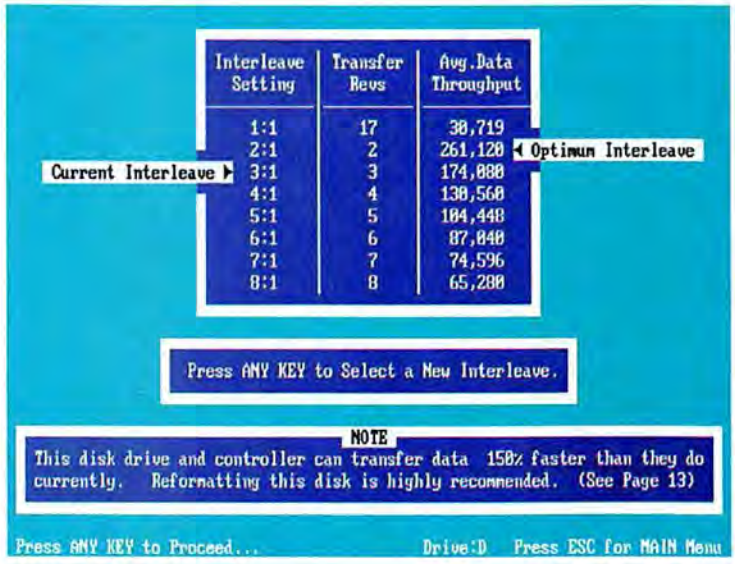

SpinRite performs a low-level format on a hard disk and lets you reset the drive interleave ratio. The result can be a big boost in performance.

Assuming *SpinRite* doesn't uncover any major problems, you can proceed to the low-level formatting routine. The program offers four format choices; the most thorough takes 4 to 10 hours, depending on drive size, while a speedier but less thorough option does the job in 10 to 30 minutes.

During that time, a track map displays the results of *SpinRite*'s formatting and surface-defect analysis. If you need to suspend the operation, simply press the <Esc> key. *SpinRite* will mark the sector and let you resume the operation at a second session. *SpinRite* also shows you the number of bad sectors and the number of clusters and sectors removed from or returned to active use. For posterity's sake, you can output a report of *SpinRite*'s findings to disk or printer.

Like similar products, *SpinRite* comes with a lengthy list of compatibility warnings. In the README file, for example, Gibson claims that *SpinRite* works with *Disk Manager* from OnTrack, *SpeedStor* from Storage Dimensions, *VFeature Deluxe* from Golden Bow, and Everex's *EverDisk*. However, *SpinRite* will *not* recognize partitions created by the partitioning software included in the Adaptec 2372 controller's ROM BIOS. Moreover, *SpinRite* refuses to reset interleave ratios on newer RLL systems that use a technique called *sector translation*. Gibson says the HP Vectra and Compaq Portable III—as well as the Mountain Computer and Verbatim 30MB hard disk cards—are known to use sector translation, as do the 16-bit Western Digital WD1003-RAH and -RA2 controllers and the 8-bit WD1002-27X. (The popular 8-bit WD1002-27X RLL controller can have its sector translation disabled simply by moving a few jumpers.) Gibson also warns that *SpinRite* is incompatible with the Awesome I/O card, Priam drives, and the drives in Toshiba's hard disk laptops.

SpinRite is hardly the first program to do nondestructive low-level formatting. That's a talent it shares with Paul Mace's *HTest/HFormat*, Prime Solutions' expensive new $189 *Advanced Disk Technician*, and Gazelle Systems' *OPTune*. Moreover, the latter includes an optimizer and several other handy utilities. But *SpinRite* neatly weds two qualities every computer user wants: ease of use and peace of mind. If your system isn't on Gibson's outlaw list, it will benefit by *SpinRite*'s ministrations. —*Ken Smith*

WHERE TO BUY

SpinRite 1.2b
Gibson Research Corp.
22991 La Cadeña
Laguna Hills, CA 92653
714/830-2200
List price: $59
Requirements: 256K, hard disk, DOS 2.1 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–5
Other support services: 30-day money-back guarantee
For more information, circle 605 on reader service card.

Dennis Dykstra is a professor at Northern Arizona University in Flagstaff and a contributing editor for PC World. *Rex Farrance is an assistant editor for* PC World. *Ralph Soucie is a certified public accountant in Lake Oswego, Oregon, and a contributing editor for* PC World. *Patrick Marshall is a writer for the* Congressional Quarterly's *Editorial Research Reports, in Washington, D.C. Ken Smith is a PC Engineer at Hewlett-Packard in Mountain View, California.* ●

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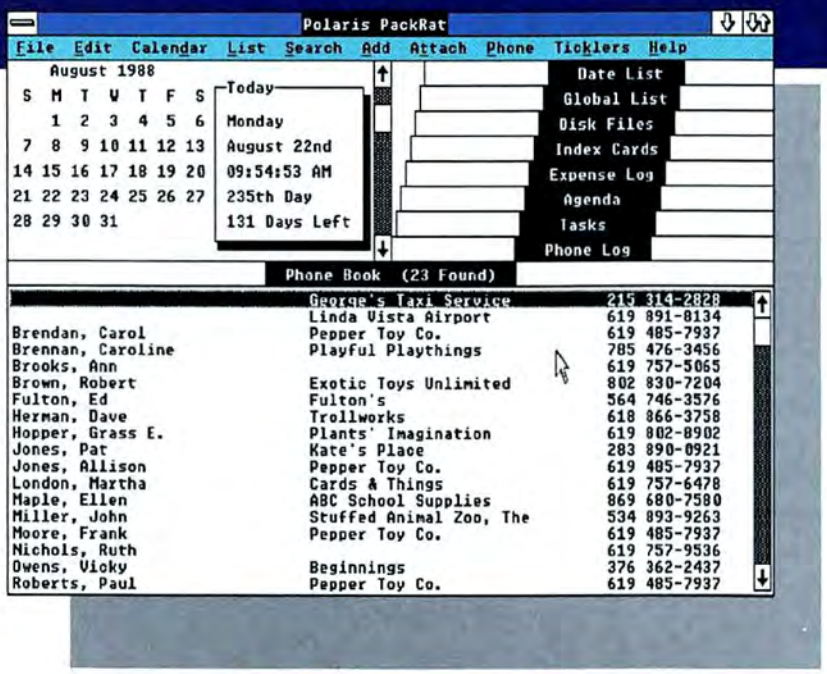

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- NBI Legend—heavy-duty word processing
- CFO Advisor—powerful financial analysis
- Opus I—hypertext presentation graphics
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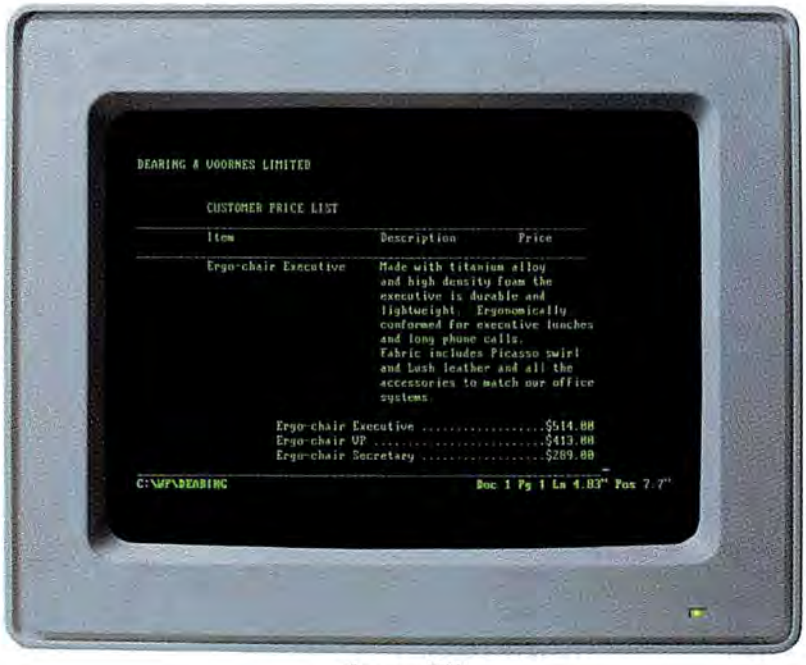
What you've been doing.



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PRESENTING THE FUTURE

WHAT BENEFITS WILL THE OS/2 PRESENTATION MANAGER BRING, AND WHEN?

Eric Bender

Never mind the ever-faster 80386 and 80486 chips, fancy coprocessors, almost bottomless reserves of disk storage, and busmasterful expansion slots. That's just hardware. In the mid-1990s, what you'll actually deal with day-to-day are applications built on the OS/2 Presentation Manager.

In OS/2 Standard Edition version 1.1, the Presentation Manager slides a pulldown-menu graphic interface over the next-generation operating system. The potential advantages to this scheme are familiar to *Microsoft Windows* and Macintosh devotees: ease of use, ease of learning, consistency among applications, rich visual information, and easy ways to move information from one program to another (see "Windows on OS/2," *Preview, PCW,* September 1988).

The benefits of a graphic interface have been dramatically demonstrated by the success of the Macintosh. Yet most PC users have ignored the huzzahs, and you can hardly blame them. According to one industry wag, *Windows* (the closest thing to the Mac interface on a PC) gives you yesterday's performance today. DOS's storage and RAM limitations are the primary culprits. With *Windows,* says David Gilmour, general manager of Lotus Development's Advanced Products Division, "you feel like you're trying to put 10 pounds of flour in an 8-pound bag."

But by building on OS/2, Presentation Manager applications will leap over the memory constraints that cripple *Windows,* run side by side simultaneously, and tap into powerful network connections. Sometime in the next decade packages also will slowly gain the ability to juggle compound documents incorporating voice, animation, video, and other elements.

"The Presentation Manager is a very good operating environment, a lot better than *Windows,*" comments Mark Zachmann, chairman of Z-Soft in Marietta, Georgia. "Applications will be easier to write and easier to run."

Gilmour concurs, adding that the Presentation Manager should make it easier to mix and match software. Moreover, the environment will allow users to keep an eye on background tasks and incoming messages easily.

Ken Whitaker, vice president for research and development at Software Publishing in Mountain View, California, points out that the Presentation Manager's "speed of use" and the IBM imprimatur will make a big difference to developers. But the biggest incentive is still the bottom line. "Our customers aren't asking for *Windows* applications, but we are getting pressure for Presentation Manager applications."

LESSONS FROM THE WINDOWS WARS

With its windows, pulldown menus, dialog boxes, icons, and mouse support, the Presentation Manager looks very much like *Windows.* And like its predecessor, it has a ravenous appetite for computing power.

Microsoft, which for years asserted that an 8088 machine was perfectly adequate for *Windows,* insists that the Presentation Manager will run quite nicely on a 10-MHz 80286 system with 2MB to 3MB of memory, an EGA monitor, and a 30MB hard disk. But developers hoot this notion down. "It's really going to take a 386, and a fast one," says Whitaker. Tests recently run by NSTL for *PC World* ("Is Your PC Ready for OS/2?" *PCW,* October 1988) confirm that the ideal system will probably be a 20-MHz (or faster) 80386 machine with memory caching, gobs of high-speed RAM, a speedy hard disk, and a price tag quickly approaching $10,000.

Senior Editor Robert Luhn edited this Special Report.

Software firms do agree, however, that the Presentation Manager interface has profited from Microsoft's years in the *Windows* trenches. *Windows*' opening MS-DOS Executive screen (little more than a glorified DOS listing) immediately strands users who aren't familiar with subdirectories and executable files—which includes most of the environment's target audience. The Presentation Manager at least offers on-line help and an *Xtree*-like file manager, and users with some knowledge can group programs and files under English headings.

But do such niceties match the Mac's simple elegance? No, says Jeffrey Tarter, publisher of the Cambridge, Massachusetts–based *Softletter* newsletter, because the Presentation Manager still approaches computing with a DOS mindset. Icons are underutilized, says Tarter, and that makes even simple actions like copying files particularly unintuitive.

But the Presentation Manager does force applications from all vendors to maintain a consistent look and feel. "The Presentation Manager is a very strict, uniform environment," says Z-Soft's Zachmann, and he expects developers to toe the line, especially when applications emerge from dominant, conservative firms like Lotus and Ashton-Tate.

Another major issue is the ability to freely exchange data among applications from different suppliers. Although *Windows* was designed to provide such integration, its manual Clipboard can't successfully transfer some graphics formats or properly convert some character attributes—in part because vendors "enhance" the Clipboard for their own product lines.

Microsoft's OS/2 product marketing manager Mark Mackaman contends that data exchange should be smoother under the Presentation Manager. Zachmann agrees, noting that the new environment's deeper underlying graphics support will aid file-format swapping. But, says Zachmann, developers will still have to share information and "stop believing that proprietary formats give them an advantage."

As for automatically linking data in different applications, Microsoft offers many mechanisms, but Dynamic Data Exchange (DDE) is the route most developers will probably take. "DDE is just a free-form message-passing mechanism," says Mackaman. And with OS/2's additional memory and network connections, he expects DDE to become considerably more useful. But as Lotus's Gilmour warns, "Saying that two applications using DDE are integrated is like saying that two people speaking different languages can understand each other." As with the Clipboard, vendors must collaborate to make DDE work.

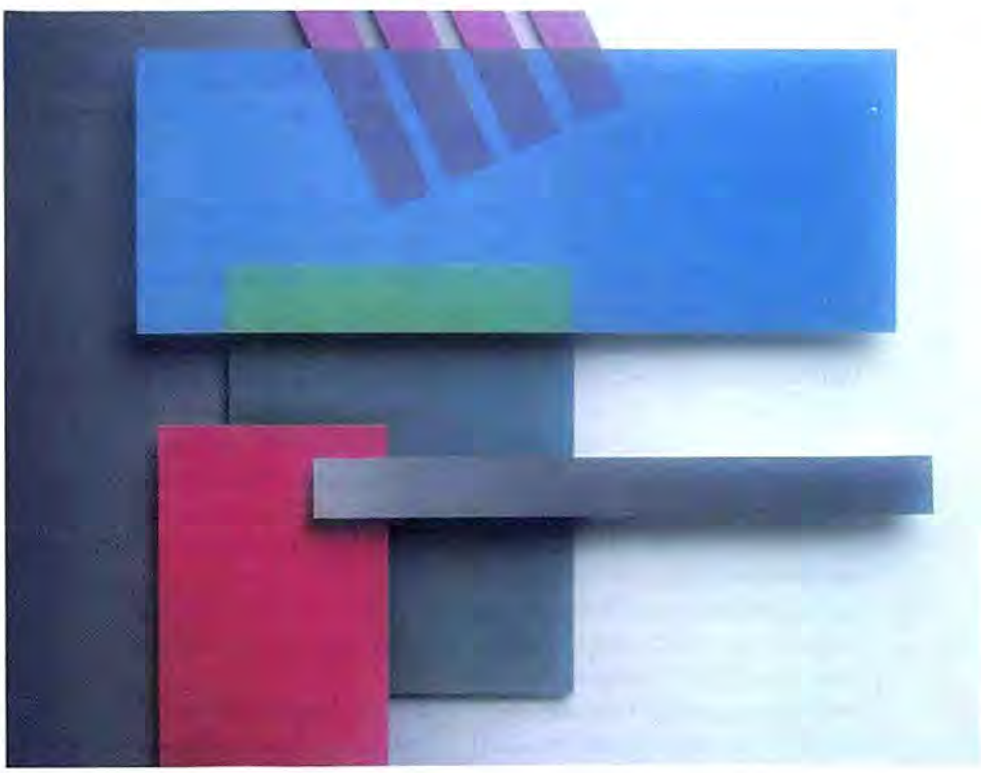


PHOTO ILLUSTRATIONS BY DAVID BISHOP

THE LONG MARCH

IBM began shipping its version of the Presentation Manager last fall, and leading PC vendors are expected to complete the considerable task of modifying it for their machines during the first quarter of 1989.

Most early Presentation Manager applications will probably be up-

graded best-sellers like *1-2-3* and *Excel*, but others could establish new product categories. One case in point is Lotus's network-oriented *Notes* (see the Preview "Notes for a Better Work Group" in this section), whose communications and graphics demands would easily overwhelm DOS.

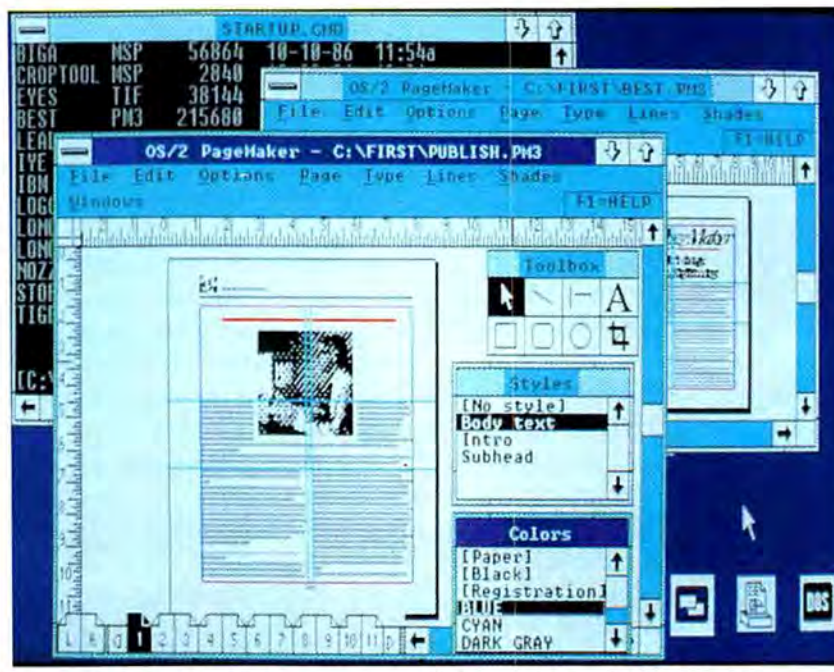
But don't hold your breath. It looks like 1989 will be the year of the quick port, with several dozen packages appearing by the middle of the year. Most industry observers believe the truly groundbreaking applications are at least a year away—or more. In the months before the Presentation Manager's scheduled October shipment, a number of developers took their projects off the front burner.

The reason? Most feel the environment will spread more slowly than originally expected, in part because the required hardware is just too costly. "Customers may need 5MB or 6MB of memory. That's major, major bucks," comments Gary Stimac, vice president for development at Compaq Computer in Houston. "The products that hit the market better have plenty of sizzle."

Another key obstacle is that relatively few programmers are experienced in writing applications for graphic environments. The Presentation Manager is much more demanding than either DOS or *Windows*, and it sits on top of OS/2, which is formidable all by itself. "It requires new programming skills," Gilmour says. "And it's not easy to develop products on top of system software that hasn't stabilized."

PLANNING FOR ADOPTION

In the meantime, how should users plan ahead? The experts advise buying a powerful 80386 system if you can afford it. Make sure the system runs OS/2 and can hold at least 4MB of 32-bit RAM on its motherboard or in its memory-bus slot. (If a RAM board is sitting in one of the system's slower 16-bit slots, OS/2 will load there first, and performance will suffer.)



PageMaker and other Windows programs will change little under Presentation Manager.

Given current high memory costs, hold off on a multimegabyte upgrade unless you need it for current DOS applications. "We don't know what [Presentation Manager] applications will do, how much memory they will need, and what will be optimum," remarks Julian Horwich, executive director of the Chicago Association of Microcomputer Professionals.

COMPOUND INTEREST

Doubtless, some developers will cry out for more from the Presentation Manager, but they'll have to wait for the next generation of OS/2, designed specifically for the 80386, according to Judith Hurwitz, senior analyst for Patty Seybold's Office Computing Group in Boston.

A 386 version of OS/2 may not look much different, says Hurwitz, but the Presentation Manager will evolve. Two major thrusts are expected: compound-document architecture and object-oriented programming. Compound documents (also called multimedia documents) will carry other cargoes—including sound, animation, and video—and work through varied communications links ranging from fax transmissions to distributed-processing networks. Sophisticated object-oriented programming (embodied in current offerings such as Hewlett-Packard's *NewWave*) may make it much simpler for users to sew together different applications.

But first, the Presentation Manager graphic interface must become *the* standard. "Graphic user interfaces will be extremely important in making the PC a much more effective cultural tool, spread throughout the free world like VCRs," says Paul Grayson, chairman of Micrografx in Richardson, Texas. "We're on the brink of going from 20 million PCs to 200 million or more, but it won't happen without a graphic user interface." ●

Eric Bender is PC World's *East Coast editor.*

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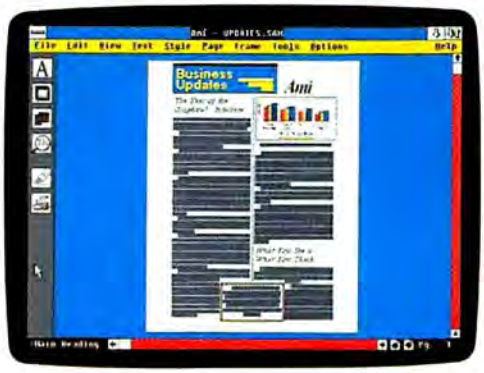

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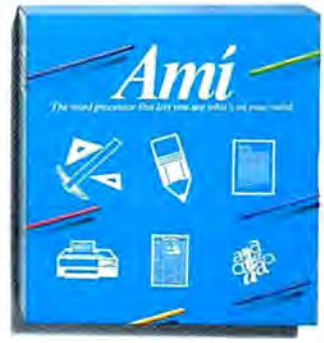

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WINDOWS: SHORTCUT OR DETOUR?

EVERYONE WANTS A GRAPHIC INTERFACE, BUT IS MICROSOFT WINDOWS YOUR BEST BET? IT COULD BE—IF APPLICATIONS ARRIVE IN TIME.

Daniel Brogan

Never have the prospects for *Windows* been brighter—or gloomier.

On the bright side, Microsoft has improved *Windows*' speed and memory management capabilities twice in the last year. More important, software developers have released heavyweight programs that hit the major application categories: *PageMaker* (publishing), *Omnis Quartz* and *FormBase* (data management), *Ami* and *Legend* (word processing), and Microsoft's own *Excel* (spreadsheets).

Another plus is Hewlett-Packard's *NewWave*, a groundbreaking extension of *Windows* that many analysts believe is a more powerful graphic user interface than that provided by Apple's Macintosh. And IBM's de facto blessing of the *Windows* interface—in the form of the Presentation Manager—doesn't hurt either.

But not all is rosy, at least for the moment. For starters, the Presentation Manager is detouring many developers away from *Windows*. Users may have a hard time boarding the *Windows* bandwagon, too. According to the Gartner Group, based in Stamford, Connecticut, nearly 70 percent of the 27 million PCs sitting on user desktops are 8088 and 8086 machines, which are far too underpowered to run *Windows*.

But the move is on. Nearly 8 million capable 80286 machines are purring away, and according to Gartner analyst Jonathan Yarmis, 286 sales will continue to skyrocket well into 1993. This booming base of 286 machines (which *won't* be able to run OS/2 comfortably) may give *Windows* developers the market cushion they need.

PROGRAMS' PROGRESS

As many critics point out, however, a handful of mainstream programs does not a business environment make. With the release of the Presentation Manager, and a crowd of accompanying applications from major software vendors expected to follow in 1989 or 1990, business users may well wonder if *Windows* is anything but a short-term solution. The answer will depend largely on how many developers buy into the *Windows* environment—and how quickly.

At last count, nearly 130 products were announced for *Windows*—but only about 50 were actually shipping. Many are desktop publishing, drawing, or esoteric vertical market applica-

tions from minor players. Companies such as Lotus, Ashton-Tate, WordPerfect, Borland, DCA, and Microrim have so far sat out the *Windows* dance, marshaling their resources instead for Presentation Manager applications.

Some companies, such as Borland, have developed *Windows* applications only to deep-six them later. "My decision was that *Windows* is a transitional operating environment," says Philippe Kahn, Borland's president. "The people who have the hardware to run *Windows* successfully—a lot of RAM, an EGA, and an 80386—can also run the OS/2 Presentation Manager successfully. That leaves *Windows* an orphan."

Perhaps not. Recent NSTL tests (see "Is Your PC Ready for OS/2?" *PCW*, October 1988) pointedly demonstrate that only pricey high-speed 286 and 386 machines can cut OS/2's mustard. The current flock of cheap 12.5-MHz and 20-MHz 80286 machines, however, can easily run *Windows*. This factor—and the release of the speedier *Windows 2.0* and *Windows/286*—have spurred a number of developers to take a chance. Users seem to be responding.

Consider *Excel*. At Martin Marietta Corporation's Energy Systems division in Paducah, Kentucky, *1-2-3* has long been the spreadsheet of choice. But, says engineer Greg Hoffman, "*Excel* does things that simply aren't posssible with *1-2-3*. For many of the charts I need to make, *1-2-3* simply doesn't have the flexibility."

But will your favorite programs—*1-2-3*, *dBASE*, *Ventura Publisher*, and others—show up with a *Windows* make-over? Probably not. Competition with Microsoft is a big factor.

According to WordPerfect's president Pete Peterson, "we definitely want *WordPerfect* to have a graphic user interface. But we don't like *Windows* because we're not a fan of Microsoft."

For Paperback Software president Steve Cook, supporting Microsoft would be like selling bullets to his worst enemy. "The money we'd make for them would fund bigger and better Microsoft applications to compete against our own products."

CAN I MAKE A BUCK?

Competitive issues aside, most software vendors interviewed for this article—particularly the big ones—aren't convinced that *Windows* applications can pay the rent. And many are unwilling to turn their back on the 18 million users saddled with 8088/8086 machines.

The choices Borland International made with its *Quattro* spreadsheet are typical: "Users told us they wanted a spreadsheet they could run on an array of machines. That's the only way they were going to switch from *1-2-3*," says Borland's Kahn. "Try running *Excel* on a laptop. You can't."

BEYOND PERFORMANCE

But performance isn't always the deciding factor. At a time when training and support costs are skyrocketing, many businesses are putting ease of use first.

At United Airlines, where a *Windows*-based reservation system has cut training time from six weeks to one, the environment gets high marks. "It has given us flexibility," says spokesperson Rick Pemberton. "In the past we couldn't hire college students for the summer, because by the time they were trained, it was almost time for them to leave."

Microsoft has also attempted to blunt the performance issue by pushing *Windows* as a stepping-stone to the OS/2 Presentation Manager. "Once the user knows *Windows*, the Presentation Manger should be a simple adjustment," says Jim Berry, a Bank of America vice president in charge of computer services who is considering standardizing the bank's PCs on *Windows*. "From a training and support perspective, that makes *Windows* very attractive."

WINDOWS OF OPPORTUNITY

Of course, those keen on making that adjustment may turn to DOS 4.0 and its Presentation Manager–style interface. But *Windows* still offers unique advantages, as *Excel* devotees can attest.

"Besides, not everyone will have the hardware—or the desire—to move up to OS/2," says Sue Morgan, whose Softview, Incorporated, recently ported its popular *MacInTax* to *Windows*. "But they are going to see the Presentation Manager on other people's systems, and they'll want a piece of that for themselves. *Windows* is that piece." ●

Daniel Brogan is the editor of Personal Publishing.

JIM BERRY

Bank of America

RICK PEMBERTON

United Airlines

STEVE COOK

Paperback Software

GREG HOFFMAN

Martin Marietta

PHOTOS BY WESLEY WONG, STEVE KAGAN, EDWARD CALDWELL, ANA THOMAS (top to bottom)

Notes for a Better Work Group

Lotus's Notes aims to provide flexible, friendly information sharing among groups.

Eric Bender

Lotus hasn't settled on the release date, the pricing, or even the product name. But the folks who brought us *1-2-3* and *Agenda* are committed to introducing yet another innovative tool, code-named *Notes*, designed to enhance work-group communication and collaboration.

Like *Agenda*, *Notes* aims to establish a new genre of software. It combines elements of data bases, electronic mail, group document collaboration, and project management but goes far beyond any of these.

These ambitious goals require a more capable platform than DOS provides. Lotus has been previewing an impressive prototype running under the *Microsoft Windows* environment. The commercial version will demand the graphic user interface, memory addressing capability, multitasking, and network links of OS/2 1.1 with the Presentation Manager.

But *Notes* has already proven in extensive pre-commercial testing that it can lend valuable assistance during four typical applications: tracking, broadcasting, referencing, and discussing information. *Notes* not only helps users disseminate information more efficiently, but it also makes data easier to retrieve and manipulate than hard copy—assuming a hard copy version can be located.

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.

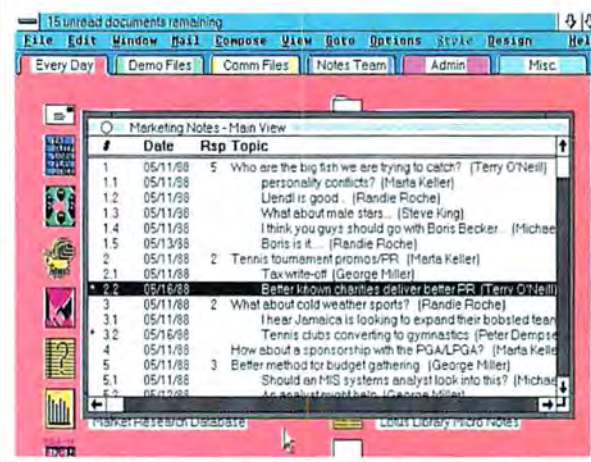
What It Can Do

Take a typical tracking application such as sales account management. For a sales team, the software offers a streamlined mechanism for swapping sales figures and phone numbers, sharing meeting reports, establishing group goals, and making comments. Other likely *Notes* tracking jobs include creating status reports and production forecasts.

Companies often need to broadcast certain types of information, for example, meeting agendas and minutes. Here *Notes* surpasses E-mail by providing more structured storage and retrieval capabilities. These help make minute-taking much more useful and more likely to be carried out consistently, says product director Eric Sall.

Notes also addresses a company's need to share reference data such as company handbooks, market research data bases, and software code libraries. As Sall remarks, these paper documents often represent "the most efficient way for the person creating them to get out the information—not the most efficient way for another person to use the information." Furthermore, *Notes* helps avoid the exasperation of groping around in file cabinets for paper documents only to have to waste more time skimming through the paper.

Notes' fourth specialty is its support for discussions—useful for brainstorming sessions, maintaining work lists, and handling product/customer support. Like an on-line bulletin board, *Notes* can be used effectively to bounce ideas among a



Lotus's Notes, shown here in a Windows prototype, offers flexible communication capabilities, as in this on-line discussion between work-group members.

PC World offers first impressions of prerelease hardware and software

group of co-workers from different departments and even from different buildings. Only interested people need respond, and they don't have to be physically present to meet. Bulletin boards generally force you to plod through one message after another; with *Notes*' referencing capability you can quickly find what you need.

Notes in Progress

The prototype of *Notes* opens with a *Windows* desktop (with Mail, Compose, View, and Go To categories added to the main menu) that includes standard *Windows* tools and *Notes* applications.

You file *Notes* messages in *forms*, and as with *Agenda*, you can look at them from many different *views*. Forms can be very straightforward; a discussion application might simply contain To, From, Date, Key Thought, and Message entries. A status-reporting application might add entries for Accomplishments, Hot Issues, and Work in Progress. You can attach other files and insert them in graphic form if they're *Windows*-compatible, or in text form if not. You also can build hypertext-like pointers to other messages. You can then view all messages in several ways—sorting by person or key thought, for example.

Writing *Notes* applications will be an odd mix of simplicity and complexity. Lotus will offer templates for popular application categories, making getting started fairly simple. Forms can be built quickly or modified via pulldown menus, and you can get even fancier with the macrolike *Notes* programming language.

By exploiting the storage on the network server, the package will also incorporate unusually in-depth on-line help. However, the net environment will force you to consider user-access levels, security, and related issues. You can make many such choices via pulldown menus, but you'll probably end up working with your network administrator. (Lotus intends average customers to install *Notes* themselves, but OS/2 networks typically will require special administrative skills.)

Under the hood, *Notes* is a flexible, text-oriented data base management system. Part of it needs to reside on an OS/2-based network server, but part resides on a workstation equipped with the Presentation Manager. The portion that runs on the workstation incorporates your desktop environment, editing, and local security software, making it, in Sall's words, "a major software application package by Lotus itself."

Lotus is considering customizing the front end for users who aren't networked. One option would allow you to call in over standard phone lines, although the program would then run more slowly. (Lotus watchers expect a *Windows* product will be a solution.) Another approach would be to bring selected server functions down into the workstation.

The network server, meanwhile, manages the data base, enforcing data integrity, security, and so on. One server can link to other *Notes* servers and update them at specified intervals. A discussion thus can span hundreds of users or bridge continents, and Lotus says such applications are well under way.

Eric Bender is PC World*'s East Coast editor.*

Notes

Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500

For more information, circle 800 on reader service card.

DAVID BISHOP

Managing Data by Forms

Need dBASE power without the pain?

FormBase could be the answer.

John Walkenbach

dBASE horror stories are a dime a dozen in the naked PC city. Although *dBASE* is a powerful relational system, mastering it takes a lot of experience—and not a little patience. Columbia Software's *FormBase*, however, turns data base design, data entry, data retrieval, and linking data bases into a thoroughly form-driven process. Although *FormBase* saves data in a proprietary format, it can import *dBASE*, *1-2-3*, and ASCII files.

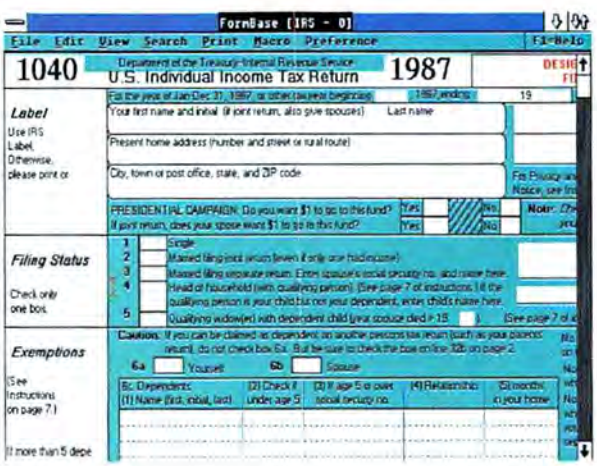
To create a new data base, you need only create a new form. In fact, a form is your only window into a *FormBase* data base. You can position fields in the form with a mouse and add rules, draw shaded boxes, and select fonts to create sharp facsimiles of printed invoices, order forms, inventory lists, Rolodexes, or letters ready for mail merge. A *FormBase* record can even treat bit-mapped or vector-based images as fields. A personnel data base, for example, could contain a scanned image of each employee; customer invoices could sport the company's logo. If you don't want to clutter the form with long fields, such as memo fields, *FormBase* can place them in a scrollable window.

Flexibility will likely be *FormBase*'s claim to fame. You can alter a data base at any time by adding, removing, or modifying a form's fields in the draw mode. (In the data-entry-only type mode, your errant keystrokes can't alter the data base's structure.) More important, you can attach multiple forms that contain any or all of the data base's fields to a data base. Need to link several data bases? You merely create a form containing a field that all the data bases share. *FormBase* speeds operations with a passel of keyboard shortcuts and a macro processor that records both keystrokes and mouse-invoked commands.

Querying a data base is a point-and-click, query-by-example operation. You call up a "filter" identical to the current form, specify what fields the search should include, and enter various math and Boolean operators, including variables. The related lookup function can pull information from one data base into another, and a data validation feature can test entries according to data type, format, logical operators, and even multiple conditions based on values or variables in any existing form. The program can also restrict access to a data base or a form, such as a payroll view of an accounting data base, via passwords.

Like most data managers, *FormBase* offers a few canned report formats (form, form with data, data in tabular format with headers and footers), plus the ability to create custom formats. The latter process involves sorting the necessary data bases, arranging (and linking) the fields in a special on-screen form, and printing the result. It sounds simple, but generating complex multi–data base reports can be a pain.

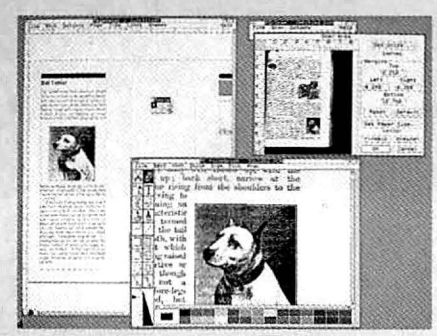
FormBase will have a head start in the market: Xerox has acquired exclusive worldwide marketing rights, so *FormBase* will be joining a company stable that includes such notables as *Ventura Publisher*. *FormBase* should be released by the time you read this. Power users note: The company plans to introduce an icon-driven procedural language in mid-1989, and later, network features and links to third-party SQL products. ●



FormBase not only offers dBASE-like power, but also sharp facsimiles of commmon forms—such as a 1040 return.

John Walkenbach manages the consumer research department of a leading savings and loan association based in Southern California.

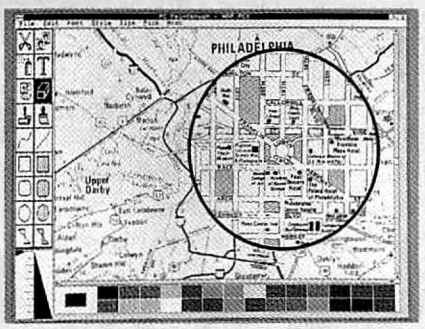
FormBase
Columbia Software
18908 Muirkirk Dr.
Northridge, CA 91326
818/363-2574
For more information, circle 801 on reader service card.



Scan an image, edit it, and paste it into your PC Pagemaker document – all in a seamless Windows environment.

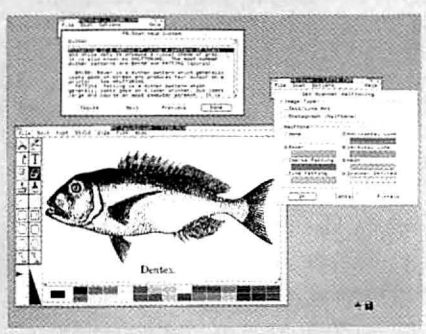
PC Paintbrush Plus for Windows

The perfect way to finish what your scanner started.



Scan and re-scale the images you need, then put a toolbox of fabulous features to work: Cut. Paste. Shrink. Grow. Text. Many, many more.

Pre-scanning saves time and memory. Just frame the precise area you want and then scan only that area at high resolution.



You'll rarely have to reach for a manual. Thanks to context-sensitive help and graphically labeled options, learning is effortless.

Now you can work swiftly – with your other Microsoft® Windows applications and with your scanner – to produce truly impressive images.

Award-winning features.

For starters, PC Paintbrush Plus™ for Windows brings you all the popular features that made PC Paintbrush® the world's favorite graphic toolbox.

You'll make freehand drawings with adjustable brush widths. You'll create instant lines, curves, and geometric shapes . . . cut, copy, and paste portions of your images, even if they're bigger than screen size . . . erase, tilt, flip, shrink, or grow them . . . zoom in for pixel editing or zoom out for viewing . . . add colors and patterns . . . and type headings or captions with special fonts in adjustable point sizes. You can save and load your images in PCX and TIFF formats.

Scanning. The ZSoft way.

PC Paintbrush Plus for Windows brings out the best in your scanner. First, ZSoft supports just about any scanner you can name. Second, a virtual memory technique lets you do full-page black and white scanning and editing with a 640K system.

Next, get complete control of your scanner's capabilities. In an instant, you can adjust brightness and contrast. Change resolution. Select halftone patterns, page size and scan area. Choose a negative or positive image. Re-scale images (25 to 400 percent). And store frequently used scanner settings for convenient use.

Best of all, with ZSoft's pre-scan feature, there's no more trial-and-error scanning! Just do a quick pre-scan to get the full image on your screen, place a frame around the portion you want to edit, and then scan only that portion at high resolution.

Seamless creativity.

Move freely between PC Paintbrush Plus and other applications – collecting, combining, editing and pasting images as you go. For example, scan a new character while editing a font with Publisher's Type Foundry™. Edit an image while designing a newsletter with PC Pagemaker®. And discover dozens of other benefits from multi-tasking.

Effortless learning.

PC Paintbrush Plus makes computer art amazingly easy for anyone. With context-sensitive help. Pull-down menus and icons. Graphically labeled "buttons". Uncluttered screens. And of course, the familiar Windows user interface.

The price for all this power and creativity? Just $149. So open the door – and Windows – to graphic freedom. Get PC Paintbrush Plus for Windows at your ZSoft dealer.

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Suite 100
Marietta, GA 30067
Telephone: 404/428-0008
Facsimile: 404/427-1150
Telex: 6502859318

Circle 206 on reader service card

Legend

Document processor

PROS: Fully featured word processor, style sheets, table generator

CONS: Slow, no printer fonts, limited typographic features, few sample style sheets, expensive

The *Windows* market has been waiting for a *real* word processor for years. Although companies from Microsoft to Samna have been in the race for a while, office automation giant NBI beat them all to the finish line with *Legend*. But don't count on *Legend* making it to the winner's circle.

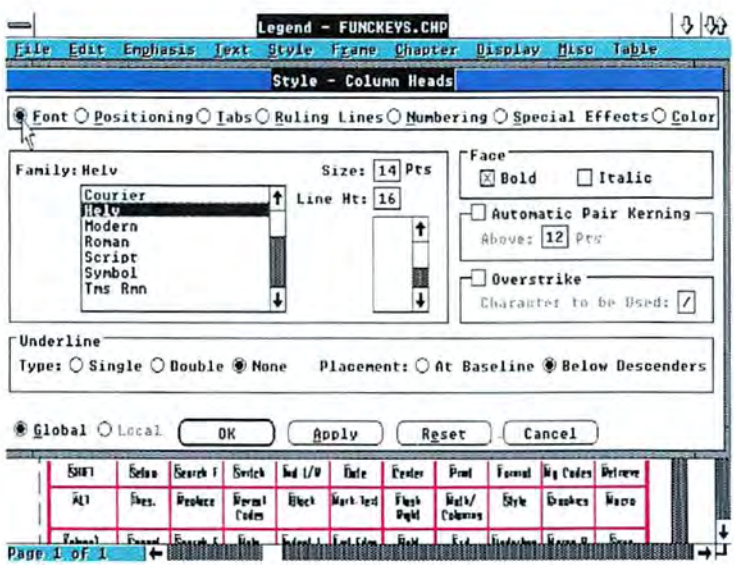
At first glance *Legend* has all the earmarks of a success story. Imagine someone turning *Ventura Publisher* into a *Windows*-based program, simplifying it a tad, and adding a beefy word processor and competent drawing toolbox. Like *Ventura*, *Legend* relies on style sheets for global formatting and uses frames to hold pictures, tables, and text files. *Legend* also offers the usual complement of features found in major word processors, from search and replace to mail merge, and generates indexes and tables of contents automatically.

But good intentions alone can't guarantee that you've got a good program. To begin with, *Legend* is excruciatingly slow even by *Windows*' standards. The program's $695 price tag is rather steep (especially compared to $195 for the comparably equipped *Ami* from Samna), and it's something of a disk hog, soaking up at least 2MB sans *Windows*. Finally, though NBI has crafted a streamlined interface, some basic operations—such as applying a style and using frames—are multistep affairs. On performance, price, and ease of use, *Legend* rates about a C+.

Working with *Legend* as an everyday word-processor-cum-page-layout program quickly exposes both its strengths and its weaknesses. On the plus side, you can change text attributes on the fly, set multiple columns on a page, and call on a capable spelling checker and outliner. *Legend* dispenses with a fixed *Ventura*-like sidebar that lists modes, opting instead for a small, movable status window. Better still, when you want to change several type specs, you don't have to plow through one menu option after another as you do with *Ventura*. Merely open the first dialog box and you'll see "buttons" for all the relevant menu options listed along the top. Click a button and the appropriate dialog box pops on screen. This is a real time-saver—one that *Ventura*'s designers would do well to emulate.

Unfortunately, *Legend*'s designers haven't fully streamlined other basic operations. To apply a style, for example, you don't highlight a paragraph, click a style in an on-screen list, and go on your merry way. Instead, you must open a menu, select the Use Styles command, pick the style from a dialog box, and then confirm it. (You can, however, assign styles to function-key combinations.) Worse, *Legend* doesn't come with a passel of defined style sheets like *Ventura* does—you'll have to build memo, report, and other style sheets from scratch.

Legend's approach to frames won't win many converts, either. For starters, you se-



Legend's all-in-one dialog box lets you change type specs in a flash.

lect frame-related menu options using the left mouse button, yet actually manipulate a frame using the right button. Positioning and sizing a frame calls for eagle eyes, since *Legend* lacks an on-screen ruler. If you want anything resembling precision, you'll have to call up the status window, enter four numbers that set the size and location of the frame, and then wait while *Legend* laboriously redraws the screen each time. Few desktop publishers and even fewer word processor users will put up with such inconveniences.

To its credit, *Legend* makes the onerous task of creating and editing tables a breeze. Changing space allotted to columns or rows takes a click or two, and adding, moving, or deleting rows and columns is just like cutting and pasting text with a word processor. If the data you type in (or import from a DIF file) is too long to fit on one line, *Legend* automatically adjusts cell height. Just keep in mind that you'll have to endure the 10- or 20- or even 60-second delays *Legend* imposes as you enter table text.

Of course, desktop publishers will tolerate sluggish programs if they get the typographic goodies, and *Legend* dutifully supplies them—automatic hyphenation, automatic and manual kerning, tracking, and so forth. But it curiously lacks some basics—like a set of printer fonts. If you don't already have third-party downloadable fonts, *Fontware*, or a PostScript printer, you're stuck with *Windows*' paltry collection of vector fonts. Leading is available only in whole points (which makes it hard to control type density), and contrary to good typesetting practice, *Legend* justifies some lines by adding letterspacing, which reduces overall readability.

Although *Legend* has a lot to offer, its uneven feature mix, sluggish performance, and price detract from its appeal. All program design involves compromises, but in trying to serve both word processor users and desktop publishers, NBI has satisfied neither.
—Luther Sperberg

WHERE TO BUY

Legend 1.1
NBI
3450 Mitchell Ln.
Boulder, CO 80301
800/922-8828, 800/624-1111 (except Colorado), 303/444-5710
List price: $695 (Windows runtime included), demo version $9.95
Requirements: 640K; DOS 2.0 or later version; hard disk; EGA, VGA, or Hercules graphics card; two- or three-button mouse
Not copy protected
Technical support: unlimited, toll-free number, M–F 7–6
Other support services: free design guide
For more information, circle 810 on reader service card.

CFO Advisor

Decision-support program

PROS: Multiple goal seeking, imports data from accounting and spreadsheet programs, more than 50 reports, in-context help

CONS: No macros or custom reports, no trend analysis, spotty manual

Is your business ship steaming along or slowly sinking? Is that an iceberg up ahead or just an ice cube? Financial officers constantly seek the answers to such questions, typically with the aid of programs like *1-2-3*. Yet bending a spreadsheet to such tasks takes considerable time and expertise—something not all managers have.

Bend no more. With *CFO Advisor*, financial managers for large and small companies can easily play out complex "what if" scenarios and examine the financial ramifications without sweating over macros. *CFO Advisor*'s powerful analytical tools can measure a company's current and desired financial position 75 different ways and solve over 600 equations. Yet like a dedicated accounting

program, *CFO Advisor* stores financial data according to established accounting relationships and ratios used in balance sheets and income statements.

CFO Advisor initially displays a modified Du Pont chart—a kind of dynamic blueprint that plots relationships among all the items in a company's balance sheet and income statement. Change a value (such as sales) and you see the effect ripple through the structure. There are also sensitivity-analysis and decision-optimization views that disclose which factors (such as price) have the greatest influence, and shows you how to fine-tune them to reach your financial goal.

The real power of the program, however, lies in its forward and backward goal-seeking feature. Suppose, for example, that you want to increase profits and cash flow to specific levels. What changes in price and volume will produce the results you want? To get the answer from a spreadsheet, you'd randomly change prices and volumes until you stumbled onto the right combination. With *CFO Advisor*, you merely feed in your goals (two's the limit) and watch the program spit out the best-fitting price and volume figures.

Financial managers will especially welcome the program's more than 50 types of reports—everything from standard tabular financial statements to *BoeingGraph*-like 3-D sensitivity graphs. *CFO Advisor* can import data from *Accpac Plus*, *Solomon III*, *Real-World*, and *CYMA*, as well as *1-2-3* and *SuperCalc 4*.

CFO Advisor offers an appealing mix of features, but power users who like to fiddle may be disappointed. You can't define ratios, create custom reports, or analyze trends, and the program lacks macros for automating tasks. The user manual is poorly indexed, sometimes conflicts with its illustrations, and lacks any summary of keyboard shortcuts.

Nonetheless, this is one powerful easy-to-use tool for business planning and analysis. *CFO Advisor* isn't cheap, but if your time is money—and your company's money is your business—buy it. —*Charles Kyd*

CFO Advisor does sophisticated goal seeking and then some.

CFO Advisor: Seek Alternatives (KPAs) COMPANY.CFO

File Edit Setup Analysis Display Itemize Graphs Options Tools Help

K.R.A. / K.P.A.	NET PROFIT	ACTIVITY	PRFBLTY%	RONA%	ROE%	CASH FLOW
K.P.A.	100,000	2.00	10.00	17.50	28.00	30,000
SALES(S.P.)	1,015,918	1,149,254	1,018,931	1,010,428	1,030,067	1,021,587
DELTA %	1.59	14.93	1.89	1.04	3.01	2.16
SALES(VOL)	1,031,709	1,185,185	1,446,723	1,076,094	1,154,340	907,076
DELTA %	8.17	18.52	44.67	7.61	15.43	-9.29
COS	784,185	184,515	784,185	790,3[illegible]	770,127	785,985
DELTA %	-1.98	-76.52	-1.98	-1.21	-3.73	-1.75
EXPENSES	79,151	N/A	79,151	85,095	65,064	79,151
DELTA %	-16.68		-16.68	-10.43	-31.51	-16.68
F/ASSETS	-251,991	300,000	-251,991	317,373	-730,873	340,163
DELTA %	-172.57	-14.29	-172.57	-9.32	-325.95	-2.81
W/CAPITAL	-403,991	150,000	-403,991	167,373	-940,873	190,163
DELTA %	-302.00	-25.00	-302.00	-16.31	-570.44	-4.92

WHERE TO BUY

CFO Advisor
Financial Feasibilities, Inc.
9454 Wilshire Blvd.
Penthouse Suite
Beverly Hills, CA 90212
800/752-5556, 800/247-4452 in California, 213/278-8000
List price: $995; trial package (minus print and save functions) $45
Requirements: 640K, hard disk, Microsoft Windows 2.0 or later version; mouse recommended
Not copy protected
Technical support: one hour free support for registered users via toll-free number; extended support $495 per year or $65 per hour; operates M–F 9–5
Other support services: training and financial consulting services available
For more information, circle 811 on reader service card.

Opus I

Hypertext drawing program

PROS: Can link images to other images or data records, good for desktop presentations

CONS: Linking images to data is time-consuming, amateurish clip-art selection

Opus I is a perfect example of a whole that's greater than the sum of its parts. By combining drawing with data storage, Roykore Software has produced a package that lets you point to an on-screen image and

PC WORLD Profile

TOPS tells why PC WORLD works for them.

"PC WORLD is a critical part of our marketing mix. We put a strong advertising emphasis on PC WORLD because we're convinced that the magazine reaches an important part of our market, especially the department manager for the workgroup and the power user."

On reaching readers ready to buy.

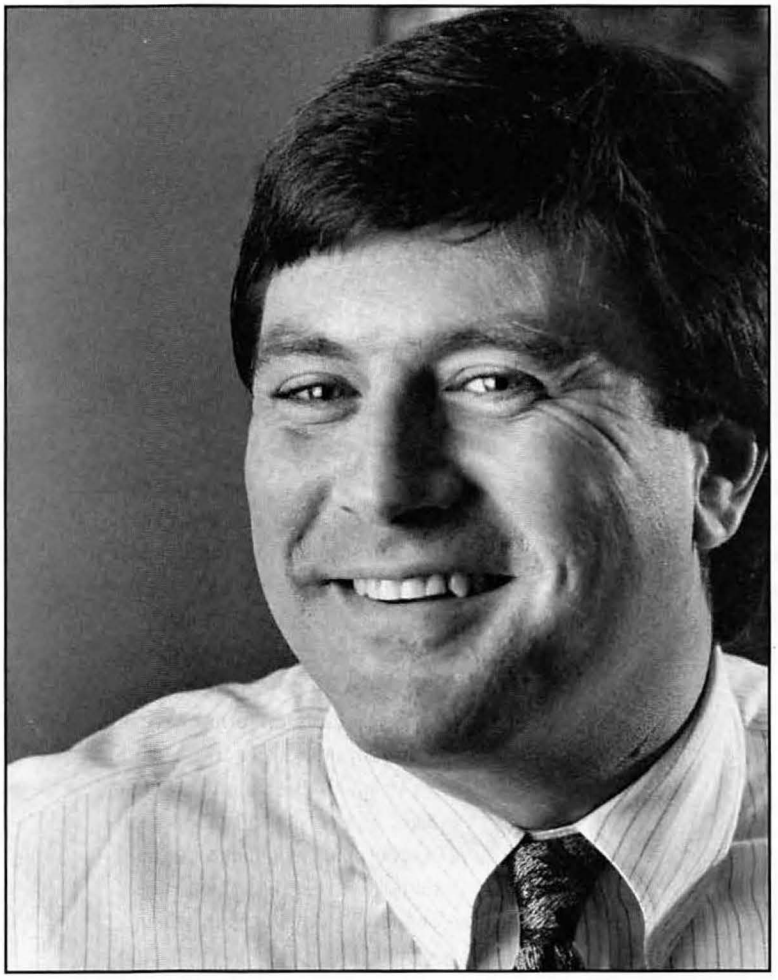
"We're pretty hot on the book. I think the best thing I can say about our involvement with PC WORLD is that **it's a magazine that reaches a marketplace which is ready and waiting to adopt a solution like TOPS."**

On readers who manage the buying process.

"I think people who read PC WORLD want an information source that helps them manage the buying process. **PC WORLD covers a lot of ground — making critical computing issues accessible to people who make purchase decisions that could affect their company's short-term health and long-term viability."**

On reaching readers who make decisions.

"We need the people who are directly affected by and interested in solutions TOPS provides. But often they are just part of the decision-making process. We also need to reach the business buyers and PC coordinators — people who need to understand what solutions are available in the marketplace and often determine what is actually purchased. PC WORLD delivers them for us."

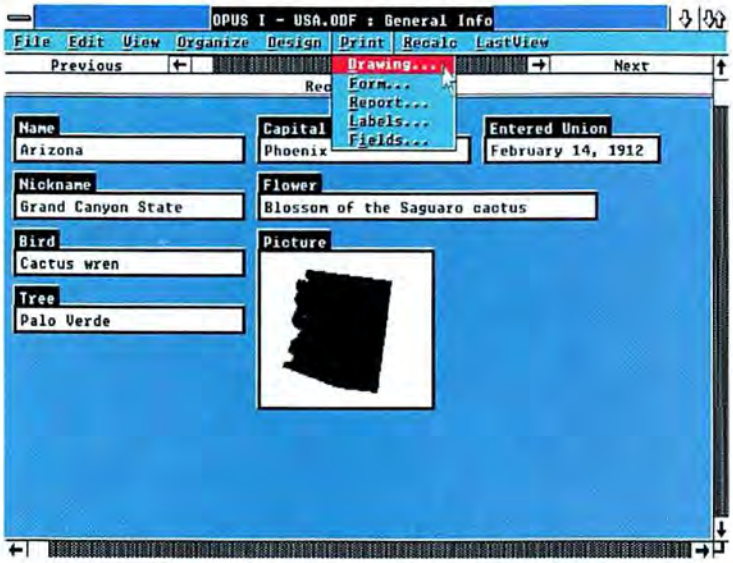


Rich Shapero, VP and General Manager, TOPS division, Sun Microsystems, speaks on the value of PC WORLD as an integral part of their success. The TOPS division specializes in developing and marketing networking products for IBM-PC's, Apple Macintoshes and Sun Workstations.

On TOPS and why PC WORLD is important to them.

"In the past twelve months, some amazing things have happened at TOPS. **We've shipped more than 400,000 TOPS network nodes. We think we're seeing the emergence of a new product category for the microcomputer industry—the plug-and-go LAN. My favorite statistic is that TOPS nodes now rival monthly Ethernet board volumes.** We've gone to PC WORLD to continue to tell the TOPS story — the growing consumer acceptance of a network solution that makes sense. PC WORLD works for us."

PC WORLD *works.*



With Opus I you can link an image (Arizona) with a data base record.

display data relating to it, switch to another image, and even execute another program. It's as if Roykore created a *Windows Draw/PC-File* hybrid that both draws pictures and remembers the facts that go with them.

Opus I's artistic talents are pretty basic, but it's what you do with a drawing *afterward* that counts. *Opus I* can either save on-screen objects in individual files to be used in other drawings or meld objects into a single composite image. You can then link each object to an off-screen file, which can be displayed on demand. For example, you can draw a map of the United States in which each state is essentially a hypertext button. Select Arizona, and *Opus I* can instantly pop up a screen supplying data about the state.

Linking objects and data is tedious but straightforward enough. First create a record by designing a data entry form and filling it in. Then display the image, open the Assign menu, scroll the desired record number into view, and click on it. Linking an executable file to an object is a bit more complicated but far more rewarding. You identify the object that will be the "button," then pick one of the actions listed in a dialog box—such as Find a record, Load an image, Execute a program. The next time you click on the object, the programmed action takes place.

Opus I's data management functions match those of a simple flat-file manager. You can search for records using a number of conditional operators and ranges. A maximum of 10,000 records can be stored with any drawing, and each record holds up to 100 data fields.

If you don't want to draw images yourself and you prefer to forgo *Opus I*'s amateurish clip-art symbols, you can import graphics from other applications using the *Windows* clipboard. *Opus I* would be a lot easier to use if it could directly import TIFF, PCX, and other popular formats.

Opus I is a screen-oriented program, and its color hard-copy capabilities are limited to those few color printers supported by *Windows*. But if you're developing educational software, tutorials, or putting on desktop presentations where you need to impart complex information about anything from real estate to engine components, *Opus I* is the ticket. *Opus I* may not be *HyperCard* for the PC, but so far it's the closest thing to it.
—Dennis Dykstra

WHERE TO BUY

Opus I 2.0B
Roykore Software, Inc.
749 Brunswick St.
San Francisco, CA 94112
800/227-0847, 415/333-7833
List price: $395
Requirements: 512K, hard disk, DOS 3.0 or later version, Microsoft Windows 2.0 or later version, graphics adapter; mouse recommended
Not copy protected
Technical support: unlimited, toll-free number, M–F 8–5
Other support services: none
For more information, circle 812 on reader service card.

Q+E

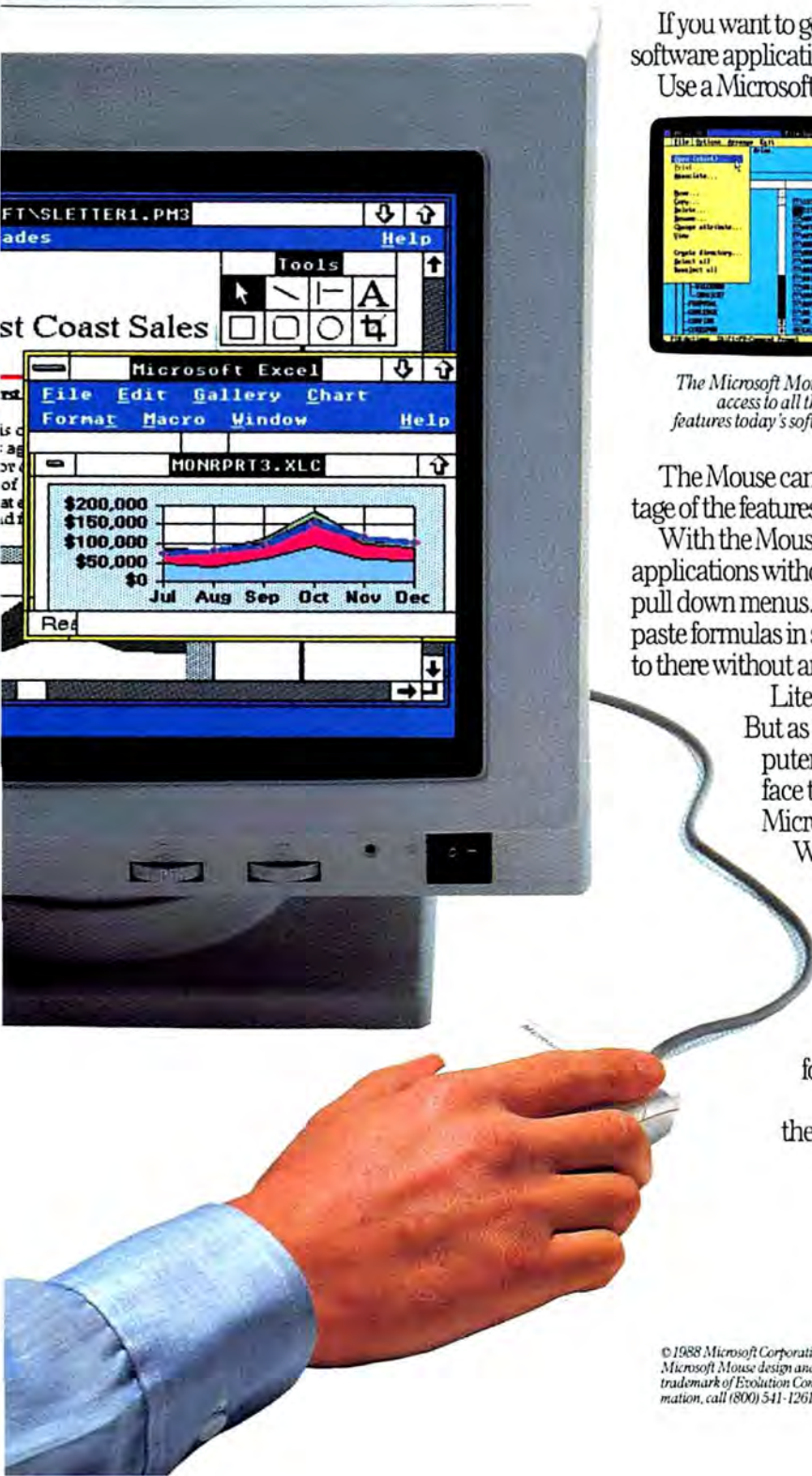
dBASE utility

PROS: Easy access and manipulation of .DBF and compatible data files, point-and-shoot operations

CONS: Doesn't support index files, can't display data from linked records, lacks formatting functions and data validation, slow sorting

Getting at the data in *dBASE* files for a quick on-screen view or a report usually requires a trip to the dreaded dot prompt. Although *dBASE III Plus*'s menu-driven inter-

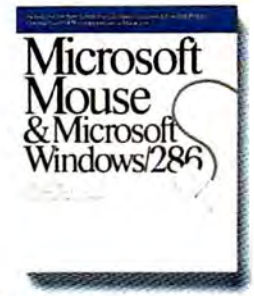
Push your software to the limit.



If you want to get the most out of today's new, high-powered software applications, we have a few words of advice:

Use a Microsoft® Mouse.

The Microsoft Mouse gives you easy access to all the powerful features today's software has to offer.



It looks innocent enough here, but wait until you see how the Mouse makes your software scream.

The Mouse can unleash your software–and take full advantage of the features intended to make your work easier.

With the Mouse you can effortlessly manipulate menu-driven applications without taking your eyes off your screen. You can pull down menus. Highlight text in one fell swoop. Copy, cut and paste formulas in spreadsheets easily. And move things from here to there without any command-key mumbo jumbo.

Literally hundreds of applications support the Mouse. But as the leading software developer for personal computers (and one of the first to bring a graphical interface to PC screens), we've gone a step further: Microsoft Windows/286 with PC Paintbrush® for Windows, Microsoft Paintbrush or EasyCAD™2 actually come with the Mouse (or vice versa).

Already, the Microsoft Mouse has made its way into the hands of over one million personal computer users. And that number is sure to grow even faster. After all, graphically oriented software is the driving force behind improved productivity.

But it's the Microsoft Mouse that puts you in the driver's seat.

Microsoft®
Making it all make sense.™

© 1988 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and the Microsoft Mouse design and Making it all make sense are trademarks of Microsoft Corporation. EasyCAD is a trademark of Evolution Computing. PC Paintbrush is a registered trademark of ZSoft Corporation. For more information, call (800) 541-1261. Customers in Canada call (416) 673-7638, outside North America, (206) 882-8661.

face supposedly makes it easier to build queries, those who need to extract interrelated data from multiple .DBF files or create custom reports must wrestle with *dBASE*'s finicky command language. Wouldn't it be great if you could bypass *dBASE* altogether and directly view, edit, and query .DBF files?

That's what the *Windows*-based *Q+E* from Pioneer Software promises—but, sad to say, only marginally delivers. When you first load the program, you think, At last! Merely click on a listed .DBF file and it pops into a window in neat, tabular form. From pulldown menus even *dBASE* novices can select records, sort them by one or more fields, search for text, make changes, total up fields, and create queries. To build a query, you simply click a column of data and open the Sort, Select, or Search menus. The program leads you through various dialog boxes, where you may select operators, such as > and <, and other options. You can even save a query and use it later. You can also view multiple files in separate windows or view different parts of the same file at once—a feat impossible using *dBASE*. Need to annotate a record? Simply click the Memo field in the desired record and append a note using *Q+E*'s pop-up notepad.

Sounds great, doesn't it? Unfortunately, if you edit a data file that's indexed—and most are—*Q+E* won't update the appropriate index (.NDX) files. Unless you immediately reindex the edited files with *dBASE*, the index files will "point" at the wrong records—with disastrous consequences. For example, innocently changing a phone number in a customer file will uncouple any linked records in a related orders file, and the data will appear to be lost. *Q+E* can't protect users from such catastrophes.

Because *Q+E* can't use index files to reorder data, be prepared to sort your data files repeatedly—and to gaze at *Windows*' little hourglass icon for aeons as *Q+E* chugs along. And what's worse, for the same reason, you can't display linked records from related files—such as an address from the customer file when you view a customer number in the orders file. Given *dBASE*'s relational raison d'être, this is a fatal omission indeed.

Finally, *Q+E* won't win any prizes as a report generator. You can set page width and lines per page, and that's it. If you want fonts or custom formatting, you must print the file to the *Windows* clipboard and paste the contents into another application for a make-over.

The *dBASE* market is crying out for a program that makes editing, querying, and reporting easy for pros and novices alike—but *Q+E* isn't it. However, Pioneer Software claims that the upcoming version 2.0 will support index files as well as performing relational joins in a single window. If the company makes good on its promises, *Q+E* will bear reconsideration. In the meantime, if you need attractive reports, turn to *Byline;* for multifile output, *R&R Report Writer* is just the ticket. And if powerful QBE or SQL querying is your goal, *dQuery* is the best bet.
—*Alan Schwartz*

WHERE TO BUY

Q+E 1.2
Pioneer Software
5540 Centerview Dr. #324
Raleigh, NC 27606
919/859-2220
List price: $89
Requirements: Windows 2.03, Windows/386 2.03, or later versions; mouse recommended
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8:30–5:00
Other support services: none
For more information, circle 813 on reader service card.

Luther Sperberg is a freelance writer and desktop publishing trainer in New York City. Charles Kyd is a Seattle-based writer and consultant, a former chief financial officer, and the author of The Microsoft Excel Business Sourcebook *(Microsoft Press, Redmond, Washington, 1988). Dennis Dykstra is a contributing editor for* PC World *and a professor at Northern Arizona University. Alan Schwartz is a Northern California consultant specializing in data base development.* ●

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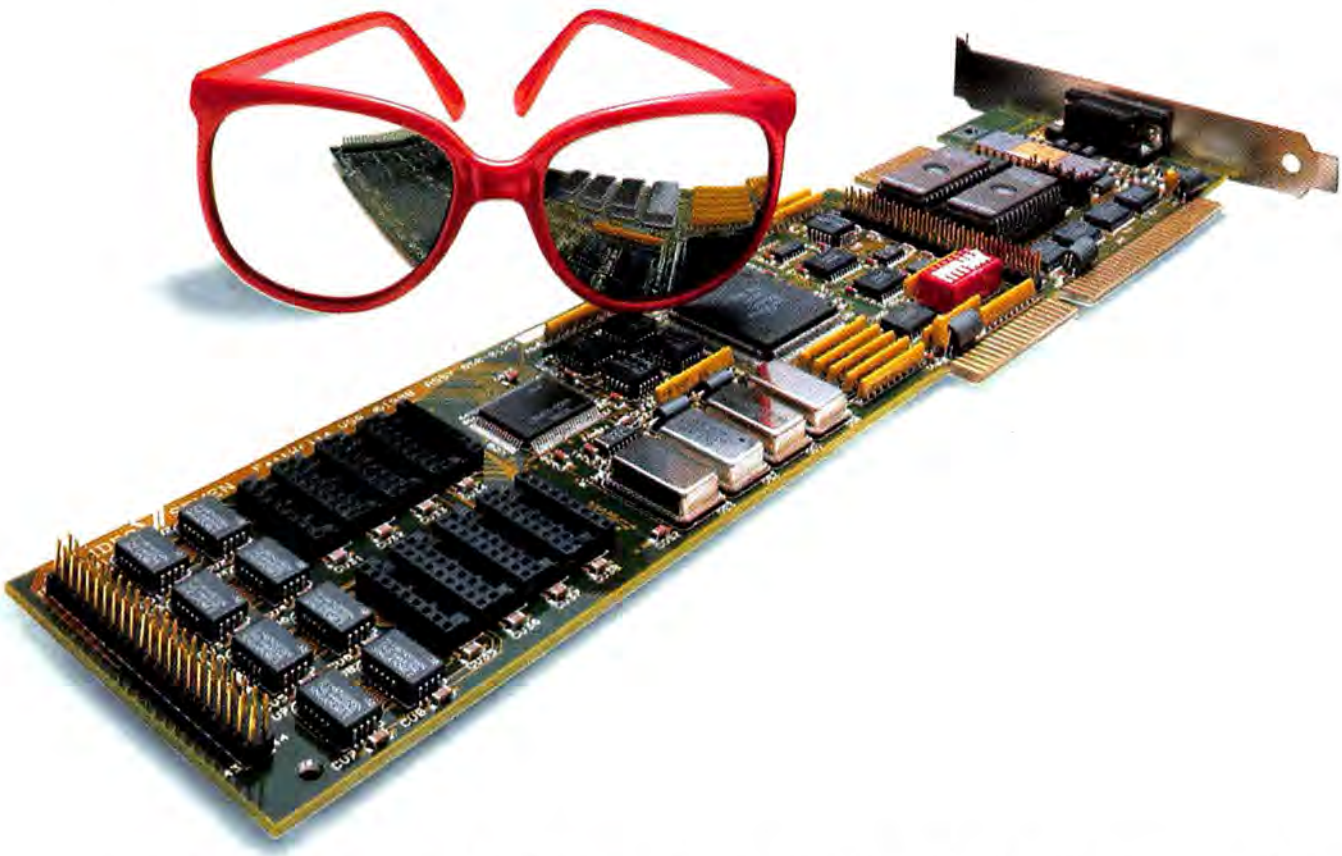

And then again, some people buy it for its high resolution. Or its 100% hardware compatibility.

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Circle 277 on reader service card

EMS 4.0 MEMORY BOARDS

Twenty-one EMS 4.0 boards promise to take your PC to the expanded memory horizons beyond 640K. But shop carefully; while some boards are truly "capable," others are merely "compatible."

Lewis Perdue

Despite a prolonged deathwatch, MS-DOS and the "obsolete" Intel 8088 live on. In many ways they owe their survival to the development of expanded memory, which, with the help of special memory boards and supporting software, allows PCs to use more than 640K of RAM. Expanded memory not only prolongs the life of the 8088, it also adds extra punch to 80286-based PCs whose owners are not ready or willing to commit to the all-encompassing solutions of OS/2.

The 640K barrier was broken in 1985 by Lotus, Intel, and Microsoft with the Expanded Memory Specification version 3.0 (LIM EMS 3.0), a scheme that gave specially written programs the ability to use up to 8MB of RAM. Only 64K was active at a time, however, so the amount of code that could run in expanded memory was limited to 64K or less. In other words, the new territory was essentially useful only for storing data.

A group led by AST Research developed a second specification called Enhanced EMS (EEMS). EEMS opened up 16MB and allowed up to a full megabyte to be active at any time. These improvements greatly eased multitasking and permitted large programs and TSRs to run in expanded memory.

Drawing upon input from the vendor community, including supporters of EEMS, the Lotus/Intel/Microsoft group upgraded EMS to version 4.0 in August 1987. The EMS 4.0 standard (sometimes referred to as LIM 4.0) embraces all the features of EMS 3.2 and EEMS and adds several new ones, notably the ability to access 32MB of RAM.

This guide examines 21 boards that support EMS 4.0. Keep in mind, however, that rather than redesign hardware, many vendors simply updated their memory management software. The result is two classes of boards: those that are *compatible* with software written for the EMS 4.0 specification, and those that are also hardware-*capable*.

What makes a board EMS 4.0–capable rather than merely compatible? Without 4.0-specific hardware, an expanded memory board cannot deliver full 4.0 performance. A fully capable board offers 1MB mapping, 32MB memory management, and multiple page maps. Two other features, page aliasing and DMA support, are also specified by version 4.0 but are much less important.

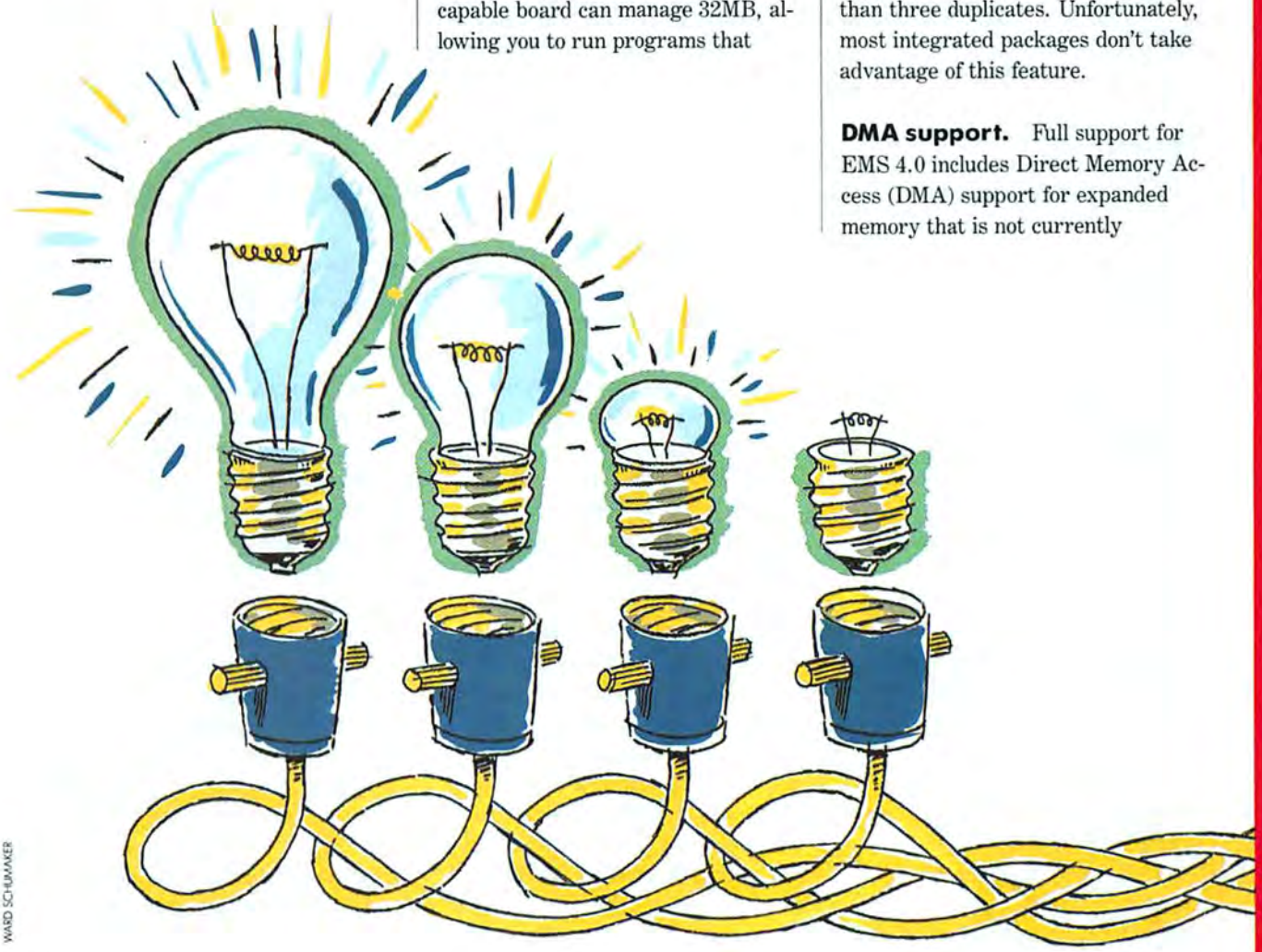
1MB mapping. A fully capable board must be able to map up to 1MB of expanded memory. Registers on the board determine which 16K "pages" of memory are active and to what addresses each is mapped. An EMS 3.2 board, which has only 4 page registers, can map only 64K of active expanded memory, and it can map only into addresses between 640K and 1MB. An EMS 4.0 board, however, has at least 64 registers per map (EMS 3.2 does not support multiple maps) and thus can handle 1MB of active memory. (The Intel Above-Board Plus has less because none of the boards are allowed to map over the video RAM, device ROM, or BIOS ROM addresses.) EMS 4.0 boards can also map into addresses below 640K. This capability enables device drivers, memory-resident programs, and even full-blown applications to run in expanded memory. Running EMS-compatible device drivers in expanded memory is a boon for LAN servers and workstations, which use large, memory-hogging drivers. And executing EMS-compatible TSRs in expanded memory frees up the space they would otherwise occupy in conventional memory, leaving more room for non-EMS programs. Being able to run program code in expanded memory lets multitasking environments such as *Desqview* run more programs.

32MB management. A fully capable board can manage 32MB, allowing you to run programs that work with vast amounts of data. It also lets multitasking environments juggle more and larger programs.

Multiple page maps. In multitasking, each session separately manages expanded memory via a single page map. A truly capable board supports more than one page map in hardware to provide faster switching between sessions.

Page aliasing. A capable board should allow a single bank of expanded memory to be mapped to more than one DOS address. This improves performance by letting the various modules of integrated programs share data simultaneously by drawing from one data set rather than three duplicates. Unfortunately, most integrated packages don't take advantage of this feature.

DMA support. Full support for EMS 4.0 includes Direct Memory Access (DMA) support for expanded memory that is not currently



WARD SCHUMAKER

Manufacturer / Product	1MB mapping	Page registers	Page maps	Maximum memory per board	Maximum memory accessible	Page aliasing	DMA transfers to "un-mapped" expanded memory	Configurable as extended memory	Serial port	Parallel port	Switchless setup	Print spooler	RAM disk	Bus interface (in bits)	Maximum bus speed (in MHz)	Wait states (top bus speed)	RAM speed (in nanoseconds)	Price (unpopulated)	Price[1] (with 2MB)
AST Research																			
Advantage Premium	●	128	2	2MB[2]	8MB	●	●	●	●	●	○	●	●	16	8	0	120	$595[3]	$2290
Rampage 286	●	128	2	2MB	8MB	●	●	●	○	○	○	●	●	16	8	0	100	$695[3]	$1995
RampagePlus 286	●	2048	32	8MB	32MB	●	●	●	◑[4]	◑[5]	●	●	●	16	12.5	0	100	$595	$2690
Boca Research																			
BocaRam XT	○	4	1	2MB	8MB	●	○	○	○	○	○	●	●	8	12	1	150	$175	$1145
BocaRam AT	○	4	1	4MB[2,6]	8MB	●	○	●	○	○	○	●	●	16	12	1	150	$225	$1195
Everex																			
RAM 3000 deluxe	○	4	1	3MB	32MB	●	○	●	○	○	○	●	●	16	10	0	150	$228	n/a
RAM 8000	○	4	1	10MB	32MB	●	○	●	○	○	○	●	●	16	10	0	120	$399	n/a
RAM 10000	●[7]	4096	4	8MB	32MB	●	○	●	○	○	○	●	●	16	10	0	120	$249	n/a
IBM																			
MMEA	○	0	1	12MB	16MB	○	○	●	●	●	○	○	○	16	8	1	150	$445	$1740
PS/2 MA	○	0	1	12MB	16MB	○	○	●	●	●	○	○	○	16	8	1	120	$445	$1740
2MB EMA	●	n/a[8]	n/a[8]	2MB	16MB	●	●	●	○	●	○	○	○	8/16	8	0/1	150	n/a	$1355
Intel																			
AboveBoard Plus	●	48	1	10MB[2]	32MB	●	○	●	●	●	●	●	●	8/16	12.5	0	100	$695[3]	$1995
Monolithic Systems																			
JustRam AT16	○	4	1	16MB	64MB	●	○	●	○	○	○	●	●	16	12	1	100	n/a	$1798
JustRam ATZ	○	4	1	8MB[2]	64MB	●	○	●	○	○	○	●	●	16	16	1	100	n/a	$1707
Newer Technology																			
Concentration	●	256	4	32MB	32MB	●	●	●	○	○	○	●	●	●	16	12	1	100	$620	$2090
LIMfile	●	256	4	16MB[2]	32MB	●	●	○	○	○	○	●	●	●	16	12	1	100	$790	$2160
Pan United																			
Micro Lap EMS	●	128	2	2MB	8MB	●	●	●	○	○	○	●	●	●	16	12	1	120	$179	$1179
Profit Systems																			
Elite 16	●[7]	1024	2	16MB	32MB	●	●	●	●	●	●	●	●	●	16	16	2	120	$695[3]	$1295[9]
Tall Tree Systems																			
JRAM AT4	○	4	1	8MB	32MB	○	○	●	○[10]	○[10]	○	●	●	16	10	1	120	$399	$1119
JRAM AT2	○	4	1	2MB	8MB	○	○	●	○[10]	○[10]	○	●	●	16	10	1	120	$349	$1069
Tecmar																			
Captain 286	○	4	1	15MB[11]	16MB	●	○	●	●	●	○	●	●	16	10	1	100	$575[12]	$1800

[1]Prices subject to change due to fluctuating price of RAM.
[2]With optional daughterboard.
[3]With 512K.
[4]Optional parallel/serial or serial/serial daughterboard.
[5]Optional parallel/serial daughterboard.
[6]Each board can also hold 2MB of extended memory.
[7]Can map 16MB.
[8]Uses 4K by 12-bit SRAM instead of registers; capabilities vary with software.
[9]With 256K SIMMs; $1695 with 1MB SIMMs.
[10]Optional high-speed laser printer/scanner daughterboard.
[11]With 1MB SIMMs; 4MB with 256K SIMMs.
[12]With 128K.

● yes
○ no
◑ deficient

mapped. DMA is a technique that enables memory transfers without intervention from the CPU. This speeds up a multitasking system by enabling it to switch to another task without waiting for DMA action in the current task to finish.

A fully capable EMS 4.0 board will be indispensable to users of DOS multitasking environments such as *Desqview* and to people who need to run device drivers in expanded memory. However, for many users, features such as print spoolers, RAM disks, and serial and parallel ports may be more important.

The board's maximum bus rate can prove particularly crucial. If you own an AT compatible with a 10-MHz or faster I/O bus rather than the industry-standard 8 MHz, you'll need a board that can keep that pace.

You should also look for a board that can be set up and configured through software rather than DIP switches and jumpers. In addition, you'll probably want a high-capacity board so you can obtain maximum memory with a minimum number of slots. If you're thinking of switching to OS/2 or UNIX in the near future, remember—a board whose expanded memory can be converted to extended memory won't become obsolete.

Some of the boards listed in this guide are fully capable, others are merely compatible, and some fall in between. Several companies are due to release new, fully capable EMS 4.0 boards soon.

Keep in mind that just because a board isn't fully capable, it's not necessarily a bad buy. If the price is right, a less capable board could prove a worthy purchase. Finally, remember that your software must support the new spec in order to take advantage of an EMS 4.0 board. Programs designed for EMS 3.2 can still access expanded memory, but with EMS 3.2's limitations. ●

Lewis Perdue is the editor and publisher of PC Management Letter.

RampagePlus 286
Rampage 286
Advantage
Premium
AST Research Inc.
2121 Alton Ave.
Irvine, CA 92714
714/863-1333
List price: unpopulated RampagePlus 286 $595; unpopluated Rampage 286 $495, with 2MB $1995; unpopulated Advantage Premium $445, daughterboard with 1MB $1295
Warranty: two years parts and labor
Extended warranty: none
Technical support: unlimited phone support, no toll-free number, M–F 7–5
Other support services: none
Reader service no. 680

BocaRam AT
BocaRam XT
Boca Research
6401 Congress Ave.
Boca Raton, FL 33487
407/997-6227
List price: unpopulated BocaRam AT $225, with 2MB $1195, daughterboard with 2MB $1095; unpopulated BocaRam XT $175, with 2MB $1145
Warranty: two years parts and labor, 30-day money-back refund in case of incompatibility
Extended warranty: none
Technical support: unlimited phone support, no toll-free number, M–F 8:30–6
Other support services: none
Reader service no. 681

RAM 8000
RAM 10000
RAM 3000 Deluxe
Everex Systems Inc.
48431 Milmont Dr.
Fremont, CA 94538
800/821-0806, 800/821-0807 in California, 415/498-1111
List price: unpopulated RAM 8000 $249; unpopulated RAM 10000 $399; unpopulated RAM 3000 Deluxe $228
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: BBS
Reader service no. 682

Multifunction Memory Expansion Adapter
PS/2 Multifunction Adapter
2MB Expanded Memory Adapter
IBM
900 King St.
Rye Brook, NY 10573
800/IBM-2468, 914/934-4488
List price: unpopulated Multifunction Memory Expansion Adapter $445; unpopulated PS/2 Multifunction Adapter $445, with 2MB $1740; 2MB Expanded Memory Adapter $1355
Requirements: PS/2 Multifunction Adapter optimized for PS/2 Model 30; Multifunction Memory Expansion Adapter and PS/2 Multifunction Adapter require Teleware's AboveDisk 2.0 software, available for $100 from IBM dealers; 2MB Expanded Memory Adapter requires DOS 4.0
Warranty: one-year limited warranty
Extended warranty: through dealer, if available
Technical support: through dealer, if available
Other support services: none
Reader service no. 683

AboveBoard Plus
Intel
5200 N.E. Elam Young Pkwy.
Mail Stop C03-07
Hillsboro, OR 97124-6497
800/538-3373
List price: with 512K $695, with 2MB $1995, daughterboard with 2MB $2195, serial and parallel port option $150
Warranty: five years parts and labor
Extended warranty: none
Technical support: unlimited phone support, toll-free number, M–F 8–5
Other support services: BBS, fax support line
Reader service no. 684

JustRAM ATZ
JustRAM AT16
Monolithic Systems Corp.
84 Inverness Cir.
East Englewood, CO 80112
800/525-7661
List price: JustRAM ATZ with 2MB $1707, daughterboard with 2MB $1587; JustRAM AT16 with 2MB $1798
Warranty: five years parts and labor
Extended warranty: none
Technical support: unlimited phone support, toll-free number, M–F 7–4
Other support services: none
Reader service no. 685

Concentration
LIMfile
Newer Technology
1117 S. Rock Rd. #4
Wichita, KS 67207
800/678-DRAM
List price: unpopulated Concentration $620, with 2MB $2090; unpopulated LIMfile $790, with 2MB $2160, unpopulated daughterboard $300; for nonvolatile version of LIMfile, add $260
Warranty: two years parts and labor
Extended warranty: five years on SIMM memory
Technical support: unlimited phone support, toll-free number, M–F 8:30–5:30
Other support services: BBS, user newsletter
Reader service no. 686

Micro Lap EMS Board
Pan United Corp.
1967 Route 27 #12
Edison, NJ 08817
201/985-8009
List price: unpopulated board $179, with 2MB $1179
Warranty: one year parts and labor
Extended warranty: none
Technical support: unlimited phone support, no toll-free number, M–F 9–6
Other support services: none
Reader service no. 687

Elite 16
Profit Systems Inc.
30150 Telegraph Rd. #173
Birmingham, MI 48010
313/647-5010
List price: with 512K $695
Warranty: five years parts and labor
Extended warranty: none
Technical support: unlimited phone support, no toll-free number, M–F 9–6
Other support services: none
Reader service no. 688

JRAM AT2
JRAM AT4
Tall Tree Systems
2585 E. Bayshore Rd.
Palo Alto, CA 94303
415/493-1980
List price: unpopulated JRAM AT2 $349, with 2MB $1069, unpopulated daughterboard $330; unpopulated JRAM AT4 $399, with 2MB $1119, unpopulated daughterboard $330
Warranty: one year parts and labor
Extended warranty: none
Technical support: unlimited phone support, no toll-free number, M–F 7:30–4
Other support services: none
Reader service no. 689

Captain 286
Tecmar
6225 Cochram Rd.
Solon, OH 44139
216/349-0600
List price: with 128K $575, with 2MB $1800
Warranty: two years parts and labor (board replaced if found defective in the first six months)
Extended warranty: none
Technical support: unlimited phone support, toll-free number, M–F 8–5
Other support services: BBS, E-mail
Reader service no. 690

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

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60 MB, 65 MS Hard Drive System $1,128

40 MB, 40MS Hard Drive System $1,127

40 MB, 28 MS Hard Drive System $1,210

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Monochrome (640x350)	$ 998	$1,039	$1,094
CGA (640x200)	$1,198	$1,218	$1,246
EGA (640x350)	$1,424	$1,444	$1,472

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6/12 MHTz w/
ZERO WAIT STATE

$1193

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60 MB, 65 MS Hard Drive System $1,531

40 MB, 28 MS Hard Drive System $1,543

70 MB, 29 MS Hard Drive System $1,669

VIDEO OPTIONS / DRIVES	Discount Micro 286-6/12 Hard Drive Options		
	40MB(40MS)	40MB(28MS)	70MB(29MS)
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CGA (640x200)	$1,602	$1,724	$1,848
EGA (640x350)	$1,876	$1,963	$2,087
EGA (800x600)	$2,199	$2,286	$2,410
VGA (1024x768)	$2,295	$2,389	$2,519

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- KX-P1595 9 Pin, 240 CPS Draft, 51 CPS NLQ $ 489
- KX-P1524 24 Pin, 240 CPS Draft, 80 CPS NLQ . . . . . $ 598
- KX-P1124 24 Pin, 192 CPS Draft, 63 CPS NLQ . . . . . $ 399

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- MSP 45 200 CPS Draft, 40 NLQ . . . . . $ 424
- MSP 50 250 CPS Draft, 50 CPS NLQ . . . . . $ 354
- MSP 55 250 CPS, 50 CPS NLQ . . . . . $ 494
- Tribute 124 200 CPS Draft, 66 CPS LQ . . . . . $ 435
- Tribute 224 200 CPS Draft, 66 CPS LQ . . . . . $ 618

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- Genoa Super VGA Hires, 1024X76 . . . . . $ 367
- MVA-1024 X 768, 16 Colors . . . . . $ 899
- MVA-1024 X 768, 256 COLORS $1148
- Paradise Autoswitch EGA 350 . . . . . $ 165
- Paradise Basic EGA . . . . . $ 140
- Paradise Autoswitch EGA 480 . . . . . $ 176
- Paradise VGA Plus . . . . . $ 274
- Paradise VGA Professional . . . . . $ 406
- Photon Mega Graphics Board . . . . . $ 510
- 1024 X 768, 960 X 720, 16 Color . . . . . $ 896
- 1024 X 768 NON-INT, 60HZ RGB ALO $1218
- 1024 X 768 C-INT, 85 HZ RGB ALO . . . . . $ 765

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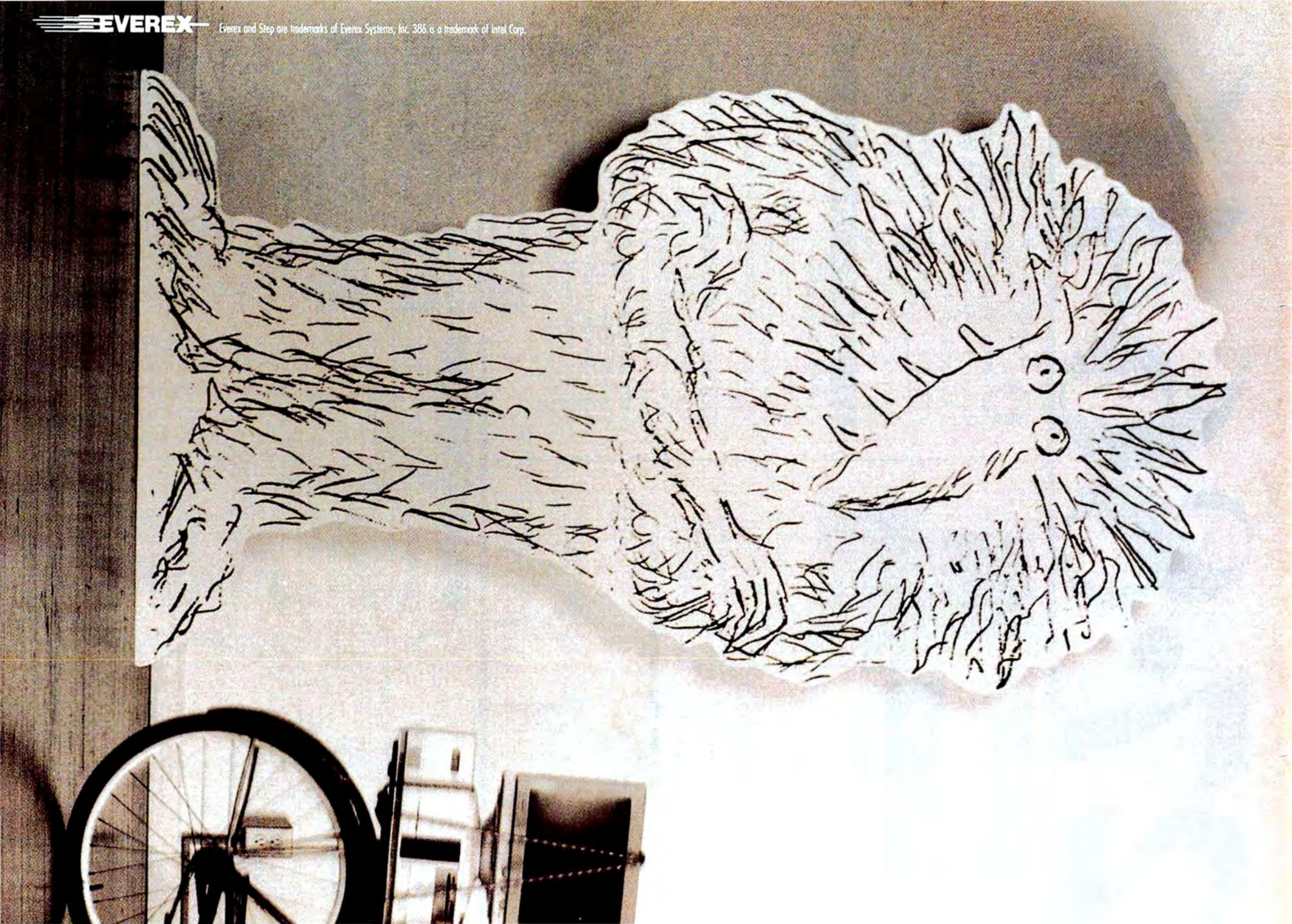

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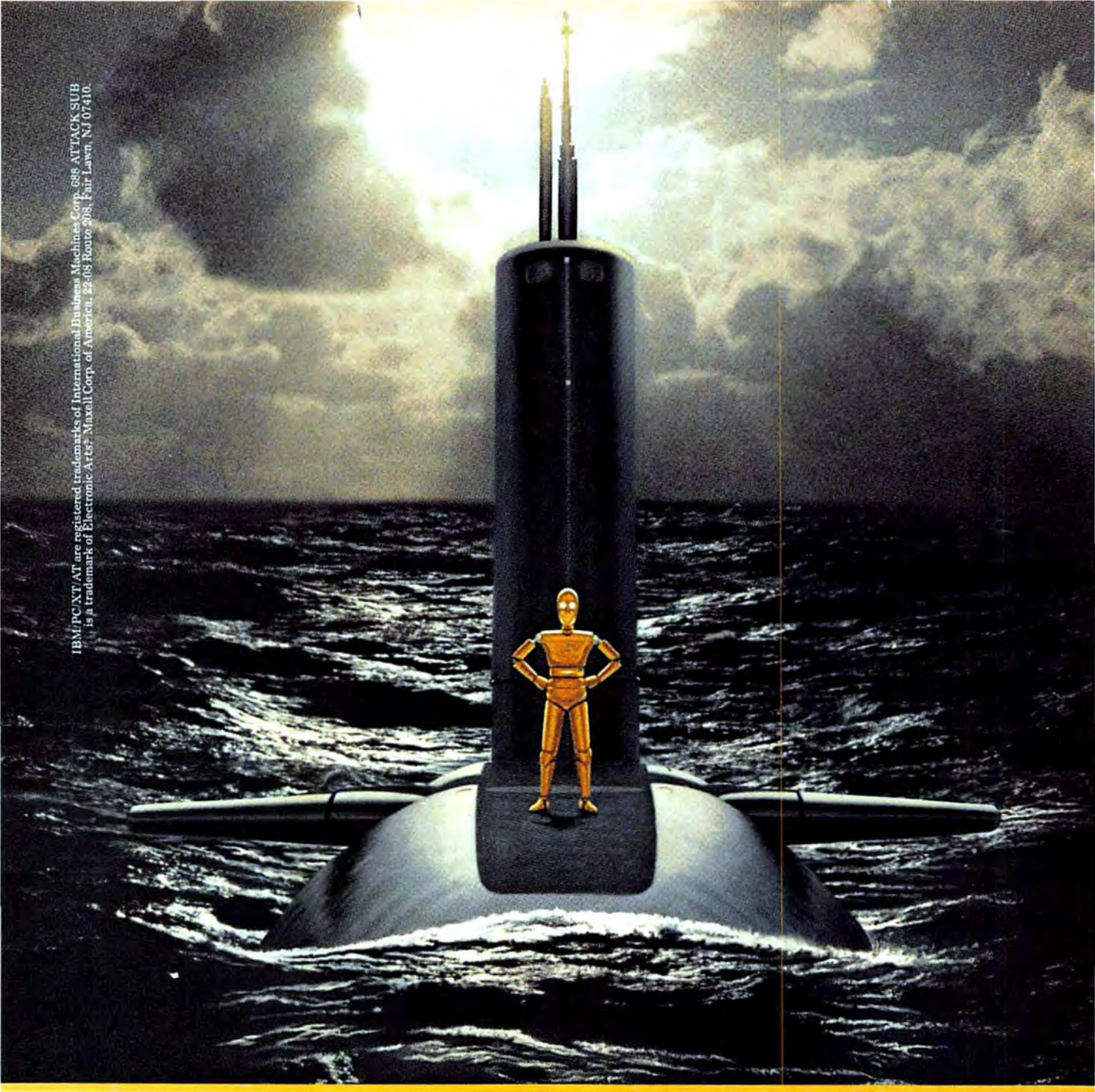

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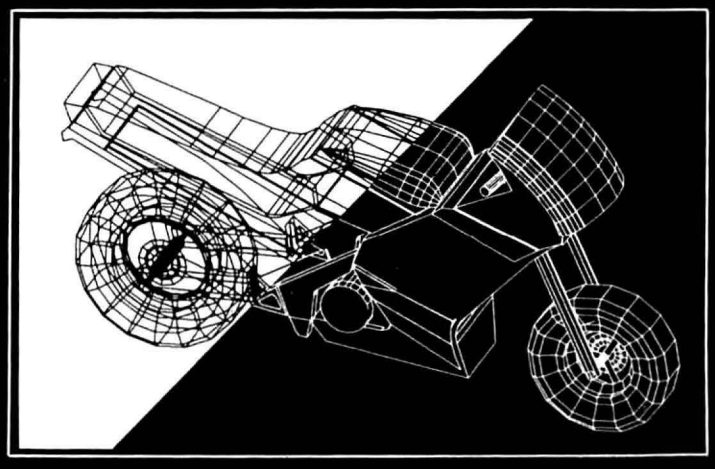

The first question asked by many people is, "Why is *DesignCAD 3-D* priced so low?" The answer? After developing *DesignCAD 3-D* we were unable to decide how the product should be priced. We consulted experts. We used the finest spreadsheets on the market. We took employee polls. We asked our lawyers and accountants for their opinion. We even asked our Mothers, Wives, and childhood Sweethearts! Finally in the greatest American Tradition, we said, *"Aw . . . What the Heck! Let's see the other guys beat this price!"* *DesignCAD 3-D* sells for $299 complete. No add-ons, nothing else to buy!

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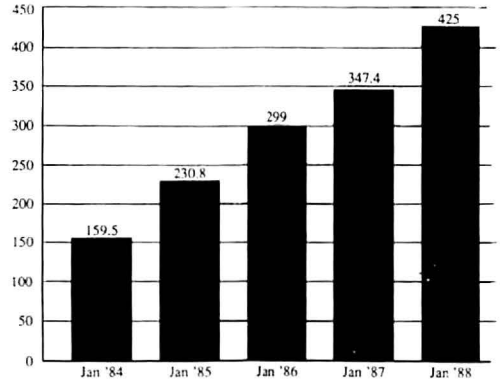

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19th Hole Special

Lifestyle Publishing has put together a package to help improve every aspect of your golf game, including the bartending skills necessary for any serious visit to the 19th hole.

- Pinehurst 2 golf simulation—as close as you can come without actually making the trip; it gives you all the hills and valleys, sand traps, water hazards, trees and bushes for a real challenge
- Golf Statkeeper—calculates driving accuracy, putting performance and keeps track of your scores to figure your own USGA handicap
- Golf Doctor—teaches the important factors for great shot making and provides many tips on improving your game
- Mr. Boston's Bartending Guide—over 1,000 drink recipes; catalogue your friends' favorites

19th Hole Special ..... $79.

Paradox OS/2 1.0 *(3½" only)* ..... 479.
□ Prolog 2.0 ..... 99.
□ Turbo C 2.0 ..... 99.
□ Turbo Pascal 5.0 ..... 99.
□ Turbo Assembler & Debugger 1.0 ..... 99.
□ Reflex 1.1 ..... 99.
• Sidekick Plus 1.0 ..... 135.
R Sprint 1.0 ..... 135.
R Quattro 1.0 w/SQZ!Plus 1.0 ..... 165.
• Paradox 2.0 ..... call
□ Turbo Editor Toolbox 4.0 ..... 69.
□ Turbo Database Toolbox 4.0 ..... 69.
R Turbo Basic Editor Toolbox 1.0 ..... 69.
R Turbo Basic Database Toolbox 1.0 ..... 69.
□ Turbo Lightning 1.0 ..... 69.
□ Superkey 1.1 ..... 69.
Bourbaki ... NCP
□ 1DIR+ 2.11 ..... 49.
Bridgeway Publishing ... NCP
□ FasTrax 3.9 ..... 35.
Broderbund ... CP
□ Print Shop 2.41 *(includes Graphics Library 1)* ..... 39.
□ Memory Mate 3.01 *(NCP)* ..... 45.
Chipsoft ... NCP
R TurboTax Personal/1040 6.0 ..... 45.
R State Packages Personal/1040 6.0 ..... *each* $32.
R TurboTax Proseries/1040 5.0 ..... 229.
Chronos Software ... NCP
R Who•What•When *(people, projects, time)* ..... 119.
Computer Associates ... NCP
• SuperCalc 5 1.0 ..... 319.
Core International ... NCP
□ Corefast 2.0 ..... 95.
Crosstalk Communications ... NCP
□ Crosstalk XVI 3.61 ..... 95.
□ Crosstalk MK.4 1.02 ..... 124.
Dac Software ... NCP
□ Dac-Easy Payroll 3.0 ..... 59.
□ Dac-Easy Light 1.0 ..... 45.
□ Dac-Easy Accounting 3.0 ..... 59.
DayFlo ... NCP
□ Tracker 1.4 ..... 99.
Delrina Technologies ... NCP
• PerFORM 1.0 ..... 159.
Digital Research ... NCP
□ Gem Desktop 3.0 ..... 35.
□ Gem Draw Plus 2.01 ..... 189.
• Gem Desktop Publisher 1.1 ..... 179.
5th Generation ... NCP
• Fastback Plus 2.01 ..... call
Fox Software ... NCP
R Foxbase Plus 2.1 *(single user)* ..... 209.
R Foxbase Plus 386 2.1 ..... 319.
Funk Software ... NCP
□ Sideways 3.21 *(creates wide printouts)* ..... 42.
• Worksheet Utlities 1.0 *(1-2-3 utilities)* ..... 59.
• Inword 1.0 ..... 59.
□ Allways 1.0 ..... 85.
• Noteworthy 1.0 ..... 49.
General Information ... NCP
□ Hot Line Two 2.0 ..... 57.
Generic Software ... NCP
□ Generic CADD Level 1 ..... 35.
• Generic CADD Level 2 ..... 55.
• Generic CADD Level 3 1.05 ..... 109.
□ Level 3 Dot Plot ..... 35.
• 3D Solids 2.2 ..... 189.
• Estimator ..... 159.
□ Basic Home Design 3.0 ..... 35.
CADD Starter Kit *(contains Level 2, Home Design, Workbook tutorial, & sample disk)* ..... 85.
Harvard Associates ... NCP
R PC LOGO 4.0 ..... 59.
Hayes ... NCP
• Smartcom II 3.0 ..... 89.
Hilgraeve Software ... NCP
□ HyperACCESS 3.31 ..... 89.
Individual Software ... NCP
• Typing Instructor Encore 2.13 ..... 26.
□ Professor DOS 2.51 *(with Smartguide)* ..... 33.
Intuit ... NCP
• Quicken 2.0 ..... 35.

For IBM Personal Computers exclusively.

PC CONNECTION®

When inside my brain,

there arose such a clatter,
I looked up from my keyboard to see what
was the matter. Away to my notepad I flew like a flash,
to see what I'd done in Christmases past.

Lotus ... NCP
- Agenda 1.0 ... $289.
- 1-2-3 2.01 *(upgrade free to version 3.0)* ... call
- Hal 1.0 ... 109.
- Freelance Plus 2.0 ... 345.
- Manuscript 2.0 ... 359.
- Graphwriter II 1.0 ... 349.

MECA ... NCP
- Managing Your Money 5.0 ... 119.
- R Andrew Tobias' Tax Cut 1040 ... special

Meridian Technology ... NCP
- CarbonCopy Plus 5.0 ... 115.

Micro Logic ... NCP
- Tornado 1.8 ... 55.

Microlytics ... NCP
- Gofer 1.0 *(text retrieval system)* ... 45.
- Wordfinder 4.0 *(electronic thesaurus)* ... 35.

MicroPro ... NCP
- WordStar Professional Release 5 ... 259.
- WordStar 2000 Plus Rel. 3 *(Personal Ed.)* 259.

Microrim ... NCP
- R:BASE for DOS (version 2.1) ... 449.
- R:Base for OS/2 ... 599.

Microsoft ... NCP
- Learning DOS 2.0 *(for any DOS version)* ... 35.
- Windows 286 2.1 ... 69.
- Windows 286 2.1 w/Mouse ... 145.
- Works 1.05 ... 99.
- Windows 386 2.1 ... 129.
- Word 4.0 ... 209.
- Chart 3.0 ... 259.
- Excel 2.1 *(requires 80286/80386 CPU)* ... 319.
- Word 4.0 Network Version ... 499.

CD-ROM
- Bookshelf 1.0 w/Amdek Laser Drive ... 799.
- Programmers Library 1.0 ... 269.

LANGUAGES
- Quick BASIC 4.5 ... 69.
- Quick C 1.01 ... 69.
- R Macro Assembler 5.1 ... 99.
- R Basic Compiler 6.0 ... 199.
- R Pascal 4.0 ... 199.
- R Fortan 4.1 ... 289.
- R C Compiler 5.1 ... 299.
- R Cobol 3.0 ... 599.

Nantucket Software ... NCP
- Clipper *(Summer '87, dB3 Plus compiler)* ... 429.

New England Software ... NCP
- Graph-in-the-Box Release 2 ... 75.
- GB-Stat 1.0 ... 159.
- GB Analytic 1.0 ... 105.

Nolo Press ... NCP
- WillMaker 3.0 ... 35.

North Edge Software ... NCP
- Timeslips III 3.3 ... 119.

Owl International ... NCP
- Guide 2.0 ... 143.

PC Connection Software Special
through January 31, 1989

MECA ... NCP
R Andrew Tobias' Tax Cut 1040

A powerful partnership has developed to help you through this tax season. Best Programs has teamed up with MECA Ventures to bring you Andrew Tobias' Tax Cut. Some program features of this "early bird version" include:

- Integration with MECA's Managing Your Money to bring you a complete financial system
- Completely up-to-date with current tax laws
- Final calculations are certified by an independent accounting firm before product is shipped to you
- Free upgrade for this "early bird version" directly from MECA

Andrew Tobias' Tax Cut 1040 for 1988 Taxes ... $49.

Paperback Software ... NCP
- VP-Info 1.4 ... 65.
- VP-Planner Plus 2.0 ... 145.
- VP-Expert 2.0 ... 145.

Paul Mace ... NCP
- H/Test-H/Format 2.0 *(hard-disk tools)* ... 49.
- Mace Utilities 5.0 *(DOS utilities)* ... 55.
- Grasp 3.1 ... 79.
- Nvelope 1.01 ... 29.

PC Support Group ... NCP
- Lightning 4.82 ... 57.
- Lucid 3-D 1.22 ... 89.

Personics ... NCP
- SmartNotes 2.0 ... 49.
- SeeMORE 1.0 ... 49.
- Look&Link 1.01 ... 59.
- Ultravision 1.0 ... 79.
- @BASE 1.1 ... 119.

Peter Norton ... NCP
- Norton Editor 1.21 ... 39.
- Norton Commander 2.0 ... $45.
- Advanced Utilities 4.5 ... 79.
- R Dan Bricklin's Demo Program 2 ... 99.

Quarterdeck ... NCP
- DESQView 2.2 ... 79.
- Expanded Memory Manager 4.2 ... 39.

Reference Software ... NCP
- Grammatik III 1.05 *(electronic proofreader)* 52.
- Reference File 5.03 *(pop-up DB manager)* ... 49.

Relay Communications
- Relay Gold 3.0 ... 149.

Revolution Software ... NCP
- R VGA Dimmer *(screen saver)* ... 19.
- R DJ *(disk manager)* ... 39.
- Cruise Control 3.02 ... 39.

Rightsoft ... NCP
- Rightwriter 3.0 ... 54.

Simon & Schuster ... NCP
- R Professional Thesaurus 1.0 ... 79.
- Typing Tutor IV ... 33.

Softlogic Solutions ... NCP
- Software Carousel 2.02 ... 49.
- Disk Optimizer 4.01 *(w/Data Guardian)* ... 45.
- @Liberty 1.1 ... 119.
- Cubit 2.02 ... 45.
- Double DOS 4.02 ... 45.
- Magic Mirror 1.0 ... 59.

SoftView ... NCP
- R TaxView *(for 1988 taxes)* ... special

Software Group ... NCP
- Enable 2.0 ... 399.

Software Publishing ... NCP
- Professional Plan 1.01 ... 59.
- PFS:First Publisher 2.0 ... 79.
- PFS:First Graphics 1.0 ... 95.
- PFS:First Choice 3.0 ... 99.
- Professional Write 2.0 ... 125.
- Professional File 2.0 ... 189.
- Office Writer 6.0 ... 259.
- Harvard Graphics 2.1 ... 309.
- Harvard Graphics Accessories ... call
- Harvard Project Manager 3.0 ... 439.

Spinnaker ... NCP
- Resume Kit 1.0 ... 25.
- Eight-in-One 1.1 ... 39.
- Splash 1.0 ... 59.
- Pinstripe Presenter 1.0 ... 115.

Springboard ... NCP
- Newsroom Pro 1.0 ... 45.
- Certificate Maker ... 34.
- R Clip Art 1 ... 19.
- R Clip Art 2 ... 25.
- R Clip Art 3 ... 19.

Symantec ... NCP
- R SQZ!Plus 1.11 ... 59.
- R 4Word 2.0 ... 59.
- Q & A Write 1.01 ... 119.

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The glow on the screen,

told a tale sad but true. I'd forgotten to get presents for people I knew! A modem for mother, Zork for the kids. Tycoon for the chief, and a hard drive for Sid.

- ◉Grandview 1.0 ... $175.
- □Q & A 3.0 *(database, word processor)* .... 209.
- □*Breakthrough* Timeline 3.0 ... 349.
- ◧Spreadsheet Analyst 2.5 ... 89.
- ◧Note-It Plus 1.02 ... 49.
- ◉Think Tank 2.4NP ... 115.
- ◧4 Views 1.0 ... 89.
- ◉Q&A Network Pak 1.0 *(requires Q&A)* .... 179.

T/Maker ... NCP

- ◧Scrapbook+ 1.0 ... 79.
- ◧ClickArt Business Images ... 42.
- ◧ClickArt Holidays ... 42.
- ◧EPS (PostScript) Illustrations ... 79.

The XTREE Co. ... NCP

- ◉XTREE Pro 1.0 ... 69.
- □Hot 4.0 ... 95.

TOPS ... NCP

- *Flashcard (AppleTalk network card; 1 year warranty)* ... 169.
- NetPrint 2.0 *(share printers)* ... 119.
- TOPS 2.0 ... 119.
- *TOPS Repeater (extends network)* ... 132.

Traveling Software ... NCP

- Battery Watch 1.0 *(3½" only)* ... 27.
- ◉Laplink Mac 1.2 *(Mac-PC transfer)* ... 79.
- ◉Laplink Plus 2.1 ... 85.
- ◉Desklink 2.21 ... 99.

True BASIC, Inc. ... NCP

- □True BASIC 2.03 *(now includes Runtime)* ... 57.
- ◧Kemeny/Kurtz Math Series ... 32.
- ◧True Basic Libraries ... 32.

Vericomp ... NCP

- ◉SoftBytes 2.0 ... 35.
- ◉SoftBytes 386 2.53 ... 49.

WordPerfect Corp. ... NCP

- ◉WordPerfect Library 2.0 ... 69.
- □WordPerfect 5.0 ... 255.
- ◧WordPerfect 5.0 Addit'l Network Stations ... 84.
- ◉WordPerfect Office 1.0 ... 269.
- ◧WordPerfect Office 1.0 Addit'l Network Stations ... 84.
- ◉WordPerfect Network Server 5.0 ... 349.
- ◉DataPerfect ... 299.
- ◉WordPerfect Executive ... 129.

Wordtech ... NCP

- □DBXL 1.2 ... 119.

Xerox ... NCP

- ◧Ventura Publisher 2.0 ... 549.

XyQuest ... NCP

- □XyWrite III Plus 3.54 w/A-la-Carte Menus ... 239.

RECREATIONAL/EDUCATIONAL

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

- ◧Bubble Ghost ... 22.
- ◧Mean 18 ... 29.
- ◧Hardball *(baseball simulation)* ... 11.

PC Connection Hardware Special

through January 31, 1989

Intel ... 5 years
Above Board Plus 512k
Above Board 2 Plus 512k
Above Board Plus I/O 512k

Intel has introduced their new generation of memory expansion products for the PC, XT, AT, and PS/2 Models 25, 30, 50, 50Z and 60. Features include:

- Above Board Plus and Plus I/O hold up to 8 Meg in one slot when used with the 6 Meg piggyback option
- Above Board 2 Plus for PS/2 Models 50, 50Z and 60 can use 256k SIMMs for 8 Meg maximum
- Full L/I/M EMS 4.0 support in hardware; compatible with Windows 2.x, DESQview, and OS/2
- Switchless installation

Above Board Plus 512k ... $429.
Above Board 2 Plus 512k ... $479.
Above Board Plus I/O 512k ... $529.

- ◧Testdrive *(driving simulation)* ... 24.
- ◧Jack Nicklaus' 18 Greatest Holes ... 29.
- ◧Grand Prix ... 22.
- ◧4th & Inches ... 22.

Broderbund ... CP

- □Where in the World is Carmen SanDiego? ... 25.
- □Where in the USA is Carmen SanDiego? ... 25.
- □Where in Europe is Carmen SanDiego? ... 29.
- ◧Toy Shop ... 39.
- □Ultima IV ... 35.
- □Ultima V ... 39.

Electronic Arts ... CP *(reqs. graphics brd.)*

- □One-on-One/Bird vs Jordan ... 29.
- ◧Chuck Yeager's Flight Simulator ... 32.
- ◉Chessmaster 2000 ... 32.
- ◧Earl Weaver Baseball ... 32.
- ◉Empire ... 35.
- ◉Mavis Beacon Teaches Typing ... 35.
- ◉Sentinel Worlds ... 39.
- ◉Grand Slam Bridge ... 45.

Infocom ... NCP

- ◉Zork Trilogy ... 33.

Lifestyle Publishing Group ... NCP

- ◉Golf Doctor *(improve your game)* ... 33.
- □Golf's Best Pinehurst #2 *(play the best)* .... 12.
- ◉Golf Statkeeper *(includes USGA Handicapper)* ... 27.
- □19th Hole Special *(3 Golf programs above bundled with Mr. Boston Micro Bartender's Guide)* ... special
- □Mr. Boston Official Micro Bartender's Guide ... 18.
- □Micro Video Companion ... 24.
- □Take Control of Cholesterol ... 24.

Microprose ... CP

- □F-19 Stealth Fighter *(requires CGA or EGA)* ... 39.
- □F-15 Strike Eagle *(requires CGA)* ... 22.
- □Gunship *(requires CGA or EGA)* ... 32.

Microsoft ... NCP

- □Flight Simulator 3.0 *(reqs. graphics brd.)* ... 35.

Parlor Software ... CP

- □Bridge Parlor *(best Bridge simulation)* ... 49.

Sierra On-Line ... CP

(All require Hercules, CGA or EGA)

- ◉Leisure Suit Larry ... 25.
- ◉Space Quest II ... 33.
- ◉King's Quest IV *(512k version)* ... 33.
- ◉Manhunter ... 33.
- ◉Police Quest ... 33.
- ◉Police Quest II ... 33.
- ◉Leisure Suit Larry II ... 33.
- ◉Thexder ... 24.
- ◉3D Helicopter ... 33.

Simon & Schuster

- ◉Star Trek: Rebel Universe ... 29.

Sphere, Inc. ... NCP

- ◧Orbiter *(shuttle simulation)* ... 27.
- ◧GATO *(submarine simulation)* ... 12.
- ◉Tetris *(addicting mind teaser)* ... 24.
- ◉Falcon *(F-16 simulation, reqs. graphics brd.)* 32.

Spinnaker ... NCP

- □Sargon III *(chess game)* ... 15.
- □Kids on Keys *(ages 3 to 9)* ... 19.
- □Facemaker Gold *(ages 3 to 8)* ... 25.
- □Kindercomp Gold *(ages 3 to 8)* ... 25.
- □SAT Preparation Program ... 25.
- □Kidwriter Gold *(ages 6 to 10)* ... 32.
- □Homework Helper—Math *(grades 7-12)* ... 32.
- □Homework Helper—Writing *(grades 7-12)* ... 32.

Stone & Assoc. ... NCP *(reqs. graph. brd.)*

- ◉Algebra Plus *(ages 13 to adult)* ... 27.
- ◉Memory Master *(ages 2 to 6)* ... 27.
- ◉My Letters,Numbers,Words *(2 to 6)* ... 22.
- ◉Second Math *(ages 7 to 16)* ... 22.

Sublogic ... NCP

- □Jet 2.1 *(requires EGA or CGA)* ... 33.
- □Scenery Disks ... *each* 15.
- □San Francisco Star Scenery Disk ... 18.
- □Japan Scenery Disk ... 15.

The Learning Company ... CP

- ◧Math Rabbit *(ages 4 to 7)* ... 26.
- ◧Reader Rabbit *(ages 4 to 7)* ... 26.
- ◧Writer Rabbit *(ages 6 to 12)* ... 26.

XOR ... NCP

- □NFL Challenge 2.0 ... 69.

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PC CONNECTION®

PC Presents.

You better not pout!
('Cause Santa Dos is coming to town.)

Here in the yuletide town of Marlow, NH (pop. 556), most of our neighbors have rather traditional ideas of holiday gift giving. For software, a nice new pair of red thermal underwear would be a real hearth warmer. Hardware? Well, a chainsaw might be really sharp. And, as for utilities, a telephone and running water would be welcome additions to some homes. Nevertheless, being hip to the trendy tastes of the microcomputer age, our very presentable mascots are making sure that we're well-stocked with PC games and gadgets for the byte-bitten on your Christmas or Hanukkah list.

It's a wrap!

People often ask us why we go to such lengths to satisfy customers. Well, our Customer Service Director thinks it's good business. Our Advertising Director thinks it makes good copy. Our mothers think it's their influence. But, actually, we give such nice (as opposed to naughty) service because of that famous list that Santa and his raccoons are making (and checking twice, we hear). But, frankly, we're a little worried about companies who don't give toll-free support, or who charge your credit card before they ship, or who don't ship backorders free, or who have developed any of those other naughty mail order habits. It's lump o' coal city for those dudes.

You're gonna get what's coming.

At our modest headquarters in the former Christmas Trees Inn in Marlow, we're frantically doing our last minute holiday shopping. If you want to be on our list, just place an order of $500 or more by January 31st, and you will get your very own surprise present from PC Connection! Specially programmed to self-destruct if opened before Christmas.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit please call ahead.

A surprise present which will no doubt feature our most gifted mascot. Offer not available to net accounts. One per customer.

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Call 800/243-8088.

I dialed that number. They got it all straight.
And I heard them exclaim as they resolved my poor plight,
"Happy Holidays to all, and to all
a good night."

MSC Technologies ... lifetime
OmniMouse w/Designer Pop-up menus *(serial only; 1 year warranty)* ..... $57.
PC Mouse II w/PC Paint+ *(bus or serial)* ... 89.
PC Mouse II w/Autosketch *(bus or serial)* .. 105.
NEC ... 2 years
Multisync Plus *(960 x 720 max. resolution)*. 949.
Multisync II *(800 x 560 max. resolution)*.... call
NSI Logic ... 3 years
Smart VGA *(supports full VGA specs)*..... 229.
Orchid Technologies ... 2 years
RAMquest 2-Z Øk*(for PS/2 50/50Z/60)*.... 199.
Tiny Turbo 286 *(accelerator board)* ..... 289.
ProDesigner VGA ..... 319.
RAMquest Xtra 16/32 Øk*(for PS/2 models)* 339.
PC Power & Cooling Systems ... 1 year
REPLACEMENT POWER SUPPLIES
Turbo Cool 150 *(run 25° - 40° cooler)* .... 129.
Turbo Cool 250 *(run 25° - 30° cooler)* .... 169.
Silencer 150 *(84% noise reduction)* ..... 115.
Silencer 200 *(69% noise reduction)*..... 149.
PC Support Group ... 1 year
Breakthrough 286 Accel. Board *(8 MHz)*... 299.
Breakthrough 286 Accel. Board *(12 MHz)* .. 449.
Practical Peripherals ... 5 years
1200 Baud Internal Modem *(w/ProComm)*. 69.
1200 Baud External Modem *(mini)*..... 79.
P/Link *(parallel line extender/32k)* ..... 109.
Microbuffer Inline *(par. print buffer/32k)* 135.
2400 Baud Internal Modem ..... 151.
2400 Baud External Modem ..... 181.
Princeton Graphics ... 1 year
Ultrasync *(supports CGA, EGA, VGA)* ... 549.
Max15 Monochrome Monitor ..... 269.
Safe Power Systems ... 2 years
Safe 250W *(standby power backup)*..... 249.
Safe 425W *(standby power backup)*..... 369.
Toshiba ... 1 year
P321SL printer *(80 col., 216 cps, w/tractor)* 529.
P351SX Printer *(132 col., 360 cps)*..... 999.
T1000 Laptop *(80C88, 6.4 lbs., 5 hr. battery)* call
T1200 Laptop *(80C86, 10 MHz, 20 Meg)*.. call
T1200HB Laptop w/Backlit screen..... call
T1200F Laptop Dual Floppy System ..... call
T1200FB Laptop Dual Floppy System w/Backlit screen..... 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
External 5¼" Drive for Laptops..... 369.
768k RAM Card for T1000..... 299.
1 Meg EMS Card for T1100+/T1200 .... 499.
Video 7 ... 5 years
VEGA Deluxe *(supports 640x480)*..... 219.
VEGA VGA *(supports full VGA specs)*.... 287.
FastWrite VGA ..... 399.
VRAM VGA ..... 529.

DRIVES

IOMEGA ... 1 year
Dual 20 Meg Bernoulli Box *(8")* .....$1679.
20 Meg Cartrige *(8")* ..... 82.
20 Meg Tripak *(8")*..... 244.
Bernoulli II Single 20 Meg Internal *(5¼")*. 767.
Bernoulli II Dual 20 Meg External *(5¼")*. 1659.
20 Meg cartridge *(5¼")* ..... 59.
20 Meg Tripak *(5¼")* ..... 169.
PC2 Card ..... 169.
PC2B Card *(bootable card for PC/XT/AT)*. 229.
PC4 Card *(for PS/2 Model 50/60/70/80)*.. 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 ... 2 years
Hardcard 20 Meg *(49 ms)* ..... 549.
Hardcard 40 Meg *(28 ms)* ..... 699.
Passport *(20 or 40 Meg removable drives)*. call
Seagate ... 1 year
FREE PCTV® Hard Drive Installation Tape with the purchase of 20, 30 or 40 Meg Seagate drive for the IBM PC (not for AT). Specify Beta or VHS.
20 Meg Internal Hard Drive ST225 *(w/controller and cables, 65 ms)* ..... 299.
30 Meg Internal Hard Drive ST238 *(w/controller and cables, 65 ms)* ..... 329.
40 Meg Internal Hard Drive for AT *(40 ms)* 399.
40 Meg Internal Hard Drive for XT *(w/controller and cables, 40 ms)* ..... 469.
40 Meg Internal HD ST251-1 for AT *(28 ms)* ..... 469.
80 Meg Internal HD ST4096 for AT *(28 ms)* ..... 689.
TEAC ... 1 year
PC, XT 360k Drive *(5¼" half-height)* ..... 89.
720k Drive *(3½" half-height, specify XT or AT)*..... 95.
1.44 Meg Drive for AT *(3½" half-height, includes Bastech software utilities)*..... 125.
Toshiba ... 1 year
AT 360k Drive *(5¼" half-height)*..... 89.
AT 1.2 Meg Drive *(5¼" half-height)* ..... 99.

DISKS

All disks have a lifetime warranty.
5¼" 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.
5¼" DS/High Density Disks for AT *(1.2 Meg)*
Fuji MD2HD *(10 disks per box)* ..... $22.
Sony *(10 disks per box)* ..... 23.
Maxell MD2-HD *(10 disks per box)*..... 23.
Verbatim Datalife *(10 disks per box)* ..... 22.
3½" DS/DD Diskettes *(720k)*
Sony *(10 disks per box)* ..... 19.
Fuji *(10 disks per box)* ..... 19.
Maxell *(10 disks per box)* ..... 20.
3½" DS/High-Density Diskettes *(1.44 Meg)*
Sony *(10 disks per box)* ..... 55.
Fuji *(10 disks per box)* ..... 55.
Maxell *(10 disks per box)* ..... 59.

MISCELLANEOUS

CompuServe
CompuServe Information Service ..... 24.
Grolier's OnLine Encyclopedia ..... 19.
Cables ... lifetime
Smartmodem-to-AT cable *(9 feet)*..... 15.
Parallel Printer cable *(15 feet)*..... 19.

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- 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 Monday through Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

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Note: Accounts on net terms pay actual shipping.
Continental US:
- For monitors, printers, Bernoulli Boxes, computers, and hard drives, pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

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

Alaska and outside Continental US:
- Call 603/446-3383 for information.

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It gave me great pain,

There was so much to do!
How could I possibly see this list through?
When what to my wondering eyes should appear, but
PC Connection's number big, bold, and clear.

HARDWARE

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

Alloy ... 1 year
Tape System/2 *(for PS/2 MicroChannel)* .. $299.
Retriever/40 *(for IBM AT & compatibles)* ... 349.
AST Research ... 2 years
I/O Mini 2 C/S/P ..... 89.
SixPakPlus 64k C/S/P *(upgrades to 576k)* 129.
Advantage Premium 512k S/P *(upgrades to 1 Meg or 2 Meg w/Piggyback)* ..... call
Advantage 2 512k *(for PS/2 Models 50/60)*. call
Advantage 2-386 *(for PS/2 Model 80)* .... call
RAMpage Plus 286 512k *(for XT286/AT)* .. call
RAMpage! Plus MicroChannel 512k *(for PS/2 Models 50/60)* ..... call
Amdek ... 90 days
LaserDrive-1 *(external CD-ROM Drive)* ... 629.
LaserDrive-2 *(internal CD-ROM Drive)* ... 629.
Compucable ... 2 years
2-Position switch box ..... 29.
3-Position switch box ..... 39.
Cuesta ... 1 year
Datasaver 400 Watt *(standby power backup unit)* ..... 459.
Curtis ... lifetime
ACCESSORIES
Curtis Clip CC-1 ..... 6.
Disk Holder DB-1 *(holds 50 5¼" disks)* .... 8.
3½" Disk Holder DB-2 *(holds up 40 disks)* . 8.
3½" Diskette Cleaning Kit CK-2 ..... 16.
Printer Stand PS-1 ..... 18.
Universal System Stand SS-3 ..... 25.
Static Mat SM-2 ..... 25.
Toolkit TK-1 ..... 25.
DS-1 Switch Box *(controls 2 printers)* ..... 33.
CABLES
Smartmodem-to-PC Cable EC-7 *(9 feet)* ... 17.
Printer-to-IBM cable EC-6 *(9 feet)* ..... 17.
PS/2 Keyboard Extension Cable EC-9 .... 25.
Keyboard Extension Cable EC-2 ..... 25.
SURGE SUPPRESSORS
Safestrip SP-3 *(6 outlets; 1 year warranty)* .. 19.
Filtered SafeStrip SPF-3 ..... 21.
Diamond SP-1 *(6 outlets)* ..... 29.
Emerald SP-2 ..... 36.
Diamond Plus SP-1 Plus ..... 41.
Sapphire SPF-1 ..... 45.
Ruby SPF-2 *(6 outlets; EMI/RFI filtered; 6 ft cord)* ..... 55.
Ruby-Plus SPF-2 Plus *(w/FAX & modem protection)* ..... 69.

PC Connection Software Special
through January 31, 1989

SoftView ... NCP
®TaxView for 1988 Taxes

Be prepared to face this tax year head on with SoftView's TaxView. See your tax form right on your PC screen. All calculations will be done automatically for you. And if you have a question, simply consult with the IRS instructions which are right on your screen. Other features include:

- Prints entire form with all data
- Links and updates all forms on each change
- Imports text files from spreadsheets, databases, and accounting programs
- Includes tax planner
- Supports over 75 IRS forms and schedules

TaxView for 1988 Taxes ..... $69.

DCA ... 1 year
Irma 2 *(3270 emulation board)* ..... 729.
Irma 2 Micro Channel *(for PS/2 Models 50/60/70/80)* ..... 729.
Epson ... 1 year
We are an authorized Epson Service Center.
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FX-1050 *(136 col., 264 cps, 9 pin)* ..... call
LQ-500 *(80 col., 180 cps, 24 pin)* ..... call
LQ-850 printer *(80 col., 264 cps, 24 pin)* .. call
LQ-1050 printer *(136 col., 264 cps, 24 pin)* call
LQ-2550 printer *(136 col., 400 cps, 24 pin)* call
LX-800 printer *(80 col., 180 cps, 9 pin)* .... call
Printer-to-IBM cable (6 feet) ..... 15.
Everex ... 1 year
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2400 Baud Internal Modem ..... 149.
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Logical Connection 256k ..... 479.
Logical Connection 512k ..... 539.
Hayes ... 2 years
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Smartmodem 1200B *(hardware only)*. ... 265.
Smartmodem 2400 ..... 449.
Smartmodem 2400B *(with Smartcom II)* . 449.
Hercules ... 2 years
Graphics Card Plus ..... 189.
Network Card Plus *(with TOPS DOS)* .... 339.
Incolor Card ..... 229.
Intel ... 5 years
2400B Modem *(internal modem for IBM-PC/XT/AT)*. ..... 249.
2400B Modem 2 *(internal modem for PS/2 Models 50/60/80)* ..... 269.
Inboard 386/PC w/1 Meg ..... 799.
Inboard 386/AT Ø*k (req. installation kit)* .. 899.
Inboard Installation Kit *(specify computer)* 139.
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Above Board 2 Plus 512k. ..... special
Above Board Plus I/O 512k ..... special
Connection Coprocessor *(FAX board plus)* ..... 769.
Optional 2400 Baud Modem for Connection Coprocessor ..... 229.
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8087-2 *(8 MHz, for PS/2 Models 25 & 30)* 149.
80287 *(for AT & XT286)* ..... 165.
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80287-10 *(for PS/2 Models 50 & 60)* ..... 279.
80387 *(for 16 MHz PS/2 Model 80)* ..... 439.
80387-20 *(for 20 MHz PS/2 Model 80)*. ... 499.
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Key tronic ... 3 years
101 Keyboard. ..... 99.
101 Plus Keyboard *(enhanced layout)* ..... 99.
Kraft ... 1 year
Three-button Joystick ..... 33.
High Speed Joystick Adapter Card ..... 25.
Adapter Card/3-Button Joystick Bundle. ... 49.
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Dyna Mouse GM-6 Plus *(w/Dr. Halo III)* .... 54.
Logitech ... lifetime
Series 2 Mouse *(for PS/2 50/60/70/80)*. ... 65.
HiREZ Mouse *(bus only)*. ..... 89.
Mouse w/Paint Show *(bus or serial)* ..... 95.
Mouse w/LogiCAD *(bus or serial)* ..... 119.
ClearCase Mouse *(serial only)*. ..... 99.
ScanMan *(hand held scanner)* ..... 199.
Microsoft ... lifetime
Mach 20 ..... 349.
Disk+Option *(for Mach 20)* ..... 69.
Memory+Option *(for Mach 20)* ..... 339.
Mouse with Paintbrush *(bus or serial)*. ... 109.
Mouse with Easy CAD *(bus or serial)* ..... 125.
Mouse with Windows/286 *(bus or serial)* .. 145.

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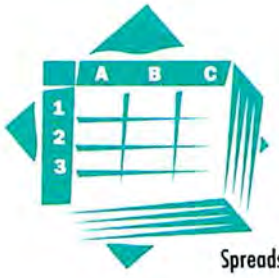
Accelerating Excel

Tired of slogging through Excel? Here's how to win extra productivity without spending a dime.



Spreadsheets

Ralph Soucie

Although *Excel* has received plaudits for powerful features and ease of use, the program's congenial *Windows*-based interface is also the source of some user dismay. On all but the fastest systems, *Excel* will have you waiting impatiently for screen refresh. The most obvious solution—upgrading your hardware—is also the most expensive.

But *Excel* also offers a number of labor-saving tricks that trim the amount of time many common tasks require. For the *1-2-3* convert in particular, the following hints should help offset the sluggishness of *Windows*.

Selecting the Data Entry Area

Whether you need to enter reams of data or a only few cells' worth, select the data entry area before keying in the data. This eliminates repeated hand movement on the direction keys.

To see how this technique works, start up *Excel* and select the range **B2:F10** using a mouse or **<Shift>**-*cursor key*. Now type in a number and hit **<Tab>**; the active cell becomes C2, and the entire range remains highlighted. Keep pressing **<Tab>**; when you reach the last cell in the range, the cursor recycles to the upper left corner (cell B2).

Pressing <Shift>-<Tab> takes you backward through the range. To move down through each column in succession rather than across each row, press <Enter> instead of <Tab>. To move up row by row, press <Shift>-<Enter>.

Use Mass Data Entry

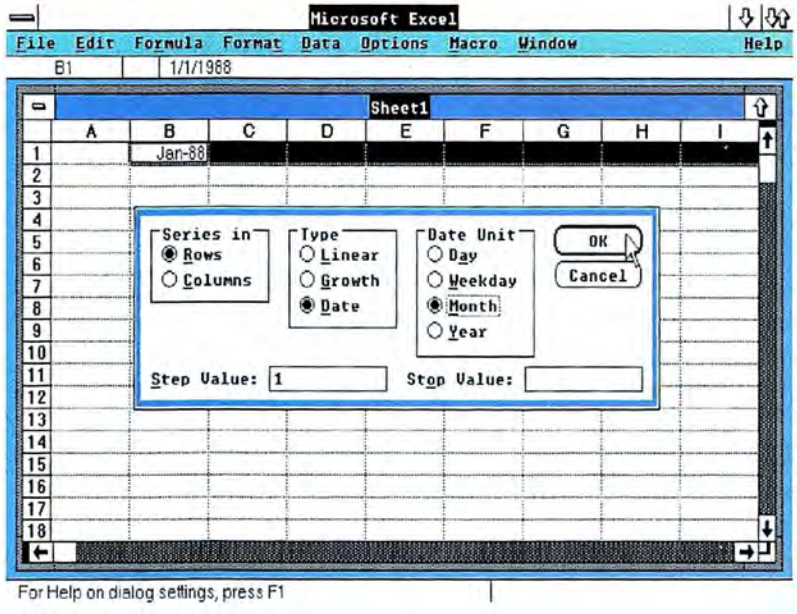
If you need to enter identical data—text, numbers, or formu-

las—into several cells, *Excel* does it with dispatch. Suppose you want to divide amounts in the first 20 rows of column B by those in column C and show the results in column D. The low-tech approach would be to enter =B1/C1 into cell D1, then copy the formulas to the range D2:D20. The smart way is to first select the range D1:D20 (making sure D1 is the active cell), type =B1/C1, and then press <Ctrl>-<Enter>. Both methods yield the same results, but the latter is quicker.

Note that the procedure just described enters ordinary formulas. Alternatively, you could substitute <Shift>-<Ctrl>-<Enter> for <Ctrl>-<Enter> to enter an array formula—a single formula that applies to a range of cells. Array formulas add the benefit of memory conservation; however, they can be troublesome to edit. Since the entire range shares a single array formula, you cannot make quick changes to individual cells within the array range; you must first select the entire array range before editing any part of the formula.

Don't Copy, Fill!

Suppose you have a SUM formula in cell B13 that you need to copy across to cells C13 through H13. Instead of using Edit Copy and Edit Paste, try the Edit Fill command. Highlight the range, including the cell to be copied and the cells you want to copy it to (in this case, the range B13:H13). Then choose the Edit Fill Right command, and—bam!



SCREEN 1: With the Data Series command, you can rapidly fill a range with dates in the format of your choice.

You've copied the formula with two swipes of the mouse.

On a rectangular range, you can also use Edit Fill Right to copy all entries in the leftmost column to all other cells in the range. Edit Fill Down, as you might guess, copies entries in the top row of a selected range to all other cells in the range.

Use Custom Number Formats

All *Excel* number formats (except for the default) have "pictures" that depict number formats. This formatting system is flexible and can save time, too. Suppose you have to enter 100 phone numbers into an *Excel* worksheet. With the cursor in cell A1, choose the Format Number command; when the dialog box appears, enter (000) 000-0000 into the Format Text box.

Next, format cell A1 to 13 spaces using the Format Column Width command, and enter the 10 digits of your own phone number. Don't enter parentheses, spaces, or a hyphen—these will be inserted automatically.

With this custom format, you could enter 100 phone numbers by selecting 100 rows, finding a comfortable armrest, and hammering away at the numeric keypad—moving the cursor row by row using <Enter>.

Copying Cell Formats

The Edit Paste Special command allows you to copy selected cell features. Suppose, for example, you have applied the following formatting elements to a range of cells: bold font, centering, outlining, and a custom date format. To apply identical formatting elsewhere in the worksheet:

1. Select the cell containing the format you want to copy.

2. Choose Edit Copy (<Ctrl>-<Insert>).
3. Select the range you want to format.
4. Choose Edit Paste Special.
5. Select the Formats button in the Paste group and either press the OK button with your mouse or press <Enter>.

You can limit the copy operation to formulas, values, or notes. For fast mathematical operations, use the options contained in the Operation box (add, subtract, multiply, divide). Say you want to multiply all values in the range A3:A10 by 3. Enter 3 into cell A2; then choose Edit Copy. Next select the range A3:A10, choose Edit Paste Special, and click the Multiply button twice with the mouse. Presto! The results appear in A3:A10.

Filling a Range With Dates

Pairing *Excel*'s date formatting with its Data Series command pays off in super-quick entry of date labels. Suppose you want to enter the months January 1988 through December 1988 across the top of a worksheet, starting with cell B1. Enter 1/88 in cell B1; then select the range B1:M1 and execute the Data Series command (see **SCREEN 1**).

Since cell B1 is formatted as a date, *Excel* defaults to the Date option in the dialog box's Type option group. All you have to do is punch the Month option button in the Date Unit group and hit <Enter>. *Excel* will enter the serial dates corresponding to the first days of each month in 1988 and apply date formats to this range. Changing the date format at this point is quite simple because the entire range is still selected.

The Data Series command can even fill a range with times of the day. Enter a time, such as 10:30 am, into cell B1; then select range **B1:M1** and execute the *Data Series* command. Enter **.0416666667** in the Step Value box to change the time value incrementally by one hour, since .0416666667 is a close decimal equivalent of 1/24.

Use the Shortcut Keys

Many *Excel* commands have shortcut keys. The most productive are those for copying and moving cell formulas. The shortcut for Edit Copy is <Ctrl>-<Insert>. Then use <Enter> instead of Edit Paste. Rather than choosing the Edit Cut and Edit Paste commands to move cells, use <Shift>-<Delete> followed by <Enter>. Other useful shortcuts include those for Edit Fill Down and Edit Fill Right (<Ctrl>-< and <Ctrl>->, respectively).

Select Multiple Ranges

Suppose you have a three-year schedule in *Excel* and you've put the months of the year in cells B1:M1, B20:M20, and B40:M40. Then you decide to format all the month names in boldface. *1-2-3* veterans might be inclined to format the three ranges one at a time, but it's much faster to select all the ranges first, and then issue the formatting command. To do this, select the first range, press <Shift>-<F8> to put *Excel* into "add" mode, select the next range, press <Shift>-<F8> again, and so forth.

The smart mouse-user can do even better. Simply hold down the <Ctrl> key while dragging the mouse pointer over each of the three ranges in succession. Be careful, though—if you forget to hold down <Ctrl> for any of the selections, all the other ranges will be deselected.

Multiple selection also comes in handy when you copy values to various parts of the worksheet. After pressing <Ctrl>-<Insert>, hold down the <Ctrl> key while using the mouse to select all the cells you want to copy to.

Select the Current Region the Easy Way

Sometimes you need to select a rectangular block of cells that is too large to be displayed in its entirety. Instead of scrolling around to extend the selection to the outer boundaries of this area, execute the Formula Select Special command and choose Current Region from the dialog box (see **SCREEN 2**). This will automatically extend the selection outward in all four directions from the active cell to include the entire region. The selection stops when it reaches blank cells or the edges of the worksheet itself.

Break Up Big Worksheets

With *Excel*'s file linking capability, you can break up large worksheets into a collection of smaller ones. This means you can conserve memory—and improve *Excel*'s performance—by using a compact summary worksheet that extracts values from closed supporting worksheets.

The supporting worksheets should contain data that you don't expect to change often. As long as the supporting files remain static, you can avoid loading them into memory. However, be aware that in reading values from closed files, *Excel* can return values only for *simple* external cell references—those containing only a leading equal

sign and an absolute cell reference.

To link two worksheets via a simple external cell reference, just select the cell that is to contain the linked formula, type an equal sign, and then use the mouse to select the appropriate cell in the supporting worksheet while the formula bar is still active. (If you don't have a mouse, you must type in the cell reference or use the Window command to move to the other worksheet.)

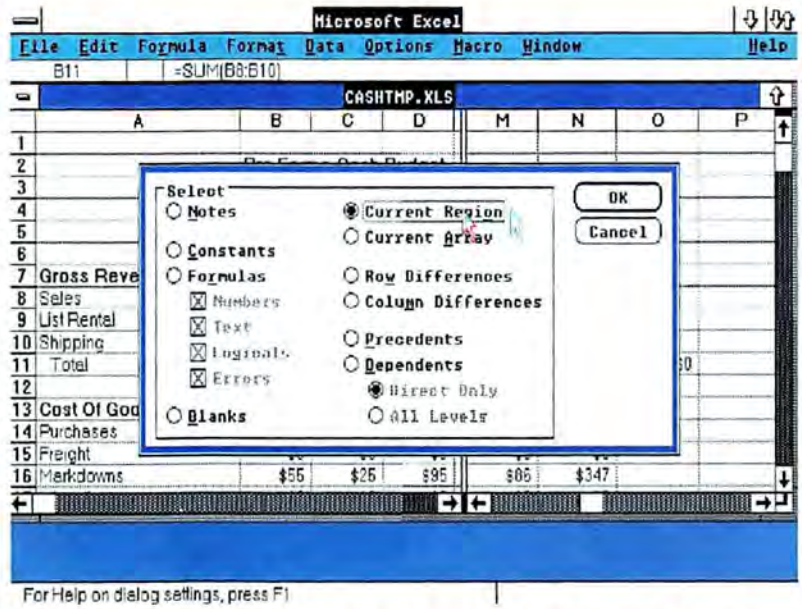
It's no great tragedy if you find you can't get along without complex external cell references—it simply means you must open all supporting worksheets while you work with the summary worksheet. In such cases you can simplify your life by saving the entire group of linked files as a work space.

Just open all files in the group, making sure no unrelated files are open. Then choose File and select the Save Workspace option. Type in the name you want to give to the work space; the program will automatically attach an .XLW extension. The next time you need to work with this collection of files, just open the work space file as you would a worksheet.

In the absence of a work space file, open the dependent worksheet, then use the File Links command to open any or all supporting files with direct links to it. You can open several files with one command by holding down the <Shift> key while clicking on file names with the mouse.

Quick Custom Dialog Boxes

Excel version 2.1, the latest update, has a new feature that makes for quick, intuitive design of custom dialog boxes in macros. Available through the Control Panel, the Dialog Editor allows you to use menus to choose dialog box elements. Once you've made your selections, the program uses the screen prototype to generate a table of dialog box coordinates, which you can then paste into your macro.



SCREEN 2: Just use Formula Select Special's "current region" option to select a big block of cells quickly.

To get to the Dialog Editor, click on the Control Panel button and choose Run; then select Dialog Editor. A menu and a blank dialog box will appear. Now, to add a text edit box, for instance, choose Edit Box from the Item menu; then select the desired type of edit box (text, integer, number, formula, or reference). Your edit box will appear inside the dialog box, with the type of box shown in grayed text. You can then size and position the box with the mouse or direction keys. Or you can delete a dialog box object by selecting it and choosing Edit Clear.

Once you are satisfied with your dialog box design, exit the Dialog Editor using the File Exit command. You'll be prompted to save the box to the Clipboard, and the program will generate a table of dialog box coordinates. You can then paste the table into your macro sheet using Edit Paste. If, after running the macro and viewing the actual dialog box, you want to refine it further, you can copy it back into the Dialog Editor using the following steps:

1. Select the table of dialog box coordinates.
2. Execute Edit Copy.
3. Select Control Panel, Run, and Dialog Editor.
4. Use the Edit Paste command.

And there you are! Using these tips won't make *Excel* any faster, but it will make you more productive. ●

Ralph Soucie is a CPA and computer consultant with Brian Murphy and Associates in Lake Oswego, Oregon. He is also the author of a forthcoming introductory book on Excel *from Microsoft Press.*

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Your complete satisfaction is our top priority. Any Swan computer system may be returned within 30 days from the date of shipment for a full refund.*

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We ship within 24 hours.*

* Items returned must be as-new, without modification or damage. All warranty cards, manuals and packaging must be included. Return shipping must be prepaid and insured, bearing a RAC (Return Authorization Code) on the shipping label. Sorry - shipping charges are non-refundable.
** Custom configured systems may take longer.

Swan 286/12

$1099 *Monitor not included*

12MHz/0 Wait State

Base System with 1.2MB Drive,
Assembled & Tested IBM® AT Compatible
MS-DOS® OS/2® Compatible

- 80286 12/6 MHz
- Phoenix BIOS
- 512K of RAM Expandable to 1MB
- 0 Wait State
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

Options:

- 80287 Coprocessor
- Upgrade to 1MB
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add $89

286/12	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	$1249	$1298	$1648	$1748
w/40MB (40ms) Harddrive	$1649	$1698	$2048	$2148
w/80MB (28ms) Harddrive	$1949	$1998	$2348	$2448

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MS-DOS is a registered trademark of Microsoft Corporation

Swan XT10

$549 *Monitor not included*

10MHz/0 Wait State

Base System with Single 360K Drive,
Assembled & Tested IBM ® XT Compatible

- 8088-1 10/4.77 MHz
- Phoenix BIOS
- 640K of RAM
- 150W Power Supply
- Ports: 1 Serial, 1 Parallel, 1 Game
- 8 Expansion Slots
- Single 360K Floppy Drive
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

Options:

- 8087 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add $89

XT10	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono†	CGA	EGA	VGA
Single Floppy	$699	$869	$1098	$1198
Dual Floppies	$779	$949	$1178	$1278
w/20MB (65ms) Harddrive	$979	$1149	$1378	$1478
w/30MB (65ms) Harddrive	$1025	$1195	$1424	$1524

* Includes Single 360K Floppy Drive
† Upgrade from 12" to 14" Flat Screen, add $49

Swan 286/10

$999 *Monitor not included*

10MHz/0 Wait State

Base System with 1.2MB Drive,
Assembled & Tested IBM® AT Compatible
MS-DOS®, OS/2® Compatible

- 80286 10/6 MHz Norton V4.0 SI 11.2
- Phoenix BIOS
- 512K of RAM Expandable to 1MB
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots, 6x16 bit, 2x8 bit
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

Options:

- 80287 Coprocessor
- Upgrade to 640K or 1MB
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add $89

286/10	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono†	CGA	EGA	VGA
Single Floppy	$1145	$1315	$1544	$1644
w/20MB (65ms) Harddrive	$1399	$1569	$1798	$1898
w/40MB (40ms) Harddrive	$1549	$1719	$1948	$2048
w/80MB (28ms) Harddrive	$1849	$2019	$2248	$2348

† Upgrade from 12" to 14" Flat Screen, add $49

Swan 386/16

$1999 *Monitor not included*

16MHz/0 Wait State

Base System with 1.2MB Drive,
Assembled & Tested IBM® AT Compatible
MS-DOS®, OS/2® & UNIX® Compatible

- 80386 16/8 MHz Norton V4.0 SI 17.6
- Phoenix BIOS
- 1MB expandable to 16MB RAM on 32 bit memory card
- 80287 & 80387 Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

Options:

- Upgrade to 2,4,8,10,16MB
- 80287 or 80387 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add $89

386/16	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14"Flat Mono	VGA Mono	VGA Color
Single Floppy	$2149	$2198	$2399	$2648
w/40MB (40ms) Harddrive	$2549	$2598	$2799	$3048
w/80MB (28ms) Harddrive	$2849	$2898	$3099	$3348

Swan 386/20

$2499 *Monitor not included*

20MHz/0 Wait State

Base System with 1.2MB Drive,
Assembled & Tested IBM® AT Compatible
MS-DOS®, OS/2® & UNIX® Compatible

- 80386 20/8 MHz Norton V4.0 SI 22.0
- Phoenix BIOS
- 1MB expandable to 16MB RAM on 32 memory card
- 80287 & 80387 Coprocessor Socket
- 230W Power Supply
- 1.2MB Floppy Drive
- Ports: 2 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

Options:

- Upgrade to 2,4,8,10,16MB
- 80287 or 80387 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add $89

386/20	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	VGA Mono	VGA Color
Single Floppy	$2649	$2698	$2899	$3148
w/40MB (40ms) Harddrive	$3049	$3098	$3299	$3548
w/80MB (28ms) Harddrive	$3349	$3398	$3599	$3848

SWAN VIDEO OPTIONS INCLUDE:

12" MONOCHROME:
- Swan Switchable Video Card
- 12" Hi-Resolution Amber Monitor
- Tilt & Swivel Base

14" MONOCHROME:
- Swan Switchable Video Card
- 14" Flat Screen Monitor
- Tilt & Swivel Base

CGA
- Swan Switchable Video Card
- RGB Monitor

EGA
- Swan EGA Video Card
- 14" EGA Monitor

VGA
- Swan VGA Video Card
- 14" VGA Monitor
- Tilt & Swivel Base

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w/PC Talk III software

- Hayes ® compatible
- Auto answer/dial
- Tone and pulse

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1200 baud internal $69
2400 baud external $149
1200 baud external $99

Swan Video Cards

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- Parallel Port

EGA
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20 Macros for Word

With macros you can whip through Word's menus to get the job done.

Here are 20 tools to place word processing power at your fingertips.

Word Processing

George Campbell

There's nothing like a library of personalized macros to simplify repetitive tasks and facilitate programming. With *Microsoft Word 4.0* and *5.0*, users can take advantage of a powerful function that builds both keystroke macros and more potent text macros.

To create a keystroke macro, you simply press <Shift>-<F3>, enter the desired keystrokes, press <Shift>-<F3> again, and name the macro. To create a text macro, you develop a file containing keystrokes and commands from *Word*'s comprehensive macro language, which can pause for user input, perform command loops, and run nested macros.

This article presents both keystroke macros and text macros. All of them work with *Word 4.0* and *5.0*, but if you have a library of *4.0* macros you want to use in *5.0*, it's a good idea to run them through *5.0*'s macro conversion utility. The utility prompts you to correct any *4.0* macros that call menus that have been changed in *5.0*.

It's All in the Name

A *Word* macro can have a descriptive name up to 31 characters long as well as a <Ctrl>-*key* code. It's a good idea to use both: The name reminds you what the macro does, while the <Ctrl>-*key* code is a fast way to put the macro to work.

To create the <Ctrl>-*key* portion of the macro name, simply press <Ctrl> and the appropriate key after typing in the descriptive name. But there's a catch: Once you create a macro that uses <Ctrl> and a single letter key, such as A, you can't create a macro that uses <Ctrl>-A followed by another

key. The solution is simply to use <Ctrl>-A*second key* from the outset.

Making the Macros

Before you create the following recorded macros, load a document into *Word* so you can see the effects of keystrokes on screen as you record them. When you begin recording the macro, the letters 'RM' will appear on the status line in the lower right corner of the screen. If you make a mistake, just press <Shift>-<F3>, press <Esc> at the 'Copy to: { }' prompt, and start over.

<Ctrl>-A: ASCII Text

Here's a quick way to save the current document in ASCII format.

1. Press **<Shift>-<F3>**, then press **<Esc>TS<Tab>N<Enter>Y**.

2. Press **<Shift>-<F3>**; at the 'Copy to: { }' prompt, type **ASCIISave.mac^** and press **<Ctrl>-A<Enter>**.

<Ctrl>-D: Double Space

The <Ctrl>-D macro double-spaces a document, then positions the cursor at the top of the file.

1. Press **<Shift>-<F3>**, then press **<Shift>-<F10><Alt>-2<Cursor Up>**.

2. Press **<Shift>-<F3>**, type **DoubleSpace.mac^** at the prompt, and press **<Ctrl>-D<Enter>**.

<Ctrl>-H: Hidden Toggle

With *Word* you can hide on-screen comments or notes. <Ctrl>-H toggles between displaying and concealing hidden text.

1. Press **<Shift>-<F3>**, then press **<Esc>WO<Tab><Tab>** to select the hidden text option. (*Word 5.0* users press **<Esc>O<Tab>**.)

2. Press **<Space><Enter>** to toggle between the display and hide choices.

3. Press **<Shift>-<F3>**, at the prompt type **Hiddentext.mac^**, and press **<Ctrl>-H**.

<Ctrl>-J: Justify Text

<Ctrl>-J justifies all text from the cursor to the end of the document, then returns the cursor to its original position.

1. Press **<Shift>-<F3>**, then press **<F6><Ctrl>-<Page Down>** to highlight the document. Next, press **<Alt>-J<Cursor Left>**.

2. Press **<Shift>-<F3>** at the prompt, type **JustifyDown.mac^**, and press **<Ctrl>-J<Enter>**.

<Ctrl>-L: List Files

This macro displays the contents of a specific document directory so you can pick a file to edit. The following example displays the files in a subdirectory called Letters in the Word4 directory. Substitute your own directory names in the macro.

1. Press **<Shift>-<F3>**, then press **<Esc>TO**, type **C:\Word4\Letters** at the prompt, and press **<Enter>**.

2. Next press **<Esc>TL<F1>** to display the list of files.

3. Finally, press **<Shift>-<F3>**, at the prompt type **ListFiles.mac^**, and press **<Ctrl>-L<Enter>**.

<Ctrl>-M: Make a Box

Using *Word*'s line-drawing function, you can make a macro that

<Ctrl>-Key Macros for Word

<Ctrl>-A	ASCII text
<Ctrl>-D	Double space
<Ctrl>-E	Envelope template
<Ctrl>-F	Footnotes
<Ctrl>-H	Hidden text toggle
<Ctrl>-J	Justify text
<Ctrl>-K	Kill files
<Ctrl>-L	List files
<Ctrl>-M	Make a box
<Ctrl>-NO	Notes open
<Ctrl>-NC	Notes close
<Ctrl>-O	Load backup files
<Ctrl>-P	Select printer
<Ctrl>-R	Running page numbers
<Ctrl>-S	Save and continue
<Ctrl>-T	Transpose
<Ctrl>-WO	Window open
<Ctrl>-WC	Window close
<Ctrl>-Y	Save to drive A:
<Ctrl>-Z	Zoom

Once you've invested a little time to set them up, these 20 macros will make word processing easier. You may wish to clip this chart and tape it to your computer, at least until you become familiar with the macros.

surrounds the paragraph containing the cursor with a box.

1. Press **<Shift>-<F3>, then press <Esc>FBB<Enter>.**

2. Press **<Shift>-<F3>**, at the prompt type **Box.mac^**, and press **<Ctrl>-M<Enter>.**

<Ctrl>-NO: Notes Open

Here's a handy way to jot down notes while working on a document. The <Ctrl>-NO macro opens a window at line 12, loads a file called Notes.doc, then positions the cursor at the end of the notes file. Before you record this macro, create a subdirectory called \Notes that contains a file named Notes.doc.

1. Press **<Shift>-<F3>**, then press **<Esc>WSH12<Tab>Y<Enter>** to create a horizontal window at line 12.

2. Next press **<Esc>TL**, type **C:\Word4\Notes\Notes.doc** and press **<Enter>** to load Notes.doc, then press **<Ctrl>-<Page Down>.**

3. Press **<Shift>-<F3>**, at the prompt type **OpenNotes.mac^**, and press **<Ctrl>-NO<Enter>.**

<Ctrl>-NC: Notes Close

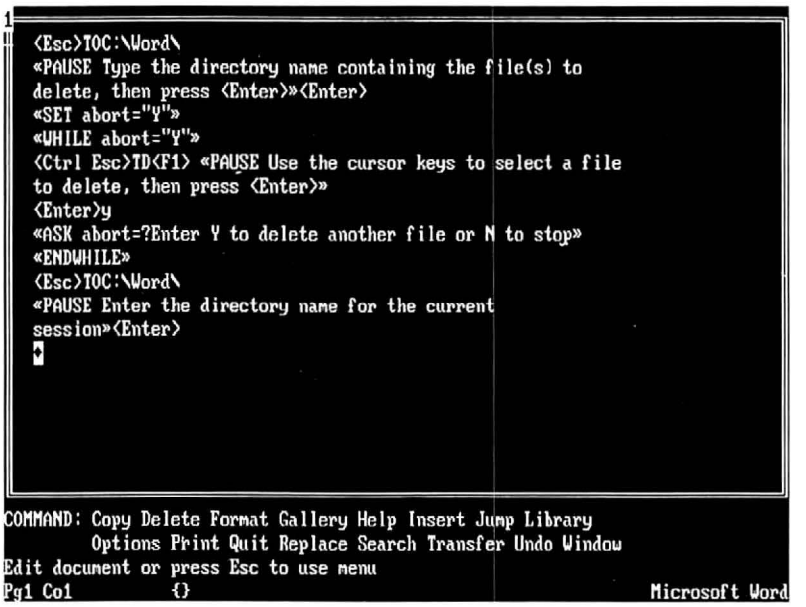
Use this macro to close the notes window created by the <Ctrl>-NO macro and save the updated Notes.doc file.

1. Press **<Shift>-<F3>**, then press **<Esc>WC2<Enter>Y.**

2. Press **<Shift>-<F3>**, at the prompt type **CloseNotes.mac^**, and press **<Ctrl>-NC<Enter>.**

<Ctrl>-R: Running Page Numbers

<Ctrl>-R creates page numbers centered at the bottom of the page, beginning with the second page of a document.



Creating text macros such as <Ctrl>-K (Kill files) demands precision typing. Put macro commands on separate lines to make them easy to edit later on.

1. Press **<Shift>-<F3>**, then press **<Ctrl>-<Page Up><Enter><Cursor Up>.**

2. Now, type **Page page** and press **<F3><F10><Alt>-C<Esc>FRB<Enter>.**

3. Press **<Shift>-<F3>**, at the prompt type **Pagenumber.mac^**, and press **<Ctrl>-R<Enter>.**

<Ctrl>-S: Save and Continue

Here's a quick way for version 4.0 users to save the current file and continue working with it. *Word 5.0* has an auto-save feature that can be set for timed intervals as frequent as 1 minute.

1. Press **<Shift>-<F3>**, then press **<Esc>TS<Enter>.**

2. Press **<Shift>-<F3>**, at the prompt type **SaveFile.mac^**, and press **<Ctrl>-S<Enter>.**

<Ctrl>-T: Transpose

The <Ctrl>-T macro transposes two letters. Place the cursor on the right-hand letter of the pair before you run the macro.

1. Press **<Shift>-<F3>**, then press **<Delete><Cursor Left><Insert>.**

2. Press **<Shift>-<F3>**, at the prompt type **Transpose.mac^**, and press **<Ctrl>-T<Enter>.**

<Ctrl>-WO: Window Open

This two-keystroke macro opens a horizontal window at line 14 and clears the new window.

1. Press **<Shift>-<F3>**, then press **<Ctrl><Home><Esc>WSH14<Tab>Y<Enter>.**

2. Press **<Shift>-<F3>**, at the prompt type **WindowOpen.mac^**, and press **<Ctrl>-WO<Enter>.**

<Ctrl>-WC: Window Close

This macro closes window number 2 and stops at the save document prompt ('Enter Y to save, N to lose edits, or Esc to cancel').

1. Press **<Shift>-<F3>**, then press **<Esc>WC2<Enter>**.

2. Press **<Shift>-<F3>**, at the prompt type **WindowClose-.mac^**, and press **<Ctrl>-WC<Enter>**.

<Ctrl>-Z: Zoom

If you have two or more windows open, the <Ctrl>-Z macro expands the current window to fill the screen. Press it a second time, and it restores the split screen.

1. Press **<Shift>-<F3>**, then press **<Ctrl>-<F1>**.

2. Press **<Shift>-<F3>**; at the prompt type **Zoom.mac^**, and press **<Ctrl>-Z<Enter>**.

Text Macros

Recording keystrokes is easier than typing out key names, but text macros enable you to use *Word*'s powerful BASIC-like macro language to create sophisticated macro routines. Text macros can use control structures such as IF...ELSE... ENDIF, PAUSE, and WHILE ...ENDWHILE to make decisions and perform repeating tasks.

To create text macros, start with a clear screen. Note that macro instructions are always enclosed by "chevrons" (« and »), created by pressing <Ctrl>-[or <Ctrl>-]. With text macros, you must type each line character by character, exactly as shown, including angle brackets and chevrons. When creating the following macros, <Tab>, for example, would be entered by pressing the less-than key, T, a, b, and the greater-than key. (In normal *PC World* style, <Tab> simply means press the <Tab> key.)

<Ctrl>-E: Envelope Template

This macro addresses and prints envelopes. Pressing <Ctrl>-E opens a window at line 14, loads an envelope template file called Envelope.doc, and prompts you to highlight the address information in the main document. When you press <Enter>, the macro inserts the address in the envelope template, prompts you to place an envelope in the printer, prints the envelope, and closes the window. This macro introduces the «PAUSE» instruction, which accepts text from the keyboard.

To use this macro, you must create a file called Envelope-.doc—set the left and right margins to 0, but leave the file blank. This macro assumes Envelope.doc is in the \Word4 directory; if you store that file in a different directory, enter the appropriate path in step 2. Steps 3 and 6 contain commands that position the address nine lines down and 40 spaces to the right, which is correct for a legal-size envelope. You may need to modify these commands to accommodate your printer and envelope sizes.

1. In a new document, type **<Esc>WSH14<Tab>Y<Enter>** letter by letter to open a window at line 14.

2. Type **<Esc>TL\Word4\Envelope<Enter>** to load Envelope.doc into the new window.

3. Type **<Enter 9><F1>** to move the cursor down nine lines and switch to the main document in window 1.

4. Type **«PAUSE Use cursor or function keys to highlight the address, then press <Enter>»** to prompt users to select the address from the main document.

5. Type **<Del><Ins><F1><Ins>** to store the address in Scrap, switch to window 2, and insert the address in the envelope template.

6. Type **<F6><Ctrl PgUp><Alt N 8>** to move the address to the proper position for printing.

7. Type **«PAUSE Insert an envelope in the printer, then press <Enter> when ready»** to prompt users to prepare for printing.

8. Type **<Esc>PP** to print the envelope.

9. Finally, type **<Esc>WC<Enter>N** to close the window and clear the Envelope.doc template.

10. Press **<F9>** to highlight the macro commands as a block of text, press **<Esc>C**, type **EnvPrint.mac^**, and press **<Ctrl>-E<Enter>** to save the macro.

Ctrl-F: Footnotes

Automatic footnoting is a breeze with this macro, which creates a footnote marker at the cursor location, jumps to the end of the document for footnote text entry, returns to the marker, and formats it as superscript.

1. In a new document, type **<Esc>FF<Enter><Space>** to set up a footnote entry.

2. Type **«PAUSE Enter footnote text as a single paragraph, then press <Enter>»**.

3. Now type **<Esc>JF** to return to the original cursor location.

4. Type **<Esc>FC<Tab 7><Space><Enter>** to make the footnote marker a superscript.

5. Highlight the macro commands, press **<Esc>C**, type **Footnote.mac^**, and press **<Ctrl>-F<Enter>** to save the macro.

<Ctrl>-K: Kill Files

<Ctrl>-K helps you delete unwanted *Word* files. The macro prompts you for a directory name, then displays the contents of the directory. After deleting a file, the macro allows you to delete more files or exit. This macro introduces four instructions from *Word*'s macro language: the «SET» instruction to assign a value to a variable, the «WHILE» and «ENDWHILE» instructions to repeat a series of macro instructions while a condition remains true, and the «ASK» instruction to get the user to enter a value for a variable. In steps 1 and 9, be sure to substitute your *Word* directory name.

1. Type **<Esc>TOC:\Word**.
2. To prompt the user for a directory name, type **«PAUSE Type the directory name containing the file(s) to delete, then press <Enter>» <Enter>**.
3. Type **«SET abort="Y"»** to set the variable *abort* to Y.
4. Type **«WHILE abort="Y"»** to begin the WHILE...END-WHILE loop. As long as the variable *abort* is equal to Y, the loop continues.
5. Type **<Ctrl Esc>TD<F1>**, then type **«PAUSE Use the cursor keys to select a file to delete, then press <Enter>»**.
6. Type **<Enter>Y**.
7. Next, type **«ASK abort=?Enter Y to delete another file or N to stop»**. This prompts the user to enter Y to continue the loop or N to abort the process.
8. Now type **«ENDWHILE»** to end the loop and start the process over again at the WHILE command.
9. Type **<Esc>TOC:\Word\ «PAUSE Enter the directory name for the current session»<Enter>**. This instruction allows the user to change to another *Word* subdirectory.
10. Finally, highlight the macro commands as a block of text, press **<Esc>C**, type **Killfiles.mac^**, and press **<Ctrl>-K<Enter>** to save the macro.

<Ctrl>-O: Load Backup Files

<Ctrl>-O loads the .BAK file into a window for comparison to the current document. It prompts the user for the file name shown in the lower right corner of the top window. This macro runs the <Ctrl>-WO (Window Open) macro created earlier. Use the <Ctrl>-WC (Window Close) macro to close the window.

1. Type **<Esc>|WindowOpen.mac<Enter>** to run the Window Open macro.
2. Then, type **<Esc>TL**.
3. Type **«PAUSE Enter current filename, without extension (see bottom corner of Window 1)».BAK<Enter>**.
4. Highlight the macro commands, press **<Esc>C**, type **LoadBak.mac^**, and press **<Ctrl>-O<Enter>**.

<Ctrl>-P: Select Printer

This macro selects a printer from the available drivers and returns to the document.

1. Type **<Esc>PO<F1>** to display a list of printer drivers.
2. Type **«PAUSE Use the cursor keys to select the correct driver, then press <Enter>» <Enter><Esc>**.
3. Highlight the macro commands, press **<Esc>C**, type **PrinterSelect.mac^**, and press **<Ctrl>-P<Enter>** to save the macro.

<Ctrl>-Y: Save to Drive A:

This macro saves a document file to a floppy disk in drive A:.

1. In a new document, type **<Esc>TSA:**.
2. Type **«PAUSE Enter filename for Drive A: and press <Enter>»**.
3. Highlight the macro commands, press **<Esc>C**, type **FloppySave.mac^**, and press **<Ctrl>-Y<Enter>** to save the macro.

Testing and Editing Macros

You can test macros quickly by simply running them in a dummy document. If a macro doesn't work properly, check it further by using *Word*'s step mode to run the macro one command at a time. To use step mode, just press <Ctrl>-<F3>. The letters 'ST' will appear on the status line at the bottom right corner of the screen. Now, run the macro. After each command executes, press <Enter> to continue.

To edit a macro, you must convert it to text. Press <Esc>I <F1> to display a list of macros. Highlight the macro file that needs editing, type a caret (^), and press <Enter>. Use normal *Word* editing techniques to change the text.

After making your changes, highlight the text, then press <Esc>C to copy the macro back into the glossary. Use the same file name and <Ctrl>-*key* extensions. At the prompt, press Y to overwrite the existing file.

Although long overdue, macros help make *Word* easier to use than ever. ●

George Campbell is a columnist for Compute's PC Magazine. *He lives in Los Osos, California.*

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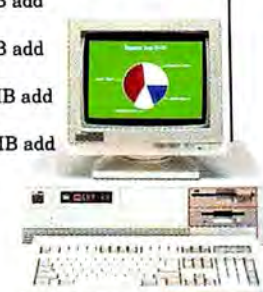

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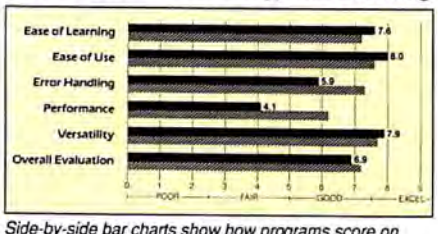

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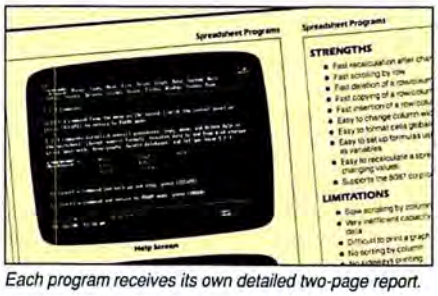

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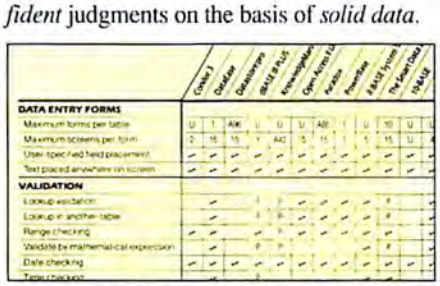

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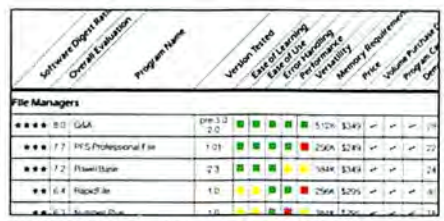

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Spreadsheets

Advanced Worksheet Design

An expert shares design tips and navigation aids

What you need: a spreadsheet

William Urschel's article "Worksheets by Design" (*PCW*, September 1987) gave novices advice for creating well-organized worksheets. Readers who heeded his suggestions are by now experienced worksheet builders, ready for the next step in worksheet design. This article builds on Mr. Urschel's basic model, with the aim of helping more sophisticated users make even their most complex worksheets easy to understand, easy to change, and easy to work with.

Avoid Spreadsheet Sprawl

Novice Lotus worksheet builders usually start with a simple rectangular layout, based directly on a familiar report or data sheet.

If you have a general business problem that requires a PC solution, our experts can help. Send your questions to Tips and Techniques (see How to Contact PC World, page 4).

As their needs and skills grow, users tack on more sections to hold more data, extra reports and calculations, and so on. The result? Spreadsheet sprawl (see **FIGURE 1**).

A sprawling spreadsheet quickly becomes unmanageable. You can no longer insert or delete rows and columns because doing so disturbs adjacent areas of the worksheet. Setting column widths involves frustrating compromises between neighboring sections.

A sprawling spreadsheet is confusing, too: The larger it becomes, the harder it is to find things. As the worksheet grows, it gets increasingly difficult to decipher the formulas—and thus riskier to trust the results.

But there's a cure for spreadsheet sprawl: a combination of strategic worksheet layout and systematic use of range names.

Tips for Organizing Your Worksheet

Most complex worksheets include several distinct functional areas; Urschel calls them *blocks*. Typical blocks include areas for data storage, printed reports, macros, graph ranges, constants and assumptions, data base ranges, results tables, and user messages. Instead of just adding new blocks haphazardly in the nearest available empty space, arrange blocks in a diamondback pattern to prevent columns and rows from interfering with one another (see **FIGURE 2**).

In a diamondback layout, each block occupies its own rows and columns, so it's never a problem to insert or delete rows or to set column widths. Moreover, you can set column widths precisely for each block.

(Note: In *1-2-3* releases 1 and 1A, the memory a worksheet requires is determined partly by the size of a rectangle covering all the active spreadsheet cells. A large release 1A worksheet must be crowded into a rectangular shape to conserve memory, making the diamondback layout impractical. Release 2 removes this limitation; now only active cells require memory.)

Range names provide instant, random access to any of the work areas in the diamondback. Use the command */Range Name Create* to name the upper left-hand cell in each work area. Begin these block names with the symbol @; since this character precedes *A* in the computer's ordering scheme, the block names will appear first in range name menus. Then, enter a label in the named cell as a reminder of the block name.

To move around the worksheet, press <F5> (the Goto key), <F3> (the Name key). Lotus displays a menu of the named ranges, with the block names first. Select the block you wish to visit, press <Enter>, and—voilà!—you're there. Suddenly, your worksheet seems composed of pages, not territory; any block can be reached as readily as any other.

In general, it doesn't matter where you place the various blocks in the diamondback, with one exception. Macros should be placed in a block near the upper left corner of the worksheet. The explanation is simple: Whenever you insert or delete rows or columns, all cells below or to the right of that point shift to new cell addresses.

If your macro executes one of these commands, it won't work as you had planned—unless the macro is located above and to the left of the insertion/deletion point. In this situation, if the macro contains any {BRANCH} commands or subroutine calls, it will fail because those commands will point to the wrong cell locations within the macro (this is so even if the macro uses range names, as it should, to refer to its cells).

Effective Block Design

You can further improve worksheet maneuverability by consistently structuring the blocks themselves. In the bottom row of each block, enter a horizontal line. Simply press \ (the repeating label prefix), then type = and press <Enter>, then copy the line into the remaining cells in that row using */copy*. The line provides a visual boundary for the work area; any entries below the line would occupy cells in another block and violate the diamondback pattern. If you need to expand a block, you can insert rows above the boundary line.

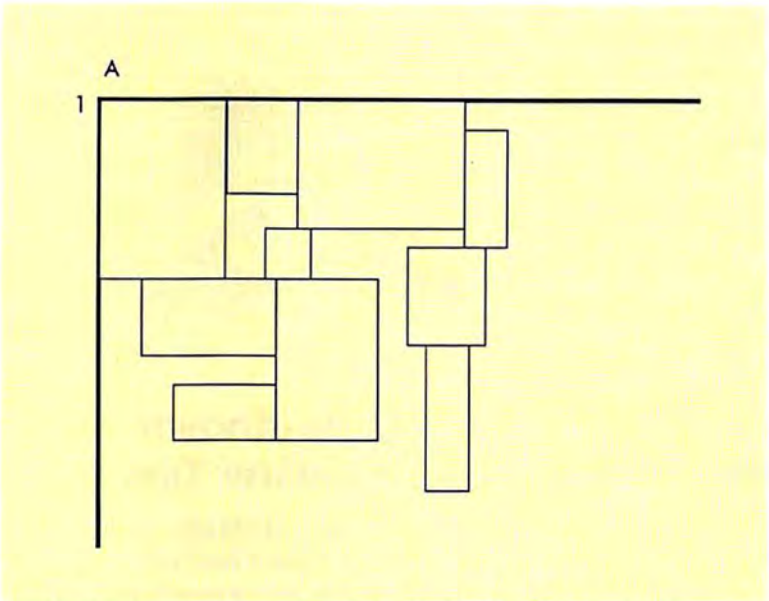

FIGURE 1: Spreadsheet sprawl comes from placing data blocks haphazardly. Sprawling spreadsheets are difficult to manage and prone to errors.

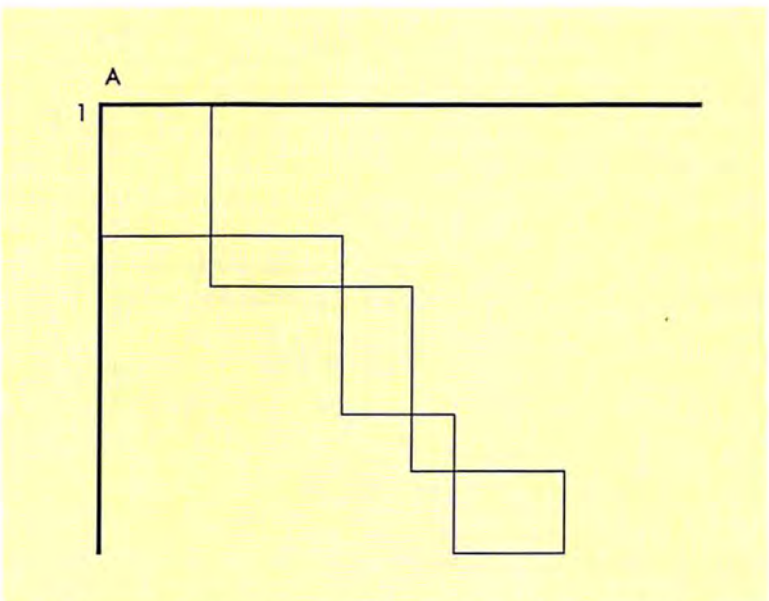

FIGURE 2: A diamondback layout prevents conflicts between data blocks. Rows and columns can be inserted as needed, and column widths can be set precisely.

Leave the far left column of each block empty, except for the block label in the top row and the boundary line at the bottom. This blank column serves as a runner column. To move quickly to the bottom of the block, press <End> and then <Cursor Down>; <End> and <Cursor Up> move you to the top. To return quickly to a particular row in the block after working elsewhere in the worksheet, place an *X* in the runner column. When you are ready to return, press <F5>, <F3>, and select the block; then press <End> and <Cursor Down>, and you'll hit the *X*.

Systematic Use of Range Names

Range names are a handy way of referring to cells and ranges. They make building formulas faster and more accurate, and they're absolutely necessary for readable, reliable macros. And range names make well-designed worksheets even easier to use.

Name every cell or range that will be used in formulas or in print, graph, or data command settings. Begin range names with a one- or two-letter prefix to denote the name of its block. For example, in a block called @INPUT, you might create range names like IN_PRICE, IN_RATE, IN_PRINT, and so on. In the Range Name menu, the range names you create will be grouped in alphabetical order by block.

A well-organized modular worksheet is fast to construct, easy to use, and simple to understand and change, and—most important—it's likely to give correct results. —*Richard Scoville*

Richard Scoville is a contributing editor for PC World.

Word Processing

Little-Known WordStar Tips

A clutch of hidden tricks adds speed and convenience to WordStar.

What you need: WordStar 4.0 or 5.0

With the zest of kids trading baseball cards, *WordStar* users have swapped tips, tricks, and hidden features for years. Much of this folk wisdom was incorporated into release 4.0, but there are still plenty of clever techniques floating around. These popular tricks require at least *WordStar 4.0*, and some—including all the macro tips—also work with version 5.0. Few are documented, so remember to work with a copy of your program and never patch or modify the original.

WordStar Speed Tips

JUMP INTO WSCHANGE FROM THE DOS PROMPT

With *WordStar 4.0*, MicroPro added WSCHANGE, a useful customizing program that supplements WINSTALL. Here's a fast way for you to bypass WSCHANGE's tiresome initial questions, 'file to install?' and 'file to save changes to?' From the DOS prompt, type **WSCHANGE WS** and press **<Enter>**. This takes you straight to the WSCHANGE opening menu.

RUN TELMERGE AS A STAND-ALONE COMMUNICATIONS PROGRAM

WordStar 5.0's TelMerge telecommunications module will never replace *Crosstalk*, but it's handy for simple uploads and downloads. To run TelMerge from the DOS prompt rather than having to load *WordStar*, just type **TelMerge TelMerge.sys**.

WordStar Shorthand Macros

USE A SHORTHAND MACRO TO PRINT A FILE TO ASCII

New in version 4.0, *WordStar*'s Shorthand macros speed routine tasks by substituting an <Esc>*key* sequence for a word or command you would otherwise have to type out. With any Shorthand macro, remember to press <Ctrl>-P before inserting any <Ctrl>- or <Alt>-*key* combinations, and to release the <Ctrl> key before typing the second letter of a two-key combination such as <Ctrl>-QA. In the macros that follow, we list both the actual keystrokes and the way the resulting macro looks on the Shorthand menu screen.

WordStar can print a document to an ASCII file, but stepping through the print menu is a pain. This macro jumps you into

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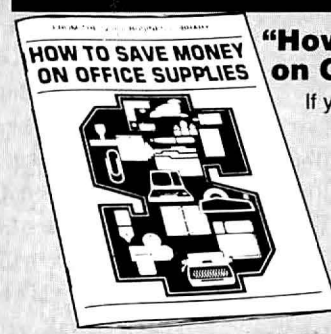

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WordStar's ASCII mode and prints a file to disk in ASCII format from the menu. The macro uses the letter *A* (for "ASCII file") as a mnemonic, but you can pick any letter or number as the trigger.

Enter the Shorthand macro editor by pressing **<Esc>** and then **?**. When it asks you for the character to be defined, type **A** and press **<Enter>**. When *WordStar* asks for a description, type **Make an ASCII file** and press **<Enter>**. At the 'Definition?' prompt, type the following (but don't enter the spaces):

<Ctrl>-P <Ctrl>-K <Ctrl>-P
<Ctrl>-DP <Ctrl>-P <Ctrl>-R
<Ctrl>-P <Enter> <Ctrl>-P
<Enter> <Ctrl>-P <Enter>
<Ctrl>-P <Enter> <Ctrl>-P
<Enter> <Ctrl>-P <Enter>
<Ctrl>-P <Enter> ASCII <Ctrl>-P
<Enter> <Enter>

On the menu, the macro will look like this:

^K^DP^R^M^M^M^M
^M^M^MASCII^M

Now when you type <Esc>A from within a document, *WordStar* will convert the file to ASCII format and save it under the file name ASCII.WS.

STRIP CARRIAGE RETURNS FROM AN ASCII FILE

If you've ever had to search for and replace the carriage returns in a downloaded file, you know what a hassle it can be. The following two macros automate the job—provided the original file has at least one blank line (i.e., a double carriage return) between each paragraph. Clean1 replaces all double carriage returns with ## symbols and strips out the remaining returns. Clean2 replaces the ## symbols with double carriage returns and reformats the document.

To create Clean1, enter the Shorthand menu, select **K** as the trigger letter, type **<Clean1>** and press **<Enter>**, and enter the following (without the spaces):

<Ctrl>-P <Ctrl>-QA <Ctrl>-P
<Ctrl>-N <Ctrl>-P <Ctrl>-N
<Ctrl>-P <Enter> <Ctrl>-P
<Ctrl>-N <Ctrl>-P <Enter> GN
<Ctrl>-P <Enter> <Ctrl>-P
<Ctrl>-[<Ctrl>-P <Ctrl>-QR
<Ctrl>-P <Ctrl>-Q <Ctrl>-P
<Ctrl>-Q <Ctrl>-P <Ctrl>-6
<Enter>

The macro appears as

^QA^N^N^M^N^MGN
^M^[^QR^Q^Q^^ on the Shorthand menu.

To create Clean2, select **L** as the trigger letter, type **<Clean 2>** and press **<Enter>**, and enter the following:

<Ctrl>-P <Ctrl>-QA <Ctrl>-P
<Ctrl>-P <Enter> <Ctrl>-P
<Ctrl>-N <Ctrl>-P <Ctrl>-N
<Ctrl>-P <Enter> GN <Ctrl>-P
<Enter> <Ctrl>-P <Ctrl>-[
<Ctrl>-P <Ctrl>-QR <Ctrl>-P
<Ctrl>-QU <Enter>

The macro will appear as

^QA##^M^N^N^MGN
^M^[^QR^QU on screen.

To clean up a downloaded ASCII file, first run Clean1; when it's finished, run Clean2. Don't combine the two macros; keystrokes in Clean2 will interrupt the "repeat command" function (<Ctrl>-Q <Ctrl>-Q) in Clean1.

UNDERLINE SINGLE WORDS WITH A MACRO

This macro lets you underline a word with a quick keystroke combination. Select **U** as the macro trigger, name the macro **<Underline>**, then type:

<Ctrl>-P <Ctrl>-A <Ctrl>-P
<Ctrl>-PS <Ctrl>-P <Ctrl>-F
<Ctrl>-P <Ctrl>-PS <Enter>

This yields ^A^PS^F^PS on screen. To underline a word, just locate the cursor on any but the first character in the word and type <Esc>U.

BOLDFACING WITH A MACRO

To write a macro that boldfaces a word, use B as the trigger letter, and substitute ^PB for ^PS in the Underline macro definition.

Using WordStar With dBASE

You'd be hard-pressed to find two packages that complement each other better than *dBASE* and *WordStar*, since you can use data from the former for MailMerge letters. The trick is to export *dBASE* data in a form that *WordStar* recognizes.

EXPORT DBASE FILES TO WORDSTAR

With all versions of *WordStar* before 5.0, you must change *dBASE*'s comma-delimited data to data delimited with a set of quotation marks ("). Suppose you have a *dBASE* file called CUSTOMER.DBF and want to send your customers a form letter. Let's assume the customer file contains eight fields: first, last, address, city, state, ZIP, homefone, and workfone. For your MailMerge letter you need only six of the eight fields, so you would just export those six.

After loading *dBASE* and bringing up CUSTOMER.DBF, you'd enter the following com-

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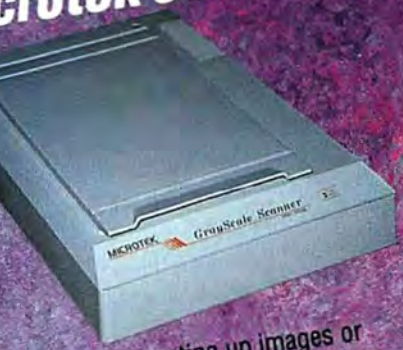

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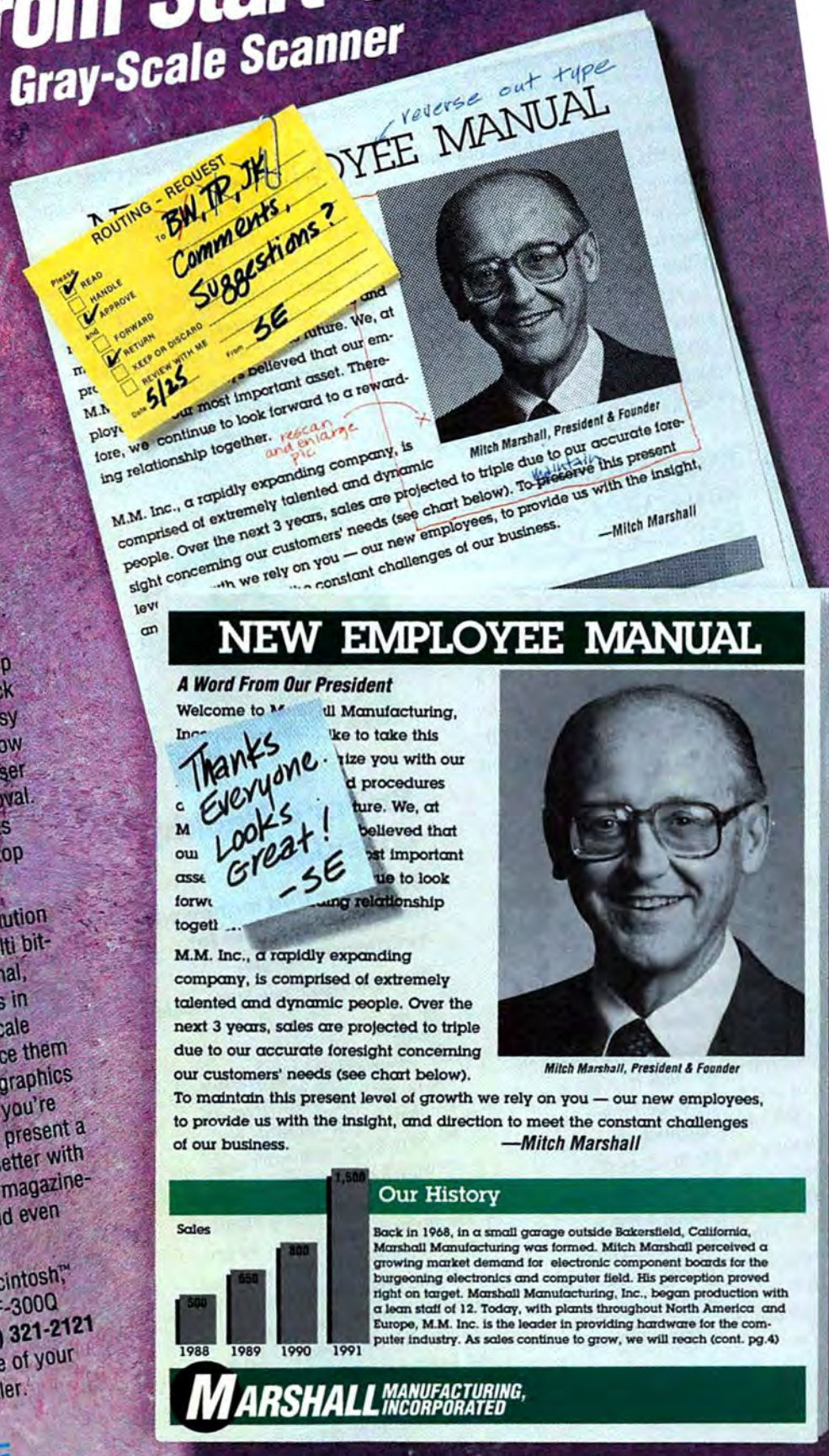

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mand at the dot prompt:
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(There are no spaces between the field names, but you must have the spaces before and after the word *with*.) This command instructs *dBASE* to copy the specified six fields in an ASCII format whose records end with a carriage return and contain six fields separated by quotation marks. To use the file, you would enter the file name WSLETTER-.DTA on the MailMerge .df (Define File) line in your *WordStar* form letter.

EXPORT DBASE FILES TO WORDSTAR 5.0

Unlike previous versions, *WordStar 5.0* directly imports information from many data base programs and recognizes a *dBASE* file if it encounters one. To use a *dBASE* file in release 5.0, merely type .df CUSTOMER.DBF in your merge document. When you come to the 'Read Variable' line in the master merge document, use the new version 5.0 command .rv*. This command (which works only with *dBASE*-type comma-delimited data files) instructs *WordStar* to get just the named fields and then go to the next line. If you place .rv* in your merge document followed by the field names, *WordStar* recognizes the file's *dBASE* format and handles the importing.

You would normally start by opening the file in *dBASE* to identify the desired fields, but a little-known version 5.0 feature lets you import the field names directly into a *WordStar* file. The trick is to open a nondocument file and use the ^KR command followed by *file name*/f. To import the field names for the CUSTOMER.DBF file, for example, type CUSTOMER.DBF/f at the 'file to import?' prompt. You can then open a second window for your merge letter and enter only the names of the fields you need on the .rv* line. *—Ken Smith and Matt Keaveney*

Ken Smith is a PC support engineer for Hewlett-Packard and a former manager of technical support at MicroPro. Matt Keaveney is MicroPro's former WordStar *product adviser.*

Printers

Rx For a Healthy LaserJet

Save time and money with these handy LaserJet maintenance tips.

What you need: any HP LaserJet

Hewlett-Packard designed its LaserJet printer to be as trouble-free as possible but, as Murphy knew, you can't stave off entropy forever. Still, in a gratifying number of cases, simple maintenance can cure—or prevent—many LaserJet problems.

Some protective measures are simple common sense. For instance, HP designed the LaserJet to operate for an average of 6000 hours or 60,000 printed pages, whichever comes first, between failures. If you leave your LaserJet on night and day, you'll run through those 6000 hours in about eight months. So don't turn it on unless you need it. On the other hand, the power-up/power-off process taxes all computer equipment, including LaserJets, so you don't want to turn your printer on and off any more than necessary.

How do you balance these seemingly contradictory directives? Analyze your printer-usage pattern, and try to do as much of your printing as possible in one session.

Problem: Fading

Suddenly your LaserJet starts printing pages with faded or missing type—and there's plenty of toner. If you worked inside the machine recently, especially if you serviced or replaced the electrophotographic (EP) cartridge, which contains the toner, developer, and print drum, it's possible the light-sensitive print drum was overexposed.

Prevention: A little exposure (less than 5 minutes) won't do any harm, but long exposure or bright sunlight can desensitize the print drum. Save the EP cartridge's protective packaging; then, if you have to remove the cartridge from the printer, wrap it up until reinstallation. Also, avoid leaving the LaserJet open, or the cartridge may be light-struck. EP cartridges are also susceptible to automobile exhaust fumes, so avoid setting your LaserJet near open windows above very busy streets or parking lots.

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Cure: If light damage is only moderate (text slightly lighter), you may be able to revive the cartridge by storing it in a dark room for a day or two. If it's been exposed to direct sunlight, however, it's probably beyond help; you'll have to replace it.

Problem:
Striping

A dark line running the length of the page appears on all your copies. This may be due to a scratch on the print drum.

Prevention: Be very careful when choosing paper for your LaserJet. It's best to use stock designed for photocopiers: 16- to 20-pound paper with a very soft weave and texture. Never try to print on envelopes with strings, metal clasps, or transparent windows, which can melt or burst into flames inside the printer! Even some engraved or embossed stationery can scratch delicate components inside the LaserJet.

Cure: None. If your print drum is scratched, you'll have to replace the cartridge.

Problem:
Streaking

White streaks appear, running the length of printed pages. It looks as if the toner is low, even though there's no message to that effect.

Prevention: None. Some LaserJets (mainly models earlier than the Series II) don't always tell you when the toner is running low. In these printers the "low toner" message is based on the number of pages printed, rather than on a "fuel gauge" that actually measures toner level. Since graphics consume more toner than text does, and full pages of text more than half pages, the printer may or may not warn you when toner is low or improperly distributed.

Cure: Whether you get a low toner message or not, if you *think* the toner is low, try redistributing it; you can often print several hundred more pages. Remove the EP cartridge from the printer, shake it to loosen toner clumps, rock it back and forth several times, and replace it.

Problem:
No output

You just installed a new EP cartridge, but the LaserJet refuses to print any image at all.

Cure: You probably failed to remove the sealing tape from the EP cartridge. There's a plastic tab attached to the end of the cartridge. Flex it back and forth to separate it from the cartridge; then pull it firmly, taking the strip of tape with it. If the tape is unusually recalcitrant and the tab breaks off, you can usually remove the tape with a pair of pliers. If that fails, your HP dealer will exchange the cartridge.

Problem:
Jamming

Label sheets jam in the paper path or shed labels that get stuck inside the printer.

Prevention: Use labels designed especially for laser printers; they employ an acrylic adhesive, which is less likely to break down under the high temperatures inside a LaserJet. You can also reduce the probability of jamming by feeding sheets manually, rather than using a paper tray.

Cure: If labels peel off inside the LaserJet, switch off the power immediately, wait a few minutes for the printer to cool, open the top, and look for wayward labels. (Count the number missing from the sheet to be sure you find them all.) Peel them off with your fingers; avoid scratching delicate surfaces with tools. Remove adhesive residue with a cotton swab and small amounts of rubbing alcohol, being careful to avoid dripping or leaving bits of cotton behind.

Problem:
Printing errors

Your LaserJet was just moved to a new location, and now it won't print properly, or it displays an error message when you switch it on.

Prevention: Improper transportation is one of the leading causes of LaserJet malfunctions. You should never move a LaserJet more than a few feet without preparing it properly.

1. Before moving, remove the EP cartridge. Not only is spilled toner messy, it can fuse to surfaces, causing permanent damage to rollers, belts, and other parts.

2. Be sure to replace all the internal foam spacers that came with the printer (you have, of course, saved them) to immobilize fragile moving parts.

3. The mirror is especially vulnerable; if you don't have the foam spacer HP provides to cushion it, you can use duct tape. Pop up the lid of the LaserJet, remove the EP cartridge, and you'll see a metal flap underneath it. The mirror lies beneath this flap. Tape down the metal flap carefully.

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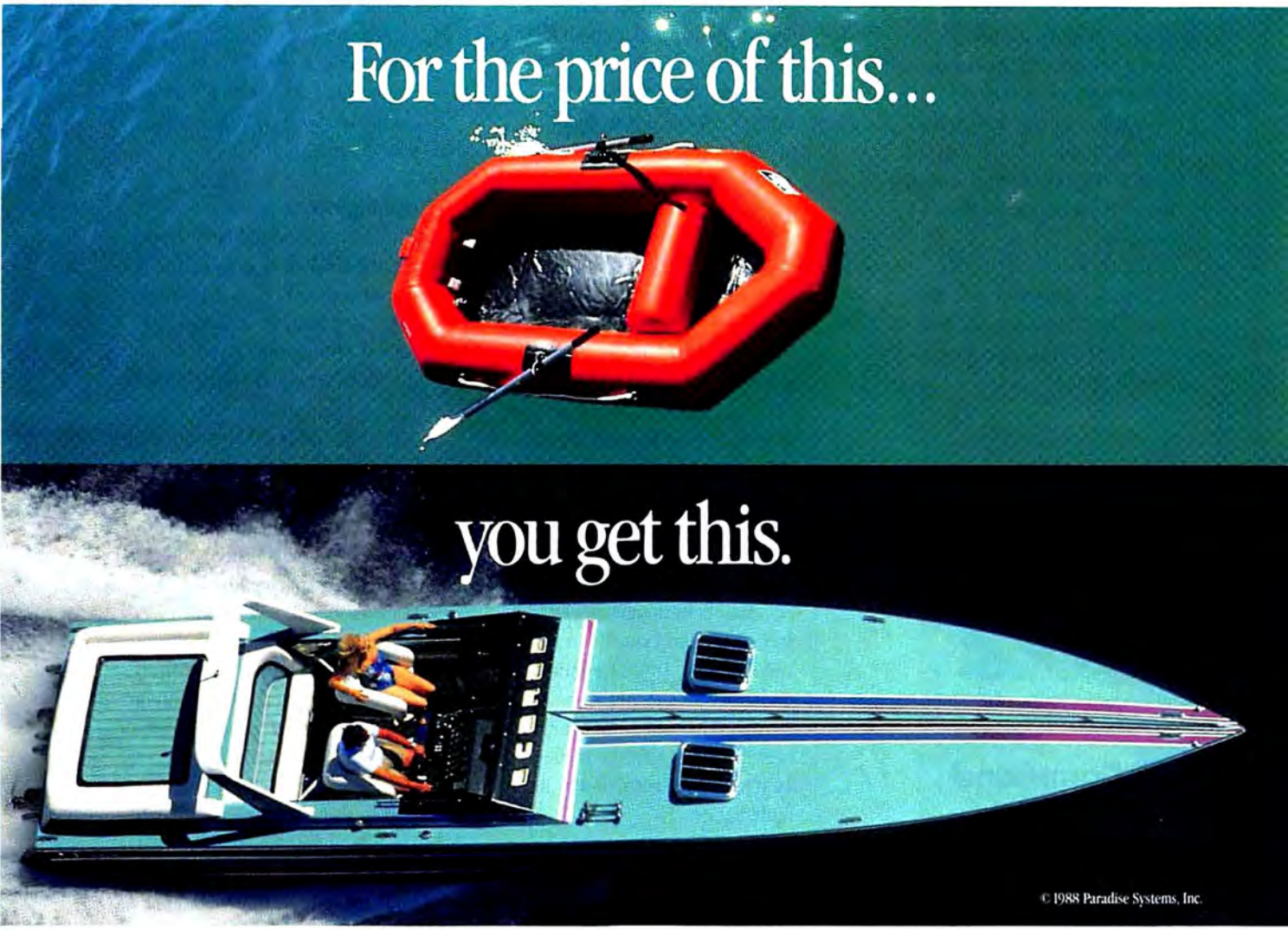

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4. If the printer is moving any further than down the hall, put it back in its original shipping carton, using all the foam spacers.

Cure: If toner spills inside the printer, remove it immediately. Use a *small* vacuum cleaner (like a Dustbuster), if available. Then wipe affected parts with a soft, slightly damp cloth. When the area is thoroughly dry, install a new EP cartridge. —*Michael Gardner*

Michael Gardner is coauthor of LaserJet Unlimited, Edition II *(Peachpit Press, Berkeley, California, 1988).*

Communications

AT Command Survival Kit

Take control of your modem using handy AT commands.

What you need: Hayes-compatible modem, telecommunications software

No one wants to be left dangling at the mercy of a modem. With a few AT modem commands slipped into your technical arsenal it will never happen to *you*.

AT commands are the codes that make your Hayes-compatible modem actually do something: dial, hang up, wait, and so on. Communications programs handle most of those chores automatically by sending the appropriate commands to the modem, but occasionally something goes wrong. AT commands can help you out when your modem mulishly refuses to pick up the phone, for instance; or when call-waiting blips from an unexpected call turn a download into a backdrop for *Psycho III;* or when your simple-minded auto-dialer can't figure out how to tell the modem to wait a few seconds for an outside line.

Making the Modem Pay Attention

How can you establish a relationship with your modem? Just type AT; that's the command that causes the modem to snap to attention and prepare to take orders. Two things to note: First, some modems only accept AT commands in uppercase letters, so be safe and type them that way. Second, the AT commands described in this article make changes that are temporary; the next time you turn your modem on it will have returned to its default values.

Where should you type these commands? With most software (such as *ProComm* and *Qmodem*) you'll send AT commands from the program's terminal screen. If you're running *Crosstalk XVI*, type GO LOCAL on the command line at the bottom of the screen; then you can type AT<Enter>. You'll know you've got it right when the modem responds 'OK'. (If by some chance you get a 0 instead of an 'OK', it just means your modem is sending number codes; to switch them into English, enter the command ATV1).

Establishing Meaningful Dialogue

Unfortunately, some communications software is set up so there's no screen echo when you type a command, which means you can't see what you're typing. To correct this, enter ATE1, and commands will be echoed on your screen.

Dialing It Your Way

The basic command for instructing the modem to pick up the phone and dial out is ATDT. *AT* gets the modem's attention, *D* tells it to dial, and *T* tells it to dial with tones. If your phone requires pulse-dialing, you'd use ATDP instead.

A number of modifiers can be appended to the basic dial command. Adding a comma, for instance, will cause the modem to pause for two seconds before proceeding. Say you want to call MCI Mail from San Francisco and your office phone system requires you to dial *9* to get an outside line; the full command would be ATDT9,5431560. This causes the modem to get a dial tone, dial *9*, and wait 2 seconds for the outside line before dialing MCI.

If you need a longer pause, you can type as many commas as you like: 2 commas for a 4-second pause, and so on. Alternatively, you can increase the length of the "comma pause" by increasing the value of the S8 register. Its default value is 2; you can increase it to a maximum of 255 by entering ATS8=255. For a 10-second comma pause, use ATS8=10. Thereafter, each comma in the dialing string will produce a 10-second pause.

A slightly more elegant way of getting the modem to wait for an outside line is by adding *W* to the

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dialing string. *W* causes the modem to wait for a second dial tone before dialing the rest of the number. The command here would be ATDT9W5431560.

Alternatively, using @ in the dialing string makes the modem wait for silence before dialing the rest of the string. Both commands can be extremely useful when navigating through a long-distance carrier or a complicated office phone system.

Recipes for Picking Up the Phone

There are two ways to get a modem to answer the phone. Method 1 uses the S0 (that's a zero, not a capital *O*) register, the location in the modem's memory that remembers how many rings to wait before answering an incoming call. To make the modem pick up the phone after one ring, enter ATS0=1. If you have an auto-answer light, it should go on. To make the modem wait four rings before picking up (say, to give you time to answer a voice call), enter ATS0=4.

To disable the auto-answer function altogether, set the S0 register to zero with ATS0=0. If your modem refuses to answer incoming calls, the reason may be that you have accidentally told your telecommunications software to set the S0 register to zero. ATS0=1 corrects the problem.

Method 2 makes the modem pick up *right now*, no questions asked. You simply enter ATA. You might use ATA to pick up the phone quickly, before a caller hangs up. More likely, you'd employ it to switch a phone conversation from voice to data. You would type ATA<Enter>, the person at the other end would type ATD <Enter>, and your PCs would pick up the conversation.

AT	prepares the modem to receive commands
ATDT	dials out using tones
ATDP	dials out using pulses
,	forces the modem to wait before dialing
ATS8=*n*	sets the length of time the modem will wait after the "comma pause" (,) in seconds (*n*)
W	waits for a second dial tone before dialing
@	waits for silence before dialing
ATV1	makes the modem respond on screen in English
ATE1	echoes commands to your screen so you can see what you're typing
ATS0=*n*	picks up the phone after a specified number of rings (*n*)
ATA	picks up the phone immediately
ATS10=*n*	sets the amount of time the modem will wait between the loss of the carrier tone and hanging up
+ + +	permits the modem to accept local commands without hanging up
ATH0	hangs up
ATZ	returns to default values

FIGURE 1: Here's a handy list of the modem commands covered in this article and an explanation of what they do.

When Hanging Up Is Hard to Do

If for some reason your communications software is having a hard time hanging up, there is a more gracious way of severing the connection than pulling the phone cord out of the jack. Wait until no characters have been transmitted for a full second, then type + + + to tell the modem to "go local" (accept local commands). Wait one second, then enter ATH0, which tells your modem to put the phone receiver back into the cradle.

Avoid Data Damage From Call-Waiting Beeps

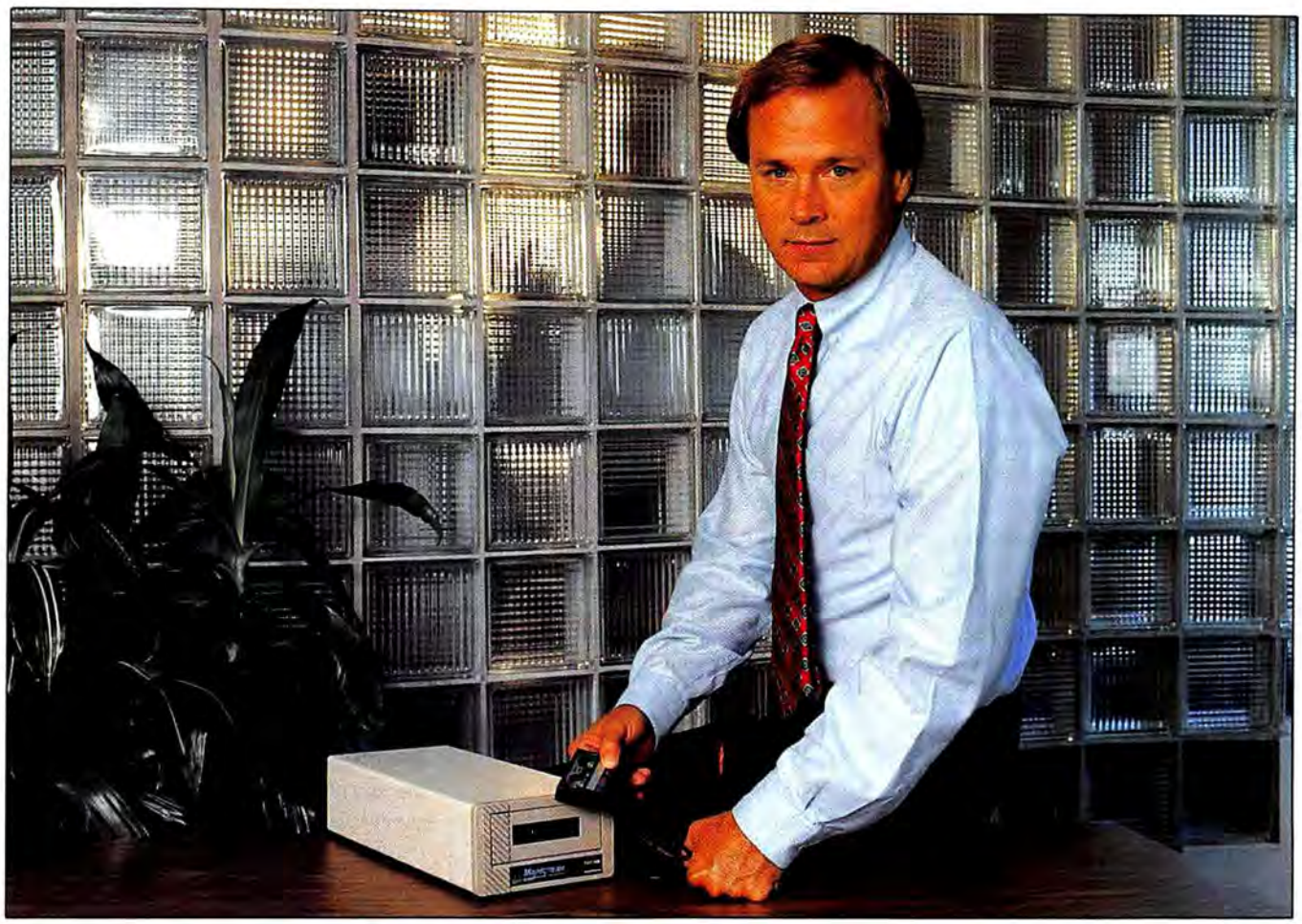
If you think call-waiting beeps disrupt the flow of human conversation, imagine the havoc they wreak when they interrupt the flow of data on a modem call. To fight back, try increasing the value of your modem's S10 register. S10 sets the amount of time the modem will wait between the loss of the carrier and hanging up. Waiting time is measured in tenths of a second; the default value is 14, or 1.4 seconds. If you increase it to a value longer than the call-waiting beep (45, say), your modem will wait out the beep without disconnecting. You can either type S10=45 <Enter> from the terminal mode or add S10=45 to your initialization or dialing string.

Getting Back to Square One

Did you mess up? Just turn the modem off and then on again to return it to its default settings. If you can't do that (because you have an internal modem, for instance), enter ATZ to restore the modem's defaults. —*Judy Getts*

Judy Getts is a contributing editor for PC World. ●

"THEY USED TO SAY I WAS CRAZY."



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USER GROUP TIPS

Helpful hints from members of the nation's user groups

Trick 1-2-3 Into Printing Page Numbers

Say you want to insert a *1-2-3* worksheet partway through a report, starting on page 13, for example. You can trick *1-2-3* into starting at the right number. Begin by using */Print Printer Options Footer* and entering # to get *1-2-3* to print page numbers on each page. Then use *Align* to reset the page counter, take your printer off line, and select *Page* as many times as necessary to move the page counter ahead to the proper starting page number. Finally, choose *Go* to print out the worksheet.

If you got an error message when you selected Page, try this instead: Press **<Esc>** to get rid of the error message, select */Print Printer Options Footer*, and enter **1#**. Then select *Page* twice, making sure your printer is on line. The printer will eject two blank pages with page numbers 11 and 12. Choose *Go* and your worksheet will print out starting on page 13. You may also need to select Page to feed the last page and get *1-2-3* to put a page number on it.

Betty Brooks
1-2-3/Symphony SIG Coordinator
Houston Area League of PC Users

TYPE DOS Files Using Wild Cards

Many DOS commands work with wild cards, but the TYPE command isn't one of them. Since wild cards do work with the COPY command, it's possible to get around the TYPE deficiency. To demonstrate, display the contents of all files that begin with the letter A, by using the command **COPY A*.* CON** at the DOS prompt. This scrolls each file in turn on the monitor. Press **<Ctrl>-S** or **<Pause>** to freeze scrolling so you can take a good look at the contents of an individual file; press **<Ctrl>-S** or **<Enter>** to resume scrolling. If your system scrolls so fast that you can't pause at the point you want, and the DOS utility MORE.COM is in a PATH directory, try the command **COPY A*.* CON`MORE**. To stop the scrolling, press **<Ctrl>-C** or **<Ctrl>-<Break>**.

Hy Bender
Contributing Newsletter Editor
New York PC User Group

Printing Envelopes With the LaserJet II and Microsoft Word 4.0

One of the easiest ways to print envelopes in *Microsoft Word* is to create a reusable envelope template file. Begin with a clear screen in *Word*, then select a landscape printer driver such as HPLASLAN using **<Esc>** *Print Options* **<F1>**. (You may need to copy the HPLASLAN printer driver from your *Word* Printer 1 disk first.) Press **<Esc>** to leave the Print menu. Next, use the **<Esc>** *Format Division Margins* command and set the top margin to **2.25**, the left margin to **1.5**, and the right margin to **0** for #10-size (4⅛-by-9¼-inch) envelopes. For #6-size (4¾-by-6½-inch) envelopes, use a top margin of 2.5 and a left margin of 4.5. Press **<Enter>** when finished.

Now type in your return address on the first three or four lines of the empty *Word* file. Press **<Enter>** eight times and type in the mailing address. Highlight only the mailing address; then press **<Alt>-N** seven times to move it to the right. (Use only four <Alt>-Ns for #6-size envelopes. If the recipient's address wraps, put a larger value in the width field of the Format Division Margins menu.)

Finally, insert the envelope face up, stamp end first, into the manual-feed guides atop the paper tray, and use the *Print Printer* command. When the envelope is printed, delete the mailing address from your *Word* envelope template file and then save the file for reuse. Remember to switch to a regular printer driver before printing out your next document.

Christine Rivera
New York PC User Group

Are you a user group member with a productivity tip to share? See How to Contact PC World, page 4. ●

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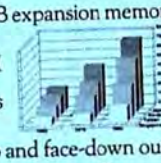

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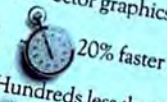

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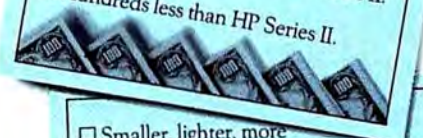

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CONSUMER WATCH

Advice and information for the computer consumer

From the Consumer Watch mailbox and from savvy shoppers in the field, here's a potpourri of tips for buying software and hardware.

Anita Amirrezvani

Micro Shopping Tips

Can you trust your computer dealer to give you good advice? When does a $1599 printer really cost $1720? How can you find out about bugs *before* you buy a new product? Read on for a mixed helping of shopping tips and cautionary tales.

Advice With a Grain of Salt

If you think your computer dealer is recommending a product because it's perfect for your needs, you may be dead wrong. Salespeople get *spiffs*—also known as *push money*—for selling certain products. These bonuses are offered directly from the vendor. For example, $25 was paid for every sale of *Quattro* when it was first released; $40 was offered for every sale of *Q&A Write*. Considering that the packages retail for $249 and $199, respectively, those are hefty commissions.

Spiffs aren't unique to the computer industry, but still, how far can you trust a salesperson's advice if there's a hidden payoff? Says one salesperson who asked to remain anonymous, "I benefit from spiffs, but I think they're crooked. It's no problem if I'm being offered a spiff on an excellent package like *pfs: First Choice*—I don't have any qualms about recommending it. But what about when the spiff is offered on something that's no good? It's a real dilemma because spiffs are a big part of my income."

ANTHONY RUSSO

Finding out when a spiff is behind a recommendation is difficult, but gutsy consumers who feel they're being pushed into a sale may want to pop the question.

The Missing Piece of the Puzzle

Whenever you buy a product, especially by mail, make sure it comes complete with all necessary accessories. Steven Levenson, director of marketing for Hertz Computer in New York, notes in particular that many of the too-good-to-be-true prices for the LaserJet Series II are just that. "I've seen ads for LaserJets in the $1600 range, but when you call, you find out that the price doesn't include the cable," says Levenson.

A spot-check of mail-order companies that advertise in the *New York Times* confirms Levenson's charge. Recently Olden Computer in Manhattan advertised a Series II for $1649; but the price was footnoted "with purchase of cable only." When *Consumer Watch* called, an Olden salesperson said that $1649 included the printer and the cable—but not the paper tray or toner cartridge. The complete package actually cost $1749. Similarly, Harmony Computer in Brooklyn advertised the Series II at $1599; but the full price with toner cartridge and cable was $1720.

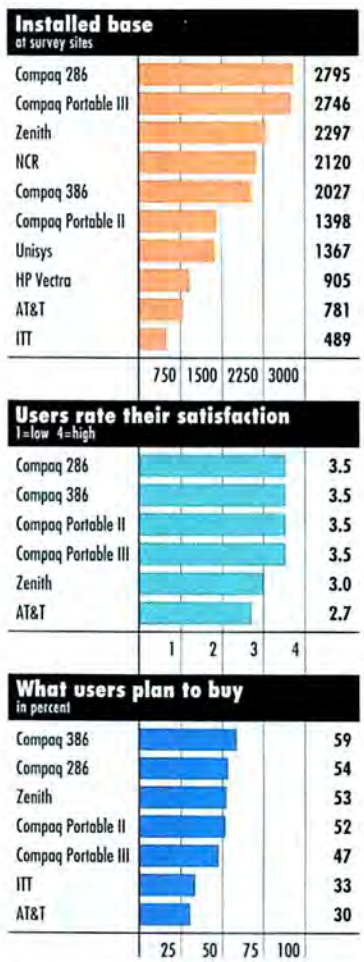
(continues)

RATE YOUR SATISFACTION: PC Compatibles

Compaq is king of the heap. This survey of 191 large organizations shows Compaq's installed base is larger than the other clone manufacturers' combined—Zenith, NCR, Unisys, Hewlett-Packard, AT&T, and ITT.

The Portable III is almost as popular as the best-selling Compaq 286, probably because the Portable III comfortably performs the added role of desktop machine. The Compaq 386, which also made a strong showing, tops the plan-to-buy list.

In user satisfaction Compaq also leads the ratings, scoring a higher average than IBM did in last month's survey. Ironically, although survey sites are more satisfied with Compaq than IBM, a larger percentage still plan to buy PS/2s.



Source: International Data Corporation. From a survey conducted in June 1988 of 191 sites, each with at least 50 PCs.

Battery Blues

If you have to reset the date and time every time you turn on your AT, your battery is probably near its last gasp. The purpose of the battery is to power your computer's CMOS, which saves setup information including date and time even when the computer is turned off. But after three to five years, the battery's power is likely to wane.

With many ATs, replacing the battery is a simple affair. But watch out for some inconsiderately designed machines like Epson's Equity II Plus and Equity III Plus. Both computers' batteries are attached to the motherboard with tie-down wires. According to an Epson spokesperson, changing the battery "is complicated for the average user, so Epson recommends you take the machine to a dealer." Of course, a battery isn't likely to fail within the warranty period, so Epson users are stuck with the hassle of dragging the machine in to the dealer and paying dealer's fees. By contrast, IBM PS/2 batteries pop right out of their slots, which makes them easier to change.

Power Supply Primer

Beware: Cheap, poorly made power supplies can fry your system. According to Doug Dodson, president of PC Power and Cooling in Bonsall, California, many power supplies lack overvoltage and overload protection. "With overload protection, if any component in the computer is drawing excessive current, the power supply will shut itself down rather than cause damage," says Dodson, whose company makes UL-approved power supplies. Dodson warns that if the power supply doesn't have built-in protection, it can blow or give out faulty voltages that burn up computer chips.

Another key consideration is whether the power supply is UL approved. "Supposedly, a power supply rated at 150 watts can handle 150 watts of voltage continuously," says Dodson. "The best evidence is a UL stamp of approval because UL tests the power supply at its maximum rating for about one hour."

To be on the safe side, according to Dodson, prospective buyers should ask these questions: Does the power supply have overvoltage and overload protection? Does it meet UL specifications? Does it have sufficient cooling for your particular system, especially if your machine's loaded with drives and cards? Does the vendor test it? And finally, does it come with a one-year warranty in case of problems?

A Matter of Expansion

The PC's open architecture makes it easy to soup up your system by adding memory or turbo boards. Note, however, that the number of expansion slots in a computer is not the important question—it's the number of *free* slots that counts.

Reader Robert King recently wrote to *PC World* about a Five-star Computers ad for a 286 system with 12 expansion slots. Writes King, "The FS286 has no electronics on the motherboard. RAM and the CPU are on two separate boards that plug into expansion slots, which means that you have only 10 expansion slots and that the ad is fraudulent."

(continues)

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134347. Huey Lewis: Small World. Latest good time rockers include Perfect World, more. (Chrysalis)

115356. Vivaldi, The 4 Seasons—Trevor Pinnock. (Archiv *DIGITAL*)

180187. Bruce Hornsby & The Range: Scenes From The Southside. The Valley Road, more. (RCA)

100008. Randy Travis: Old 8x10. Honky Tonk Moon, Deeper Than The Holler, more. (Warner-Bros.)

125179. Tchaikovsky, 1812 Overture; Nutcracker Suite; more—Solti. (London *DIGITAL*)

163629. Whitesnake. Still Of The Night, Give Me All Your Love, more. (Geffen)

100517

200596. U2: Rattle & Hum. Live set includes I Still Haven't Found What I'm Looking For, Desire, more. (Island)

182522. Dirty Dancing/ Original Soundtrack. (I've Had) The Time Of My Life, more. (RCA)

200478. Metallica: And Justice For All. One, Blackened, title song, more. (Elektra)

100603. Kenny G: Silhouette. We've Saved The Best For Last, more. (Arista)

154404. Chicago 19. Don't Wanna Live Without Your Love, Heart In Pieces, etc. (Reprise)

115457. Itzhak Perlman: French Violin Showpieces: Carmen-Fantasy, Havanaise, more. (DG *DIGITAL*)

144578. The Judds: Greatest Hits. Give A Little Love, Mama He's Crazy, etc. RCA

223559. Beach Boys: Endless Summer. 20 Greatest Hits.

115306. Handel, Water Music—Trevor Pinnock. (Archiv *DIGITAL*)

100601. Squeeze: Classics. Take Me I'm Yours, Striking Matches, Tough Love, more. (A&M)

104898. Cream: Disraeli Gears. Sunshine Of Your Love, more. (Polydor)

173233. James Galway: Greatest Hits. (RCA)

154633. Steve Winwood: Roll With It. Don't You Know What The Night Can Do?, Holding On, etc. (Virgin)

100470. Vangelis: Direct. (Arista)

153582. Tracy Chapman: Fast Car, Talkin' Bout A Revolution, Baby Can I Hold You, etc. (Elektra)

115436

152854. Whitney Houston: Whitney. Didn't We Almost Have It All, etc. (Arista)

150913. Van Halen: OU812. (Warner Bros.)

134073. Richard Marx—Hold On To The Nights, Endless Summer Nights, Should've Known Better, etc. (EMI)

163579. Segovia Plays Ponce, Rodrigo & Torroba (MCA)

100579. K.T. Oslin: This Woman. Money, title song, Hey Bobby, etc. (RCA)

100035. Robert Palmer: Heavy Nova. Simply Irresistible, etc. (EMI-Manhattan)

120768. 20 Greatest Love Songs Of The 50s & 60s. (Laurie)

123721. Jimmy Page: Outrider. (Geffen)

134321. Led Zeppelin. Houses Of The Holy—The Song Remains The Same, more. (Atlantic)

105392. Pops In Space—Boston Pops/Williams: Star Wars, Superman, more. (Philips *DIGITAL*)

173406. Jazz CD Sampler. 15 performances from Louis Armstrong, others! (PolyGram)

123790. James Taylor's Greatest Hits. Fire And Rain, Sweet Baby James, more. (Warner Bros.)

154537. Carly Simon: Greatest Hits Live Anticipation, You're So Vain, more. (Arista)

115541. Bach, Brandenburg Concertos 1-3—Pinnock. (Archiv *DIGITAL*)

172190. Elvis Presley: 18 No. 1 Hits (RCA)

134267. Mozart, Overtures. Marriner. (Angel *DIGITAL*)

100591. Steve Miller: Born To Be Blue. Ya, Ya, more. (Capitol)

273965. Sting: Nothing Like The Sun. We'll Be Together, more. (A&M)

134647. J. R. Baker: Rhapsody In Electric Blue. Gershwin on synthesizer! (Newport Classic *DIGITAL*)

244006. Simon & Garfunkel: The Concert In Central Park. [1 disc] (Warner Bros.)

124705. Jethro Tull: Aqualung. (Chrysalis)

134408. David Sanborn: Close-Up. Slam, You Are Everything, Way, etc. (Warner Bros.)

153606. INXS: Kick. Need You Tonight, New Sensation, etc. DIGITAL (Atlantic)

153621. Beethoven, Symphony No. 7; more. Royal Phil. Previn. (RCA *DIGITAL*)

164165. Bobby McFerrin: Simple Pleasures. Don't Worry Be Happy, All I Want, etc. (EMI)

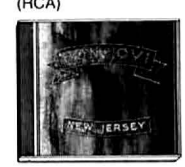
125264. Horowitz in Moscow—Scarlatti, Mozart, Rachmaninov, others. (DG *DIGITAL*)

144313. Classic Rock: Vol. 1. Elton John: Bennie & The Jets, more. (MCA)

170348. Guns 'N' Roses: Appetite For Destruction. Welcome To The Jungle, It's So Easy, etc. (Geffen)

163322. Elton John: Greatest Hits, Vol. 1. Your Song, Daniel, others. (MCA)

160027. Alabama: "Live". Love In The First Degree, There's No Way, Dixieland Delight, etc. (RCA)



100516

130230. Crosby, Stills, Nash & Young: So Far (Greatest Hits). Suite: Judy Blue Eyes, more. (Atlantic)

124546. The Moody Blues: Sur La Mer. I Know You're Out There Somewhere, No Lies, etc. (Threshold)

143293. Glenn Miller Orchestra: In The Digital Mood. (GRP)

114780. Cinderella: Long Cold Winter. Gypsy Road, Don't Know What You Got (Till It's Gone), etc. (Mercury)

154358. Slatkin Conducts Pictures At An Exhibition, more—(RCA *DIGITAL*)

144659. The Best Of The Spencer Davis Group. Steve Winwood & Co. on Gimme Some Lovin, etc. (EMI)

100352. Diane Schuur: Talkin' 'Bout You. Title song, Funny (But I Still Love You), etc. (GRP)

104857. Benny Goodman: Sing, Sing, Sing. Title song, more. (RCA)

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In response, Fivestar executive vice president Tom Dodson says, "Our specifications do not state '12 unused slots,' which would not be true. This is a common way to describe a computer's specifications—similar to saying a computer has 640K of memory, even though that amount is not really available because part of it is used by the operating system."

Vendors would do their customers a service by honestly advertising how many expansion slots are free. In the meantime, consumers should note the distinction between the number of slots and the number of *available* slots.

Bulletin Board Snooping

Many seasoned users stay away from the first release of a software package or a new computer model in anticipation of potential problems. But what if you don't want to wait to find out if a product's any good? One solution is to tap into user bulletin boards soon after a product's release. Users pour out their problems there; techs respond with solutions or admit there aren't any.

CompuServe has a large number of forums, including Adobe, Aldus, Ashton-Tate, Autodesk, Borland, Crosstalk, Digital Research, Javelin, Lotus, MicroPro, Microsoft, Monogram, Novell, Software Publishing, and WordPerfect. The Source has Ashton-Tate, ButtonWare, Datastorm, EZMenu, Nantucket, Norton Computing, WordPerfect, and Samna. GEnie, General Electric's on-line service, provides forums for Borland, Datastorm, Enable, Generic Software, Letraset, Microsoft, Nochange, Odesta, Softlogic, and Symmetry.

If you don't want to pay subscription charges for an on-line service, check into The Sound of Music bulletin board, which offers free access (excluding, of course, the cost of the phone call) to forums from 3Com, Alloy, Epson, Forbin Project (which makes *QModem*), Hayes, PKware, Quarterdeck, and WordPerfect. Two free public lines are available; simply dial 516/536-8723 with your modem to register. Or you can purchase a $50 subscription for access to private lines, faster service, and other benefits.

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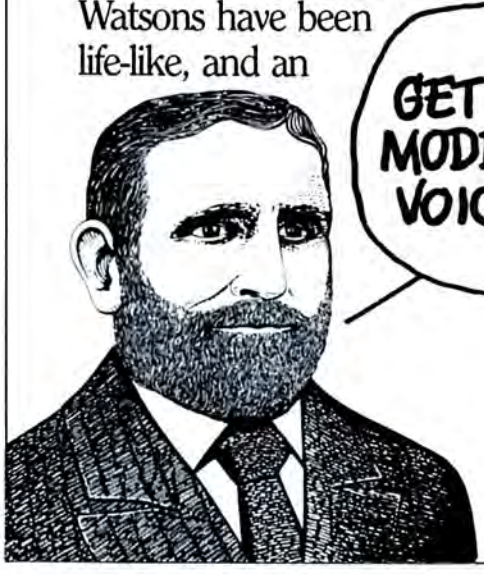

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SHOP TALK

Here Today, Gone Tomorrow

Last August *PC World* reviewed an AT compatible called the 286 Turbo Plus from TBS International in Ashland, Massachusetts (see "Business-Class ATs"). Readers who tried to purchase the system or follow up on their orders discovered that the company's phone wasn't being answered. At press time, *Consumer Watch* learned from TBS attorney Stanley Brooks in Boston that "TBS is in the process of preparing a petition to file for bankruptcy." *Consumer Watch* will report on further details once they become available.

Consumers who purchased a TBS system using a credit card but didn't receive the merchandise should write to their credit card issuer immediately and explain that the charges are in dispute due to nondelivery.

No Room to Grow

I bought a Compaq Portable 386 Model 40 a few months ago, but now I'm running out of hard disk space. To upgrade to 100MB, Compaq sales reps insist that I pay $3299 for a hard disk upgrade kit. This is unacceptable. The mail-order street price for the 40MB Compaq Portable is about $5700; the 100MB costs about $7200. So why is Compaq charging $3299 for the upgrade?

John Buginas
El Cerrito, California

Compaq responds: Compaq gets very few hard disk upgrade requests, and since we have no way of disposing of used disk drives, no exchange program is offered. The suggested retail price of a 100MB upgrade for the Portable 386 is $3299. The retail price of a Portable with a 40MB drive is $6999; for a 100MB it's $9999. Thus the cost of the upgrade is in line with our retail prices.

Bob Beach
Manager, Media Relations

Editor's note: Many portables are built with little leeway for expansion, so potential buyers should examine their options before taking the plunge. Meanwhile, Mr. Buginas says he's making do with Arc *and* FastBack*—an investment of $100 rather than $3299.*

(continues)

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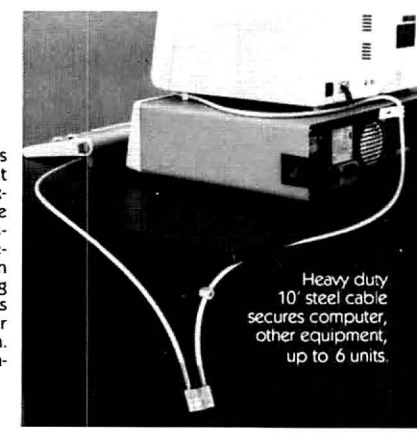

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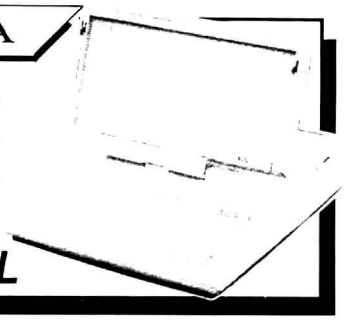

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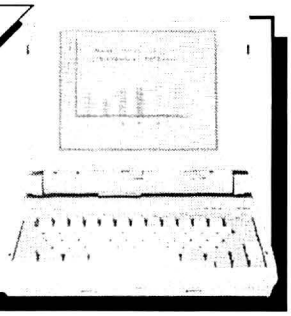

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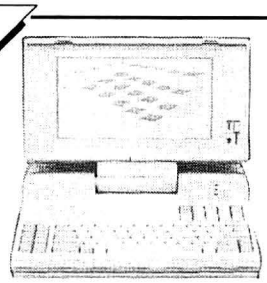

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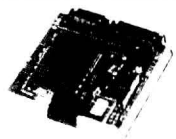

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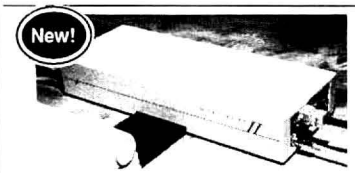

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Data Reading Error

Back in March 1988 I ordered two Key Tronic keyboards from Advanced Computer Products in Santa Ana, California, paying $357.31. Eight days later I received the shipment and quickly discovered *factory reconditioned* decals on the underside of each.

I was irate about having purchased refurbished items, but to make matters worse, neither keyboard worked. Less than 12 hours after I received the keyboards, I called ACP for a return merchandise authorization (RMA) number and sent them back.

Later, when I called ACP to confirm that they had received the shipment, they said they had no record of it. UPS was notified, and after putting a tracer on the shipment they confirmed that ACP had received it six days after I sent it.

After six months I still haven't received my refund from ACP, despite letters to the Better Business Bureau.

Arthur E. Regina
West Islip, New York

Advanced Computer Products responds: Somehow another customer of ours used Mr. Regina's RMA number. We processed that return according to the other customer's request and closed the transaction. It was not until we received a letter from the Better Business Bureau that we were made aware of the error. Mr. Regina will receive a refund check.

Michael Margolies
ACP Customer Service

Editor's note: In a phone interview, Mr. Margolies said that ACP's products come from auctions and closeouts as well as from manufacturers. "Sometimes a source will send us products they claim are new when in fact they aren't. We try to intercept these products and usually sell them at swap meets. All products advertised as new are actually new, otherwise we advertise them as reconditioned."

International Conundrum

Although I live in France, I buy all my software in the United States because most software here is copy protected and retail prices are two to four times higher.

This method works fine until I need an upgrade. Having bought

(continues)

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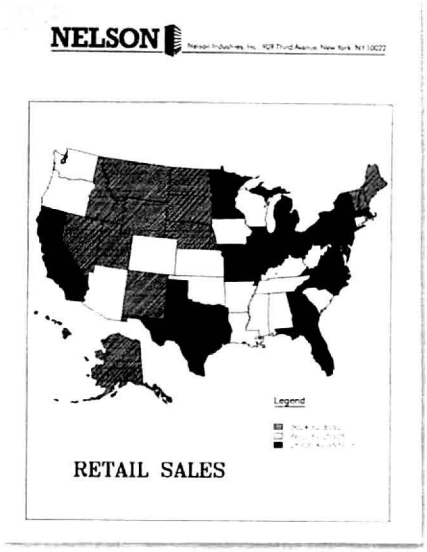

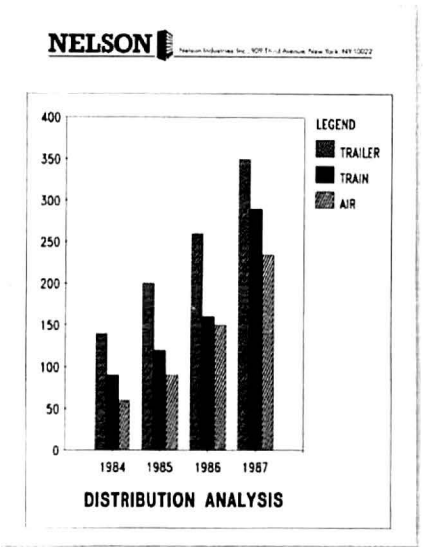

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QuickBASIC 3.0, for example, I called Microsoft in the United States to learn how I could obtain version 4.0. A spokesperson informed me that Microsoft could not supply me directly due to an agreement with its French subsidiary. When I contacted Microsoft here in France, I learned what I already knew—it would only supply a copy-protected version of QuickBASIC 4.0 at a price considerably above the U.S. retail price. Now I'm in the absurd position of being asked to pay more for the upgrade than for the original product.

David Jenkins
Paris, France

Editor's note: In a phone interview, a Microsoft spokesperson said that none of the language programs are copy protected. But the upgrade price is a little higher: In the United States, version 3.0 users pay $25 to upgrade; owners of prior versions pay $35. In France, the upgrade cost from the U.S. version 4.0 to the French version is about $45, or $55 from any prior version in any language. According to Microsoft, "when you cross the border all the rules change. Some people like to believe that prices will be the same everywhere, but it's like comparing apples to oranges."

Disk Drive Defects

After having a hard disk repaired by Peripheral Repair in Chatsworth, California, I found that it worked for only a half-hour before failing. I wanted a refund, but PRC declined, asking me instead to send the disk drive back for testing. They also asked for the disk controller board, saying that if the drive failed in my machine again, they would refund my money. But if nothing was wrong, they said they would charge me $50 plus freight.

Because I needed the controller to work another drive, I decided not to send it. Then PRC contacted me about the drive, saying that it had "tested out OK" and that they were returning it COD for $53. I was furious and refused to pay. I think my disk drive should be returned to me with a full refund.

Seth Ritter
Tempe, Arizona

Peripheral Repair Corporation responds: PRC refunds money when a customer requests it, but first we must have a chance to correct the problem. Because Mr. Ritter's description of the error sounded like a controller problem, we asked him to send the controller in with his hard drive. We pointed out that we would charge a $50 evaluation fee if there was nothing wrong with the drive, or fix it for free if there was.

We charge the evaluation fee because over 72 percent of drives returned to us for warranty repair have no problems. Cables can be bad, power supplies marginal, or jumper settings wrong. We offer a free technical support line to help users diagnose some of those problems. But if we test a drive only to discover it meets the manufacturer's specifications, we charge a labor fee to recoup our costs.

Patric E. Hayes
President

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

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By William J. Spink

For years now you've been hearing about the wonderful things personal computers will do for The Executive of the 80's—at least in theory.

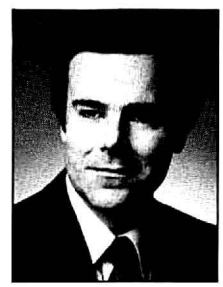
But what's the *reality*? Can a PC help you enjoy your work more and show a greater profit, here and now? According to your peers, the answer is "yes."

"With just a few keystrokes," says Al Lynch, Director of Corporate Planning and Research for JCPenney Company, "I can screen companies, find possible acquisitions or 'scope-out' competitors. It's a real competitive edge."

Walt Casey, V.P. of Communications at ConAgra says, "I spend a lot of time each day poking into this and tracking that. It's *much* easier when you can immediately get the facts from a computer, rather than having to make a series of phone calls."

"One of Dow Jones News/Retrieval's services, QuickSearch, is a Godsend," adds Jim Posner, a respected retail consultant. "It gives me detailed corporate reports within minutes—I don't even have to leave the office."

Al Lynch
Director of Planning and Research, JCPenney Co.



Walt Casey
Vice President, Corp. Communications, ConAgra, Inc.

James Posner
President, James Posner Assoc. Ltd.

Instant information: the executive advantage.

To lead in today's marketplace, you need information like *that*," Lynch says, snapping his fingers.

He recalls an example of how Dow Jones News/Retrieval®—the business and financial information service from Dow Jones & Company, Inc.—gave JCPenney Company a real advantage.

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"Then we started getting the corporate insider trading data," Lynch continues. "It showed us some things that influenced a major deal.

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Surprisingly easy.

All you need to access the service is a PC and modem. Using the service is "No problem," according to Posner.

"There's no difficulty using the service. I ask for pointed, specific information and get exactly what I need. It's much easier than manual research."

Walt Casey agrees. "Dow Jones News/Retrieval is simple enough for anyone who's at all comfortable with computers to use it effectively from their very first day online."

Making the right decision.

There are hundreds of online information services, many offering business data. How can you pick the best *one*?

"It was apparent from the first step that the most useful system was Dow Jones News/Retrieval," remembers Casey. "It offers so much of the information you're looking for—from general news and stock quotes, to data on our company and industry. It was the best single source."

"I've had other services, but Dow Jones News/Retrieval has the most useful business information in the right form," says Posner. "The time I spend 'playing' on the computer makes more money for me—and for my clients."

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–HARDWARE–

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Landscape legal worksheets, discover another DOS 3.0 enhancement, print six-part forms, match classroom computers to career concerns, identify an external PC floppy drive cable, and learn why PCs and XTs rarely have a high-density A: drive

Karl Koessel

ANTHONY RUSSO

LaserJet's Legal Landscape

Q. *My department recently acquired a Hewlett-Packard LaserJet Series II laser printer. Pressing the Print Fonts button generates a list of the fonts available, both internally and from the left and right cartridges. The printer's internal, monospaced, landscape, line-printer font I27 looks like a good choice for* 1-2-3 *worksheets; its small pitch and point size would allow a lot of data on each page.*

To print worksheets on our old wide-carriage dot matrix workhorse, I simply set the margins to the far left and right, selected the range, and entered \015 as the printer's Setup String. Can you tell me how to print worksheets on legal-size paper, in landscape orientation, on the Series II?

Pat O'Connor
San Francisco, California

A. First, insert the legal-paper tray and take the Series II off line. Then hold down the Reset Menu button until the LCD panel indicates that the menu has been reset. In landscape mode, the Series II will print up to 226 columns of font I27's 16.66-pitch type, so load *1-2-3* and set the left margin to 0 and the right margin to 226 (\Print Printer Options Margins Left 0<Enter> Margins Right 226<Enter>).

If you're using headers, footers, or top or bottom margins, issue Other Formatted Pg-Length and enter the appropriate number of lines: 60 for 8 lines per inch (lpi), 72 for 9.6 lpi, or 90 for 12. Otherwise, to suppress headers, footers, and top and bottom margins so those lines get used for data, select Other Unformatted Pg-Length 78<Enter>. Use 78 for unformatted worksheets regardless of the number of lines that will actually be printed.

After setting the page length, select Setup and enter the string shown in **FIGURE 1**. To start printing, choose Quit Range, set the print range, and then select Align Go.

In the Setup String, \027E resets the printer, and \027&l1h specifies tray-fed paper. 84p indicates legal-size paper, 1o sets landscape mode, and 4C means 12 lpi, or 90 lines per page. The numeral 4 in 4C indicates the number of 1/48-inch increments per line: use 5C for 9.6 lpi (72 lines) and 6C for 8 lpi (60 lines). \027(10U selects the line printer font I27; you can replace the 10U with other fonts listed in the fifth column, Symbol Set, of your printout of available fonts. And \027&k2S sets the pitch to 16.66.

Now that your office has a LaserJet, pick up a copy of *LaserJet Unlimited, Edition II*, by Ted Nace and Michael Gardner (Peachpit Press, Berkeley, California, 1988). It's packed with in-

(continues)

```
\027E\027&l1h84p1o4C\027(10U\027&k2S
```

FIGURE 1: This 1-2-3 Setup String resets the LaserJet Series II and then selects tray-fed, legal-size, landscape, 12-lines-per-inch, 127-font, 16.66-pitch printing.

structions for using your new printer with word processing, graphics, desktop publishing, spreadsheet, and data base management programs. It also discusses the use of forms and downloadable fonts, as well as various enhancements and upgrades.

Path Prefix

Q. *I use two different CONFIG.SYS files and appreciated the tip on how to switch between them ["Irreconcilable Drivers," The Help Screen, PCW, December 1988]. It's far better than what I had been doing: placing a bootable disk containing my alternate system configuration file in drive A: and pressing <Ctrl>-<Alt>-<Del> to reboot.*

However, I couldn't get the procedure to work exactly the way you presented it. Although I had no problem creating WARMBOOT.COM, my system would not execute the last batch command, C:\UTILITY\WARMBOOT. I got the batch file to work by replacing that single command with the two commands CD C:\UTILITY and C:WARMBOOT. Did you make a mistake, or did I misunderstand something?

Jonathan W. Siver
Dunwoody, Georgia

A. You can consider the mistake mine. I should have explained that people still using DOS versions earlier than 3.0 cannot execute external DOS commands stored in a particular directory without first logging on to that directory. To execute a command stored in drive B: while the system is logged on to drive A:, you must prefix the command with the appropriate drive designator. DOS 3.0 did away with that restriction, allowing you to execute an external DOS command from any directory by simply prefixing the command with the path designating its location.

Printing Six-Part Paper

Q. *I'm trying to find a fast dot matrix printer that can print, at the least, compressed, double-width, draft, and near letter quality fonts. And most important, it must be able to print through six-part, noncarbon, 14-inch-long, continuous-feed computer forms. Any suggestions?*

Claude Menard
Laval, Quebec, Canada

A. Most dot matrix printers don't pack the requisite punch, but last August Epson America introduced two new wide-carriage dot matrix printers that can handle six-part noncarbon forms no thicker than 0.018 of an inch and between 4 and 16 inches long. Both the top-of-the-line 24-pin LQ-2550 and the high-speed, high-volume 9-pin DFX-5000 feature automatic paper thickness adjustment. The more versatile LQ-2550 has buttons on its front panel that enable the user to set paper thickness manually.

There may be other printers capable of printing six-part forms and the fonts you want, but few can match the Epson printers in quality, features, and value. Epson printers also enjoy more application software support than do any other printers.

WHERE TO BUY

LQ-2550
Epson America
2780 Lomita Blvd.
Torrance, CA 90505
800/922-8911 for location of nearest Epson reseller
List price: $1499
Accessories: dual-bin cut-sheet feeder $449, pull tractor $69, black ribbon $15, color ribbon $28, black film ribbon cartridge $22, 32K parallel buffer $175, parallel or serial cable $29, LQ Printer Software for Microsoft Windows $19, Transplotter $99
Warranty: one year limited parts and labor
Extended warranty: $59.95 per year, renewable
Technical support: through reseller
Other support services: dot matrix printer application notes included
For more information, circle 670 on reader service card.

DFX-5000
Epson America
List price: $2199
Accessories: custom printer stand $169, pull tractor $119, black ribbon cartridge $39, ribbon replacement pack $24, 32K parallel buffer $175, parallel or serial cable $29, Transplotter $99
Extended warranty: $299.95 per year, renewable
For more information, circle 671 on reader service card.

Which Computers in the Classroom

Q. *My school is planning its first computer purchases. We want to teach a two-year course that covers typing, word processing, data base management, and spreadsheet classes. The curriculum should enable students to go directly into the workplace.*

What machine configuration would be appropriate? Would an 80286-based machine be better than an 8088-based PC? Do we need a hard disk? If so, what kind is best, and how big should it be?

I'd also like to know what software is used most frequently in the workplace so we can train our students with the programs they will most likely encounter on the job.

James S. DiGaetano, Jr.
Las Vegas, Nevada

A. Without knowing how many PCs you intend to purchase or how big your budget is, I can offer only general guidelines. Learning to use a computer takes about as much training as learning to drive a car; it should take three to six months, not two years. An 8088-based machine should fill the bill, although 80286-based systems are faster and more common in the business environment. Today's office applications demand a hard disk. For a student, 20MB is probably sufficient storage, but a 30MB or 40MB hard disk is worth the extra $100 to $200 investment in the long run. Each machine will also need a 5¼-inch 1.2MB floppy drive.

Software is a running target: The programs you buy today will not be the programs in use tomorrow. What students need to learn are the fundamentals of using software, not the commands of a particular program. In that light, your best buy is probably *Microsoft Works*. It includes a word processor, a spreadsheet, a data base, and a communications program, but its greatest benefit for your students is its similarity, in interface and function, to tomorrow's full-powered business applications.

PC's External Floppy Drive Cable

Q. *Could you elaborate on reader James Beckett's advice about installing a third disk drive via the external connector on the back of my IBM PC's floppy disk controller (FDC) ["Third Floppy for PC and XT," The Help Screen, PCW, August 1988]?*

How do I identify the proper cable? Who sells it?

My PC has a 20MB hard disk (drive C:). I expect to mount a 3½-inch floppy drive externally. What is the drive designator of a third floppy? This upgrade is just what I'm looking for; please pass on my thanks to Mr. Beckett.

Bob Watson
Asheboro, North Carolina

A. One end of the cable will obviously have a 37-pin male D-shell connector to match the connector on the back of the FDC. The other end will have to match the external floppy drive's connector; generally, basic 3½-inch drives have a pin connector, while those in 5¼-inch mounting racks have an edge connector.

Micro Solutions is one source for an external floppy cable, a 3½-inch drive with 5¼-inch mounting racks, and a single- or double-drive 5¼-inch drive case with power supply. These days the difference in price between a 720K drive and a 1.44MB drive (which can also read and write the 720K format) is so small that many vendors, including Micro Solutions, no longer sell 720K 3½-inch drives. However, the PC's and the XT's FDCs don't support the 1.44MB format, so your external 1.44MB drive(s) will only function as a 720K device. If you decide later that you want that drive's 1.44MB capability, just order and install Micro Solutions' CompatiCard I, a replacement FDC that supports your existing A: and B: drives and the 1.2MB, 1.44MB, 720K, and 360K formats for your PC's or XT's third and fourth floppy disk drives.

For readers who have an expansion slot free, Micro Solutions offers the CompatiCard II, which is identical to CompatiCard I, except that it lacks support for drives A: and B: and costs less. Readers who want a third floppy drive and won't want a fourth should consider Micro Solutions' Megamate, a "one stop" solution consisting of a CompatiCard II, an external Teac 1.44MB 3½-inch floppy drive in a 3½-inch case, and a cable that both connects a single drive to the controller and provides power from the PC.

In any case, to complete the installation of a third floppy

(continues)

drive, you change switches 7 and 8 in switch block 1 (the DIP switch block closest to the expansion slots) from off and on, respectively, to on and off. The new settings tell the system there are three floppy disk drives installed. Your hard disk, therefore, will be designated drive D:.

WHERE TO BUY

External Drive Cable
Micro Solutions Computer Products
132 W. Lincoln Hwy.
DeKalb, IL 60115
815/756-3411
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Extended warranty: none
Technical support: unlimited phone or mail, no toll-free number, M–F 9–6
Other support services: none
For more information, circle 672 on reader service card.

1.44MB Drive A: for a PC

Q. *I've upgraded my Compaq Portable with Plus Development's HardCard 40; Quadram's Quad 386/XT accelerator board, which includes its own BIOS chips; and Microsync's dClock II, a no-slot clock/calendar. Now I want to replace the A: drive with a high-density floppy drive (1.2MB or 1.44MB) so I can run OS/2 and* Windows/386.

*In "3½-Inch Drive in a Compaq Portable" [*The Help Screen, PCW, *August 1988], you explain how to install a 720K 3½-inch drive in a Compaq Portable, while "Treble Storage, Part II" [*The Upgrade Path, PCW, *September 1988] contains a detailed description of the features and installation of Micro Solutions' CompatiCard floppy disk controller (FDC) [see previous letter]. With the CompatiCard, can I install a 1.44MB 3½-inch floppy drive as drive A: in my Compaq Portable?*

Microsoft's Mach 20 and SOTA Technologies' Mothercard 5.0 and SOTA 286i accelerator boards can support high-density drives via their optional FDCs. I'm hoping the CompatiCard can do the same for the Quad 386/XT.

By the way, why does it seem that most articles about replacing 360K drives with 720K, 1.2MB, or 1.44MB drives describe swapping the B: drive?

Martin G. Ramirez
Santa Cruz, California

A. The reason drive replacement articles explain swapping the B: drive is that neither the PC's BIOS nor its FDC supports high-density A: or B: drives. (The swapped-in B: drive you read about becomes drive C: or higher.) High-density drives require support routines in the BIOS or in a device driver, and a capable controller; without them, a PC cannot boot from a high-density drive. The Mach 20 and the Mothercard 5.0 have high-density drive routines in their optional FDCs' ROMs, so they can handle high-density A: and B: drives (the SOTA boards support OS/2). The Quad 386/XT does not have such routines; its floppy disk BIOS support is as limited as the PC's. Since the CompatiCard's circuitry that controls drives A: and B: mimics that of the PC's FDC, it couldn't support a high-density drive A: or B: even if the Quad 386/XT BIOS had the appropriate driver.

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

POWER TIP NO. 29

Money-Saving Protocols

If you transfer large files with a high-speed modem (9600 bps or faster), you can save time and money by using an asynchronous error-checking protocol such as ZMODEM, windowed XMODEM, or windowed Kermit. Synchronous protocols like XMODEM and YMODEM send a block of data and wait for the remote PC to check the block before sending another, leaving periods of idle time on the line between blocks. Asynchronous protocols transmit data in one continuous stream, enabling you to make cost-efficient use of all your phone line time.

Judy Getts
Wauwatosa, Wisconsin

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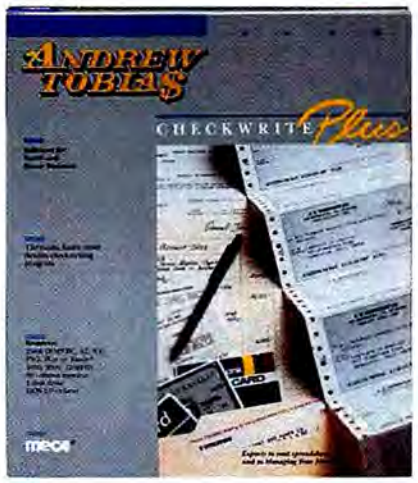

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STAR-DOT-STAR

.

A global exchange of personal computer discoveries

Make quick and dirty DOS macros, check printer status in dBASE programs, delete WordPerfect lines à la WordStar, mark WordStar lines, columnize dBASE reports, and get off to a quick start with two software tool kits.

Edited by Tom Swan

ANTHONY RUSSO

Quick and Dirty DOS Macros

Instead of repeatedly typing an oft-used DOS command, you can use my quick-and-dirty DOS macro maker [see **LISTING 1**] to assign a command and up to eight parameters to <Alt>-Z. Make sure the line DEVICE = ANSI-.SYS is in your boot directory's CONFIG.SYS file. Next, enter ALTZ.BAT using a text editor that reads and writes ASCII files. Store ALTZ.BAT in a directory listed in your AUTOEXEC.BAT file's PATH command. From the DOS prompt, you can now assign any string to <Alt>-Z simply by typing ALTZ followed by a space and the string to be assigned. For example, issuing ALTZ DIR *.* /W enables you to quickly get a directory of the current drive by pressing <Alt>-Z at the DOS prompt.

Bill Forseth
Duluth, Minnesota

Editor's note: I'm finding lots of uses for this two-line batch file. Before running Brief *(my editor), I can enter ALTZ EXIT. Pressing <Alt>-Z (*Brief*'s temporary-exit key) sends me to DOS; a second <Alt>-Z zips me back to editing. Another good one is ALTZ DEL *.BAK, which sets <Alt>-Z to erase backup files. To assign different <Alt>-*key *combinations, change the 44 in* **LISTING 1** *to 16 through 25 for <Alt>-*key *combinations with the letters Q, W, E, R, T, Y, U, I, O, and P, respectively; 30 through 38 for A, S, D, F, G, H, J, K, and L; or 45 through 50 for X, C, V, B, N, and M.*

Ready, Set, Print

When a *dBASE* program bombs because the printer isn't ready, the user's comments are predictable—and unprintable. Fortunately, a simple assembly language program makes it easy to check the printer's status.

Load DEBUG and create PRNTEST.BIN by entering the commands listed in **FIGURE 1**, pressing <Enter> at the end of each line. Using *dBASE*, a text editor, or a word processor, enter PRNTEST.PRG [shown in **LISTING 2**]. Store both files in the same directory. Start *dBASE*, and at

```
nprntest.bin        <Enter>
a                   <Enter>
mov ah,2            <Enter>
mov dx,[bx]         <Enter>
dec dx              <Enter>
int 17              <Enter>
mov [bx],ah         <Enter>
retf                <Enter>
                    <Enter>
rcx                 <Enter>
a                   <Enter>
w                   <Enter>
q                   <Enter>
```

FIGURE 1: These DEBUG commands create PRNTEST.BIN, which is used by the dBASE program shown in LISTING 2.

(continues)

```
prompt $e[0;44;"%1 %2 %3 %4 %5 %6 %7 %8 %9";13p
prompt $p$g
```

LISTING 1: ALTZ.BAT makes quick-and-dirty DOS macros.

```
* Printer check by Mike Parker
*
@ 23, 0 CLEAR
@ 23, 0 SAY "Make sure printer is on"
WAIT
SET CONSOLE OFF
answer = "Y"
DO WHILE answer = "Y"
  prnStat = chr(1) && 1=LPT1:, 2=LPT2:
  CALL prnTest WITH prnStat
  IF prnStat = chr(144)
    EXIT
  ELSE
    @ 23, 0 CLEAR
    @ 23, 0 SAY "Printer not ready. Try again? ";
      GET answer picture "!"
    READ
  ENDIF
ENDDO
answer = "N"
@ 23, 0 CLEAR
RETURN
```

LISTING 2: PRNTEST.PRG tests the PRNTEST.BIN routine (see FIGURE 1).

the dot prompt issue the command LOAD PRNTEST to load the assembly language program. Then enter DO PRNTEST to run the test program. Try the test with your printer on and with it off. The variable answer will equal *N* if you quit the test while the printer is not ready.

Mike Parker
Detroit, Michigan

Editor's note: The technique works well with Foxbase, *too. To select a printer connected to LPT2:, change chr(1) to chr(2).*

Same Ol' Delete-Line

WordPerfect has its pluses, but I missed *WordStar*'s ability to delete lines quickly with <Ctrl>-Y (*WordPerfect* requires a more complex block delete to do the same job). I solved the problem with a macro [see **FIGURE 2**] that emulates the *WordStar* <Ctrl>-Y command using <Alt>-Y—close enough for my purposes. I sure am glad to have that same old delete-line command back again.

Henry Owen
Minneapolis, Minnesota

Editor's note: Of course, WordPerfect 5.0 *users can create <Ctrl>-*key *macros, and even remap the keyboard to* WordStar *commands, if they're willing to fuss with* WordPerfect 5.0*'s daunting keyboard layout function. To recover a line deleted by accident, press <F1>, then the 1 key.*

<Ctrl>-<F10>	Turn on macro recorder
<Alt>-Y	Name macro
<Home><Home>	Start extreme-edge move
<Home><Cursor Left>	Move cursor to left margin
<Ctrl>-<End>	Delete to end of line
<Delete>	Delete blank line
<Ctrl>-<F10>	Turn off macro recorder

FIGURE 2: Enter these WordPerfect commands to create <Alt>-Y, a macro that deletes a line of text.

Go Ahead, Mark My Line

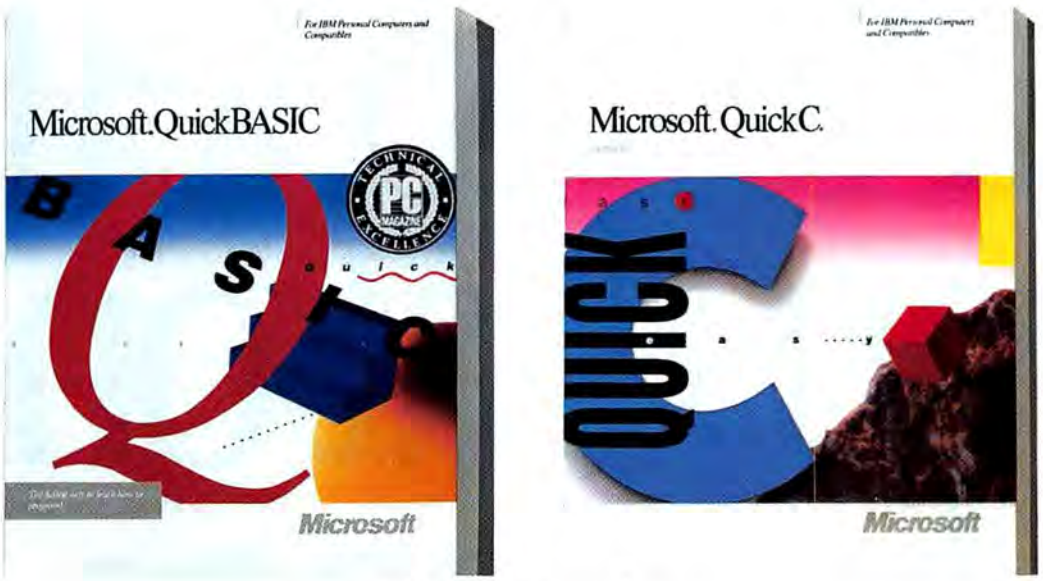
I frequently shuffle lines of text from one place to another in a *WordStar 4.0* document. To make it easier, I wrote a simple macro that marks (highlights) an entire line. Create the macro by starting *WordStar* and typing the keystrokes shown in **FIGURE 3**. Press <Enter> only where shown. To use the macro while editing, move the cursor to the line to be marked and press <Esc>-L. Then hold down the <Shift> key and press <F5> to delete the marked line. Or, to move or copy the marked line, put the cursor where you want the line and press <Shift>-<F7> or <Shift>-<F8>, respectively. The macro operates as a toggle—to unmark a line, make sure it contains the cursor, then press <Esc>-L again.

Anne Swan
Lititz, Pennsylvania

(continues)

If anyone tries to tell you that one language fits all, turn the page.

To each



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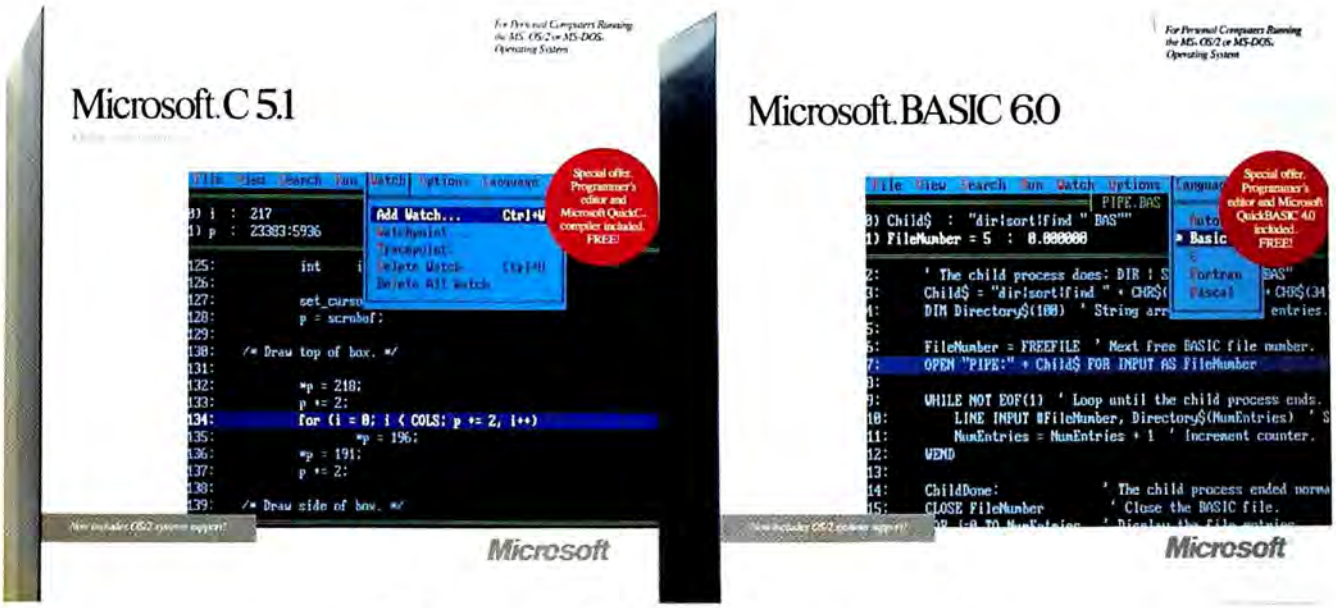

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```
<Esc>?L
Mark line<Enter>
<Ctrl>-P<Ctrl>-QS
<Ctrl>-P<Ctrl>-KB
<Ctrl>-P<Ctrl>-QD
<Ctrl>-P<Ctrl>-D
<Ctrl>-P<Ctrl>-KK
<Ctrl>-P<Ctrl>-E
<Enter><Enter>Y
```

FIGURE 3: This WordStar macro will mark your lines.

```
Trim(LNAME) + ", " + FNAME + ";" +
ADDRESS + ";" +
trim(CITY) + ", " + STATE + " " + ZIP
```

FIGURE 4: This dBASE Report Generator CONTENTS expression uses semicolons to wrap the data.

Easier dBASE Columns

September's *Star-Dot-Star* contained a tip from John Agusta on how to force *dBASE III*'s Report Generator to stack fields in one column. His method, while it works, is tedious and requires some tricky mathematics. If your calculations are even one character off, the data prints improperly.

Using quoted semicolons (";") is a far more elegant solution [see **FIGURE 4**]. The semicolons force the line to wrap, and the only math required is adding up the number of characters in the longest possible line to get the appropriate column width.

Another consideration when using multilined columns is to double-space the report, which ensures that a blank line separates each single-spaced record.

Kim Bunchuck
Washington, D.C.

ERRor Correction

In "To ERR Is Inhuman" (*Star-Dot-Star, PCW,* September 1988), my *1-2-3* macro will not work as published. **FIGURE 5** lists the corrected macro.

Leon Chalnick
Rancho Palos Verdes, California

Editor's note: The intention was to stop the macro at a blank cell, but the errors in the solution were all mine. So, I wonder, does this make me more human, or less?

DEVELOPER'S TOOLBOX

Tool Kits for Starters

Reinventing the wheel takes time—a commodity that developers can't afford to waste. Today, I'm saving time by starting new jobs with tool kits of canned goodies that all my programs require: keyboard input functions, pop-up window modules, pull-down menu subroutines, and code that automatically configures itself to run correctly on systems from plain PCs to 80386-powered speedsters.

In today's highly competitive software market, fast 80386 development systems plus language compilers that fly like the wind make it practical to attach extensive tool kit libraries to custom code—an approach that in the past could slow programming to a crawl.

Most tool kits are constructed for specific language implementations, so it's a good idea to settle on a compiler before buying add-on tools. For example, a tool kit for Lattice C may not work with another manufacturer's C compiler. Before buying "foreign" tools, therefore, ask the manufacturer if its code will work with your compiler. Also, be aware that the more reputable tool kit companies do not charge royalties for the use of their products' routines. If you find a tool kit company that charges a distribution fee, ditch it fast.

There are dozens of good compilers on the market, but if you're just getting started in software development, you can't go wrong with either Turbo Pascal or QuickBASIC. Turbo C and Quick C are excellent choices, too, but may be more difficult for beginners. (I'll cover C tools in a future column.)

Every QuickBASIC developer should have a copy of *QuickPak Professional* from Crescent Software. I've never been that fond of BASIC, but I'm slowly changing my opinion: Today's BASIC is nothing like the BASIC I learned long ago. And the next time I even think about doing a project in BASIC, I'll head straight for *QuickPak*.

QuickPak routines work with QuickBASIC, Turbo Basic, and IBM/Microsoft BASCOM compilers. A disk containing assem-

(continues)

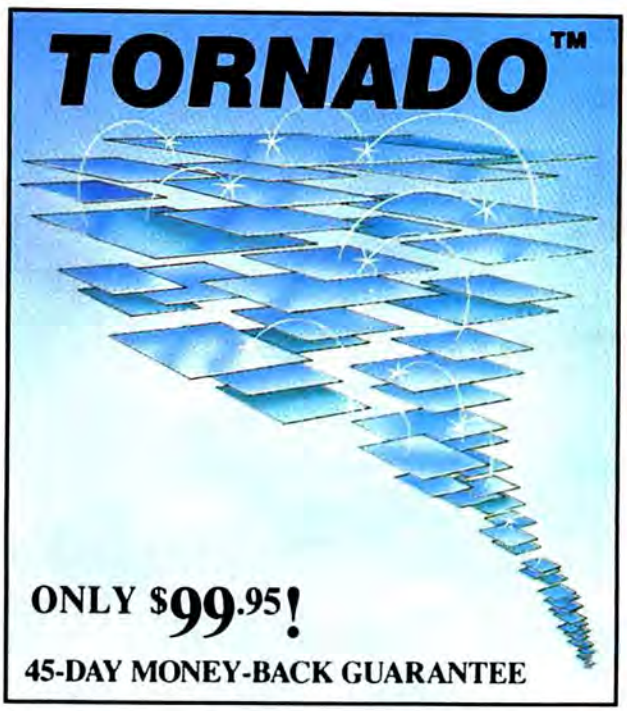
```
     AA     AB          AC          AD          AE          AF
1
2   \E    {if @iserr(@cellpointer("contents"))}/re~{down}/xg\E~
3         {if@cellpointer("type")="b"}/xgQUIT~
4         {down}/xg\E~
5  QUIT   /xq~
```

FIGURE 5: Corrected 1-2-3 macro eliminates errors.

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.



■ 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:

■ 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

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bly language source code for many *QuickPak* routines is available free on request. The *QuickPak* manual explains in detail how to link library modules to your programs. You can then call functions to display pop-up windows, pulldown vertical menus, and *1-2-3*–like horizontal menus. *QuickPak* comes with a capable text editor that you can use as your main text-input module.

Some *QuickPak* tools duplicate native functions—for example, MakeDir does the same job as MKDIR. This apparent wastefulness has a hidden advantage: easier error checking. Instead of executing an ON ERROR statement, you simply check a specified variable and take appropriate action—a feature that goes a long way toward making BASIC acceptable for serious software development.

Among packages competing in the Turbo Pascal arena, TurboPower Software's *Turbo Professional 5.0* is a champion. (I tested a prerelease beta version, but the real McCoy should be available by the time you read this. The tool kit supports both Turbo Pascal 4.0 and 5.0.) The TurboPower package has some of the fastest window routines I've tried, automatically configuring programs to display pop-up windows and text for most display standards, including Hercules, CGA, MCGA, EGA, VGA, and PGC adapters. (PGC support is new in version 5.0.)

To ease design work, *Turbo Professional* supplies several programs, including a sorting utility, a file-difference finder, a help-text generator for adding help screens to your programs, a DOS command repeater, and others. One of the best of the lot is Menu Maker 5.0, which you can use to design pulldown menus complete with optional submenus and help text. Menu Maker generates the source code to a Turbo Pascal program with all the commands necessary to implement your custom menu design. After designing a menu, you add the generated code to your program and compile—a great time-saver if you create lots of menus. You can also save common menu parts in library files and then link those parts into new programs, a feature that will appeal to consultants who write many programs that use similar menus.

In addition to these utilities, you receive four TSR programs: PTIME, an alarm clock with an elapsed timer; PCALC, a programmer's calculator; PREF, a pop-up ASCII and video-attributes reference; and SMACS, a DOS macro system. All of the source code for these TSRs and the other programs and tools is included.

Of course, the performance of a program using even the fastest tool-kit routines can be burdened by poorly written custom routines. To ensure that your code stands the test of time, try *Stopwatch* from Custom Real-Time Software (CRTS). I've found this TSR to be just the ticket for running benchmarks and time trials, as well as for measuring the performance of *1-2-3* macros and *dBASE* subroutines. The manual is a bit sparse, but *Stopwatch* is a useful addition to any developer's library—no matter what languages and tool kits tickle your fancy. —*Tom Swan*

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West Caldwell, NJ 07007
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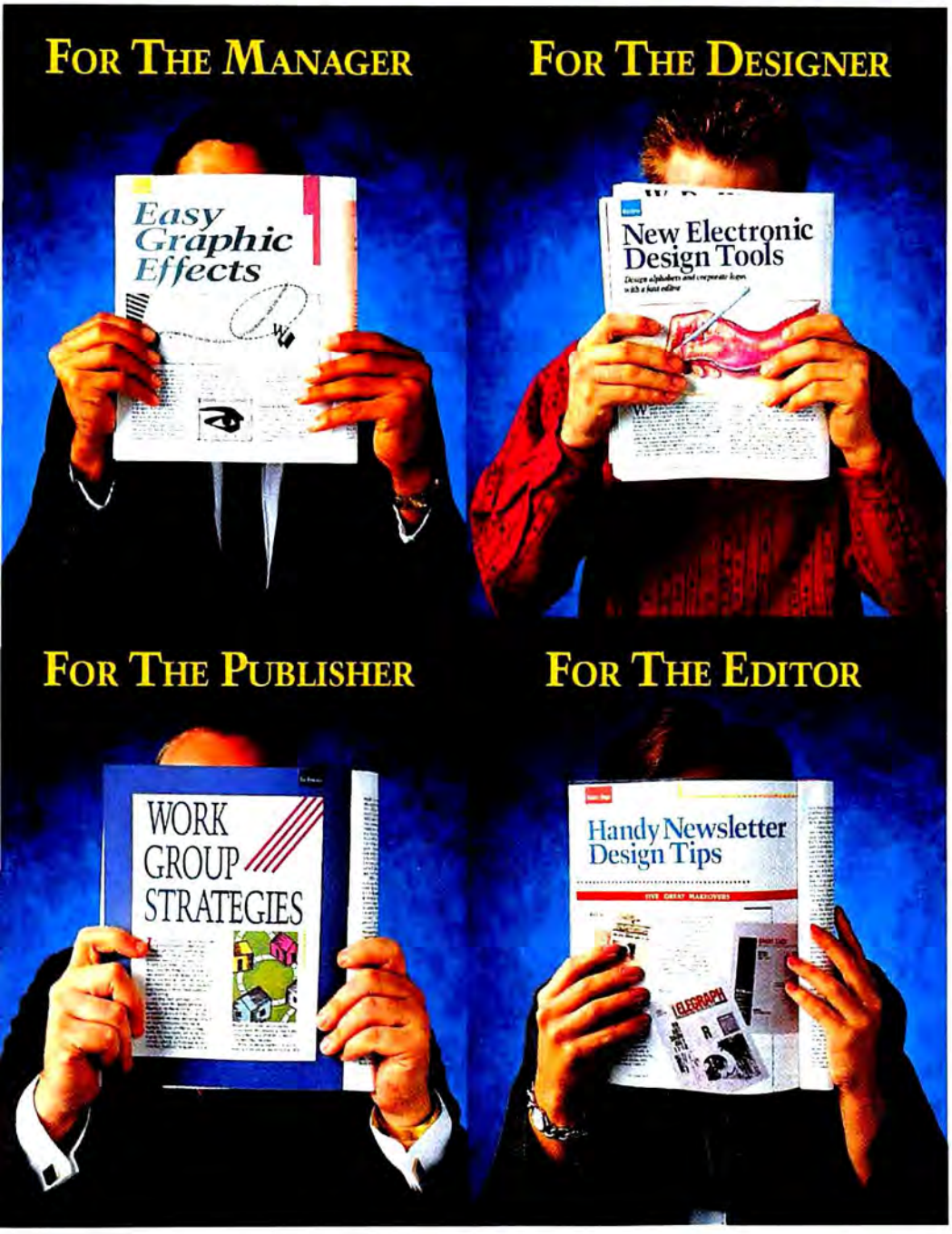

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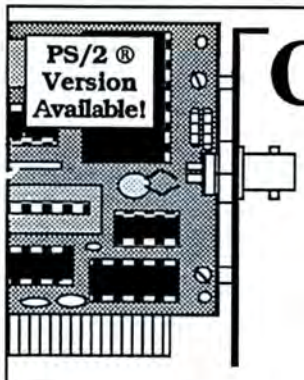

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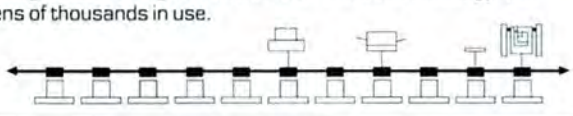

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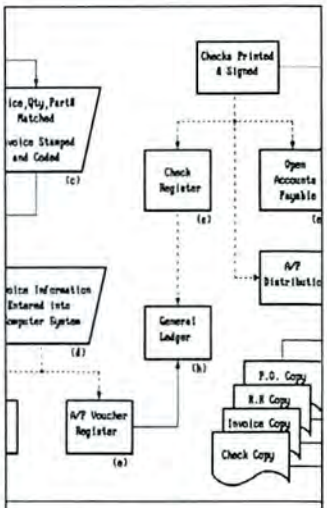

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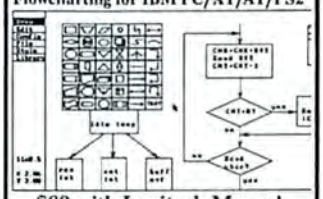

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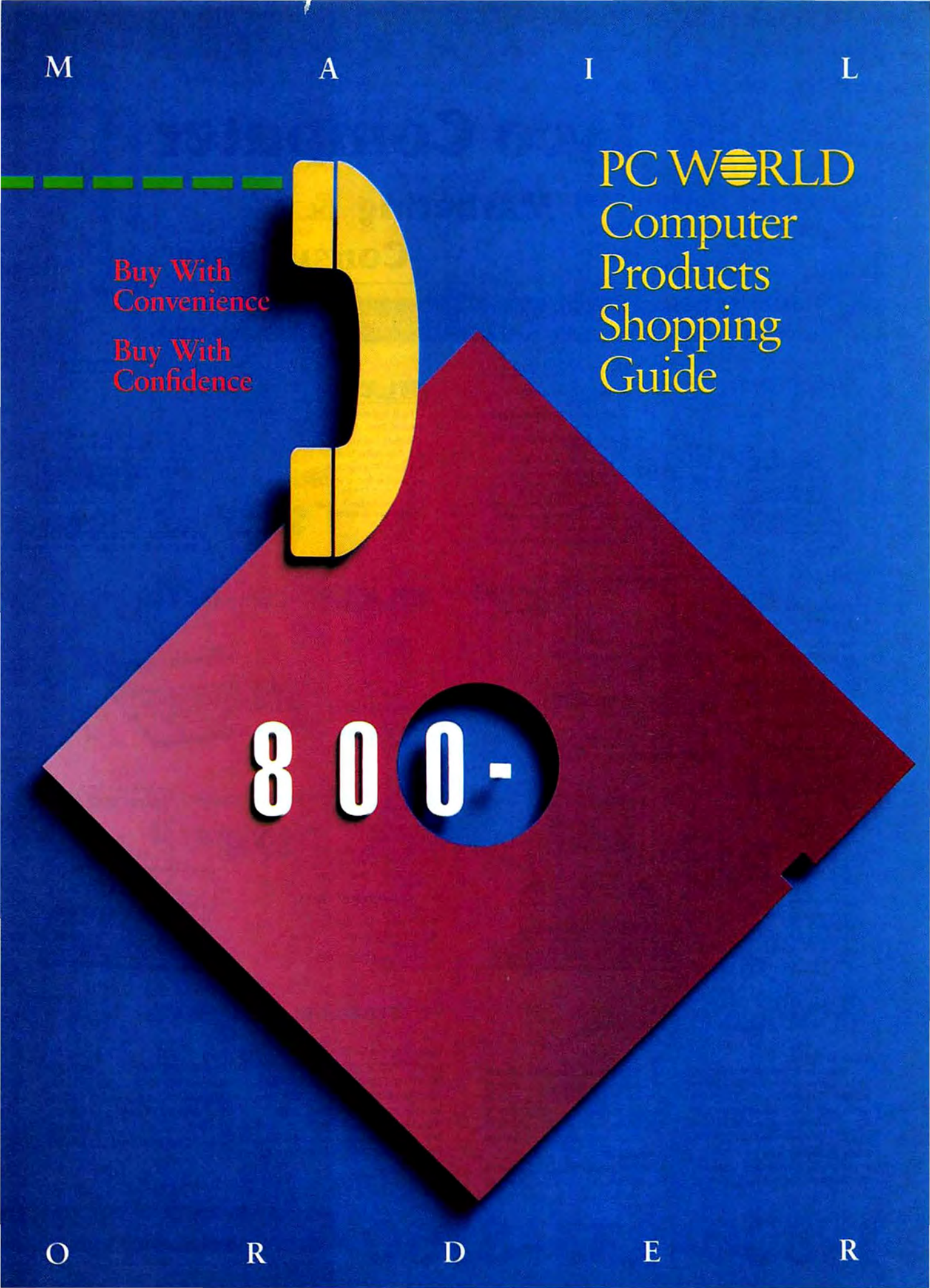
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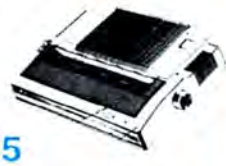

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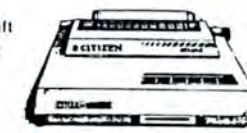

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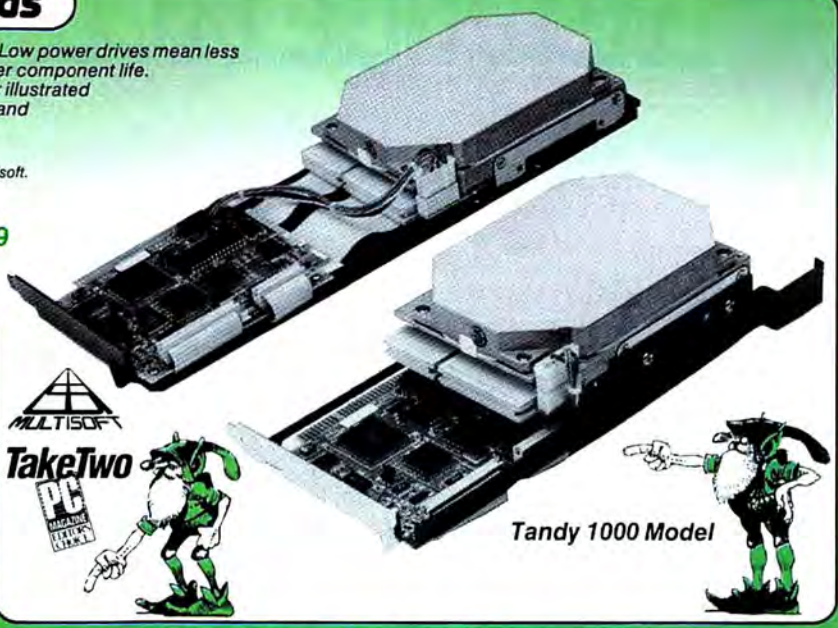

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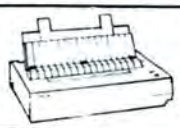

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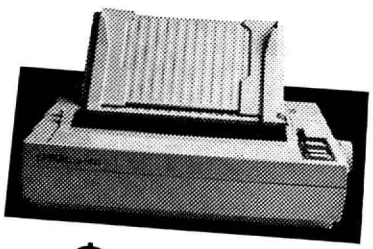

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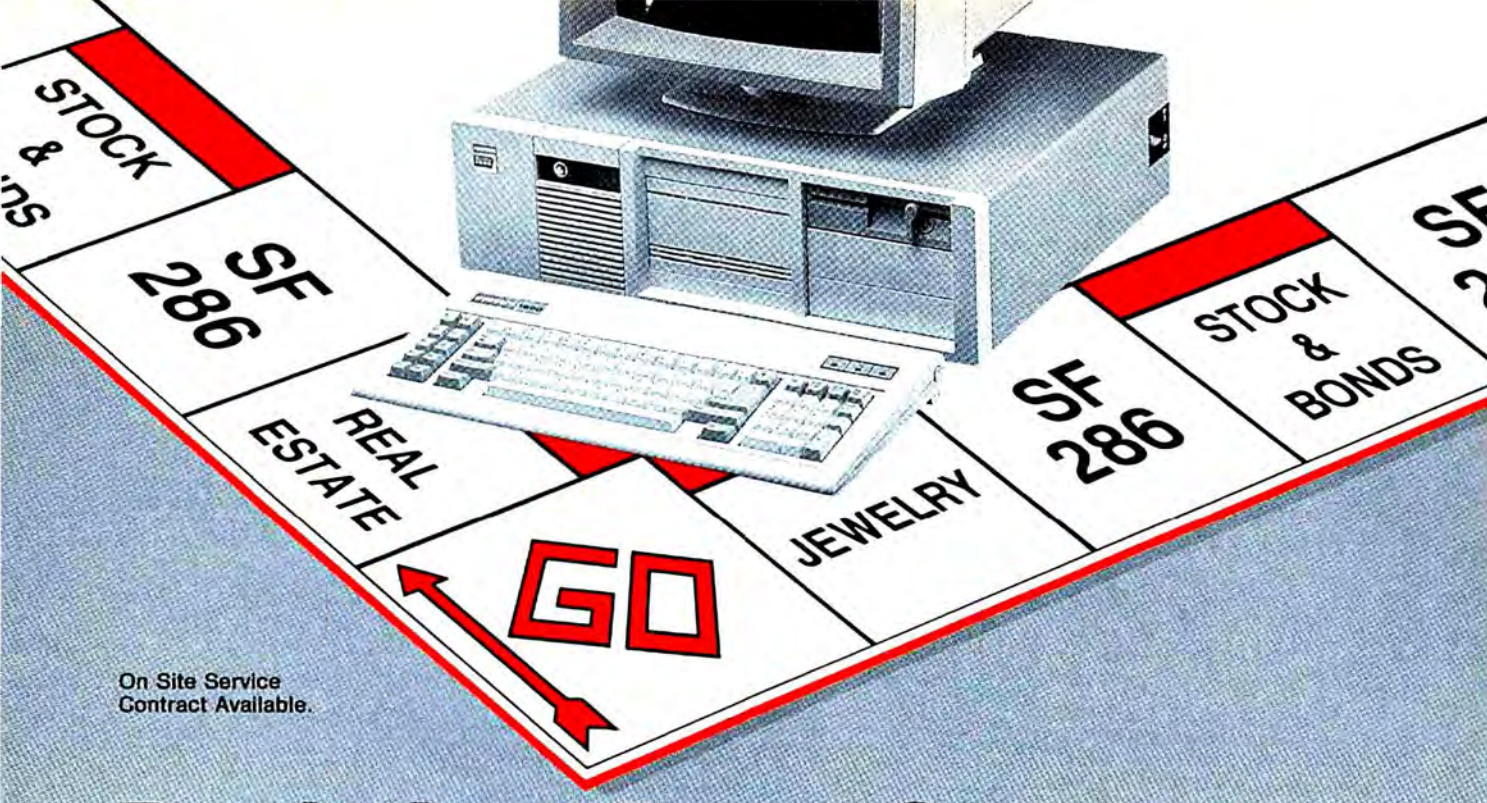

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SF-286-8MHz 20Mb EGA Special.....$1599

Basic System features plus: Everex EGA graphics board, Evervision EGA color monitor and Seagate 20Mb hard drive.

SF-286-8MHz 20Mb VGA Special.....$1839

Basic System features plus: Everex EVGA graphics board (640x480, 800x600, up to 256 colors), Evervision multisync color monitor and Seagate 20Mb hard drive. Add $60 for upgrade to Mitsubishi Diamond Scan Monitor.

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Upgrade to 40Mb Seagate hard drive, Add $160
Upgrade to 80Mb Seagate hard drive, Add $449

EGA Bundle.....$479

Everex EGA autoswitch graphics board and Evervision EGA color monitor.

Super EGA Bundle.....$579

Everex EGA Deluxe autoswitch graphics board (640x480, 752x410), and Evervision multisync color monitor. Add $60 to upgrade to Mitsubishi Diamond Scan Monitor.

Super VGA Bundle.....$709

Everex EVGA graphics board (460x480, 800x600, up to 256 colors) and Evervision multisync color monitor. Add $60 to upgrade to Mitsubishi Diamond Scan Monitor.

Hard Disk Specials (for PC)

Seagate ST225 20Mb + Controller.....$265
Seagate ST125 20Mb + Controller.....$329
Seagate ST238 30Mb + Controller.....$289
Seagate ST251 40Mb + Controller.....$449

Hard Disk Specials (for AT)

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Seagate ST138 30Mb (40ms).....$339
Seagate ST251 40Mb (40ms).....$369
Seagate ST251-1 40Mb (28ms).....$429
Seagate 4096 80Mb (28ms).....$649

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Everex Evercom external and internal modems (fully Hayes compatible) with Bitcom communications software.

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External 1200 Baud Pocket Modem.....$139
Internal 2400 Baud Modem.....$149
External 2400 Baud Modem.....$199

Misc. Specials

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Mini I/O with Game Port.....$65
Mini I/O + Logitech C7 serial mouse.....$119
Teac 3.5" 720K floppy drive.....$99
Teac 3.5" 1.4Mb floppy drive.....$129
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200 Watt Power Supply.....$79
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Tribute 124	599	429
Tribute 224	899	599
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Epson		Call
Fujitsu		
DL3400	995	549
NEC		
P2200	569	339
P5200	799	509
P5300	1049	669
LC890	4799	Call
Okidata		
182 Plus	319	219
320	499	329
390	699	469
393 (Req. Interface)	1399	915
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	185
KXP1124	529	315
KXP1595	749	419
KXP1524	949	519
Star		
NX1000	289	169
NX2400	499	319
NB2410	699	449
Toshiba		
P321SL	749	459
P341SL	999	629
P351SX	1499	929

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	LIST	FAST
AST		
Hot Shot 286	645	339
Six Pak Plus 64K	210	119
DTK		
286 10mhz M/B	499	249
XT 1.2mb FDC	79	45
Everex		
1200B Int Modem	149	69
2400B Int Modem	249	129
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Super VGA #5100	445	239
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Graphic Card +	299	169
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80287-10	480	249
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Twin Turbo 12mhz	645	359
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VGA Professional	799	Call
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2400B Int Modem	199	149
Prometheus		
Promodem 2400B	199	129
Promodem 2400G	249	159

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Fax	399	249
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USRobotics		
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1200 Baud External	179	89
2400 Baud Internal	249	119
2400 Baud External	279	149
Video 7		
Fast Write VGA	549	335
Vega Deluxe	379	189
Vega VGA	499	259
V-RAM VGA	899	Call

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Multispeed HD	3695	2249
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80MB AT #4096	1199	549
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dBXL Diamond	199	105
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Paradox	725	399
Quartz	795	449
RapidFile	295	179
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GEM Desktop Pub.	299	169
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Deluxe Paint II	105	67
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First Graphics	129	Call
Freelance Plus	495	Call
GEM Draw Plus	299	165
Generic CADD	99	49
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Mice

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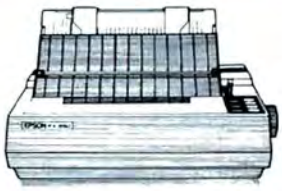

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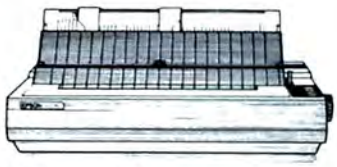
- Exclusive SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-850 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).



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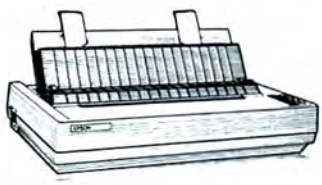

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- Epson's SmartPark™
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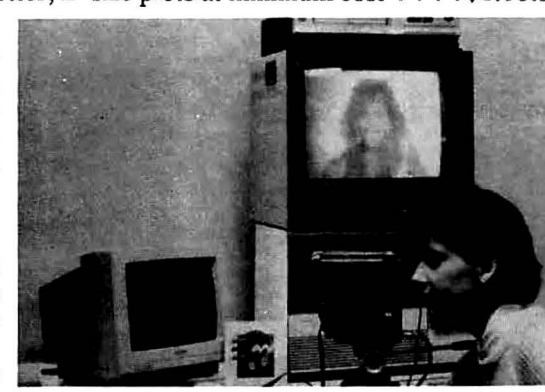

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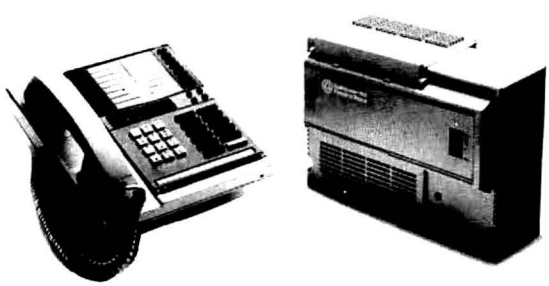

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Which Bus to Take?

Jim Nech

Until spring 1987, IBM-compatible personal computers enjoyed a clear input/output standard—the familiar AT bus, or Industry Standard Architecture (ISA). A user could buy add-in cards secure in the knowledge that they would fit every correctly designed IBM compatible on the market, and the market boomed.

Then IBM came out with the PS/2 and its much-touted Micro Channel Architecture (MCA), a wide new data path that is supposed to give us plenty of room for the high-power, I/O-intensive machines of the 1990s. Trouble is, it doesn't do much for those of us who have to buy add-in boards today and are forced to choose between the wide selection of AT-compatible add-ins or the trickle of boards that have been redesigned for the Micro Channel.

Now, nine large computer companies have proposed yet another bus, called Extended Industry Standard Architecture (EISA). As a user, my first reaction was fear and anger: fear that I would have to invest in another set of incompatible cards, and anger over that prospect. Fortunately, I find that EISA is an extension of the old AT bus, so my system can fully support it.

Most vendors agree with IBM that, at some point, we'll need a new bus to handle demands like support for multiple processors. But IBM took this opportunity to try to impose the kind of proprietary control on the microcomputer industry that it has exercised in the mainframe and minicomputer markets. At first the idea that we need to sacrifice compatibility with the old in order to gain new capabilities seemed plausible enough. But after 21 months, the emperor's new clothes are still invisible.

First of all, IBM hasn't delivered on its multiprocessing promises, and it is only willing to license MCA at a price that makes it impossible for smaller manufacturers to see a profit. Additionally, IBM now wants royalties on every IBM compatible *ever* shipped. Big Blue's intent has become apparent. By the time EISA was announced, IBM had very little story left with which to cover its naked greed.

By contrast, anyone can license EISA for a nominal fee, and it uses the same bus as the current ISA, but with an extra connector for the upcoming generation of 32-bit cards. For me, the bottom line is that I won't have to give up my current favorites in order to get the advanced capabilities.

Of course, I doubt that any company in the EISA group is driven by benevolence. Even though the new standard helps users, it's clear that the companies involved are, first and foremost, trying to save themselves from an IBM-only PC market. It's too bad they couldn't have worked *with* IBM to develop a 32-bit data path standard before MCA. But then they weren't invited, were they?

EISA has some drawbacks: Machines using it probably won't appear until late 1989, and the software that fully exploits EISA features may arrive later still. But at least EISA isn't "yet another standard" that will confuse users more.

Users needn't be confused about EISA. For me, the answer to the confusion is to say yes to EISA, and yes to cooperation between vendors that helps users.

And as for MCA? Just say *no.* ●

Jim Nech is president of the Houston Area League of PC Users.

Have a different perspective? Write Dan Lavin, user ombudsman, PC World, *501 Second St., San Francisco, CA 94107.*

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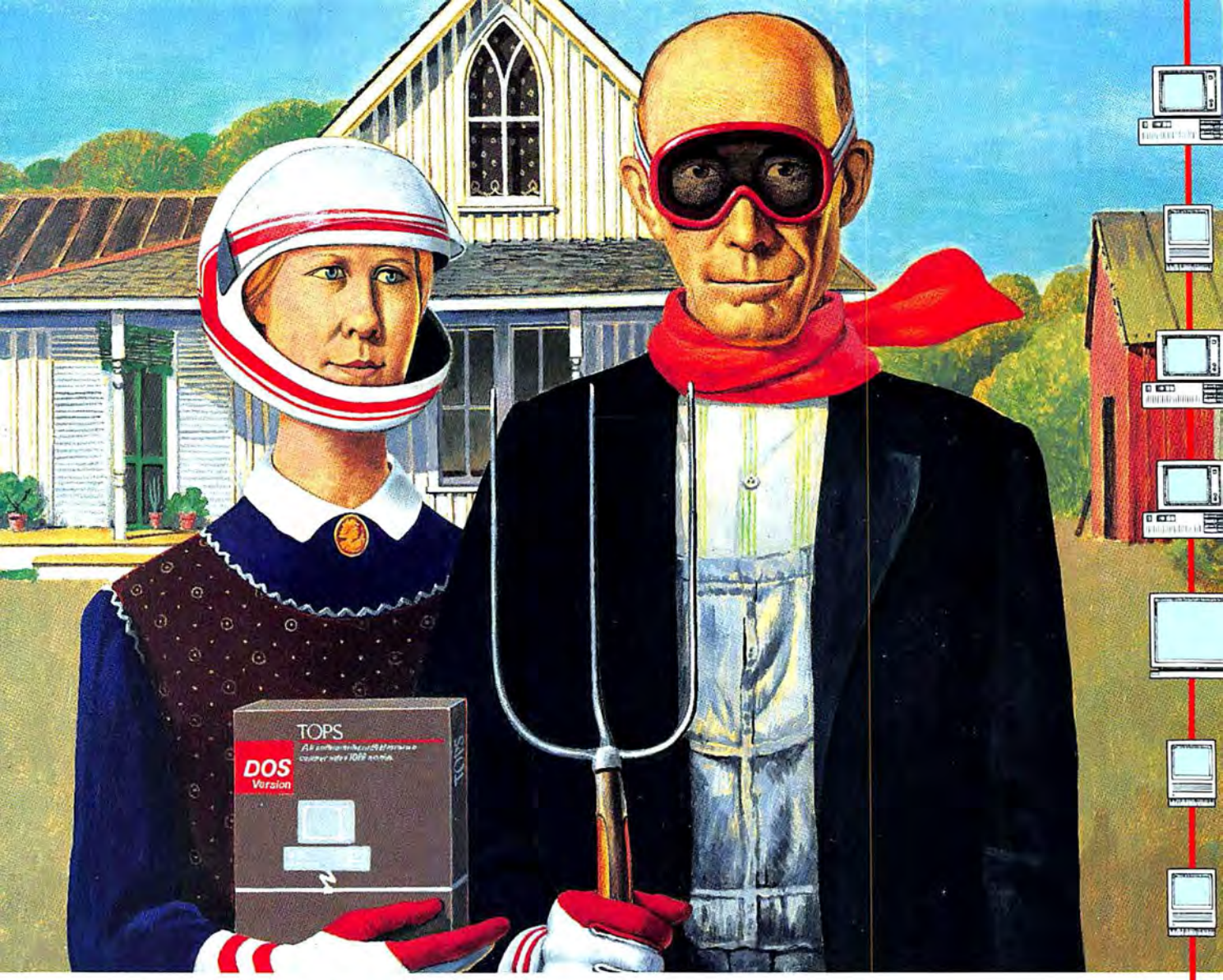

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