IS YOUR PC READY FOR OS/2? • READERS' CHOICE: 1988 WORLD CLASS AWARDS

PC WORLD

OCTOBER 1988 $2.95 CANADA $3.95

WHO'S #1 ON THE DESKTOP?

IBM's PS/2 Model 50 Z faces Compaq's Deskpro 386S in price and performance

MORE HOT HARDWARE:

- Compaq Deskpro 386/25
- IBM PS/2 Model 70
- Dell 220

PageMaker 3.0

Preview: Xerox Ventura Publisher 2.0

Fax Board Roundup

DOS 4.00: Worth the Upgrade?

Lots of software packages help you work,

Moving ahead takes more than hard work, it takes smart work. There are stacks of productivity software you can buy for your PC. But to work smart, you only need one: SideKick® Plus. It's the newest member of Borland's professional series, from the same people who brought you the original SideKick: the program that introduced more than a million PC users to the convenience of using their computer as an organizing tool.

To buy productivity applications like those in SideKick Plus *separately*, you'd spend almost a thousand dollars and drain your computer's memory dry. SideKick Plus takes as little as

SideKick Plus puts you in control . . . for as little as 64K!

64K of your computer's RAM; you decide exactly how much.

You can select just the productivity applications you need. Like a sophisticated telecommunications package, a powerful DOS manager, nine notepads, a versatile outliner, four different calculators, support for both EMS and extended memory. And lots more.

You decide how to use SideKick Plus, too. Put your applications on your hard disk to call up when you need them, or leave them in RAM for instant availability. Either way, they're always at your fingertips. Accessible over any *other* application you're working in. Amazingly affordable. And very, very smart.

Here's What You Get!

- **The PhoneBook:** complete data and voice communications that you can set to take place in the background, with autodialing, an encrypted glossary, and a full Script language. Even if you don't have a modem, it keeps your names, addresses, and phone numbers at your fingertips
- **Outlook: The Outline Processor:** nine Outliners with automatic numbering, tree charts, and table of contents
- **The File Manager:** extended DOS file and directory management
- **The Calculator:** four types: business, scientific, programmer and formula
- **The Clipboard:** for copy-and-paste integration between files and with other applications
- **The Time Planner:** includes a Calendar, Appointment Book, and Schedule window, plus alarms, repeating appointments, and attached agenda. Supports networks via a common calendar
- **The Notepad:** nine file-editor Notepads, up to 11,000 words each
- **The ASCII Table:** to find and paste characters quickly and easily
- **Supports both EMS and extended memory:** if you have expanded memory or the Intel Above™Board, you can load the SideKick Plus desk accessories into expanded memory and leave even more of your conventional memory for your other applications.

Only $199.95
(not copy protected)

*60-day money-back guarantee**

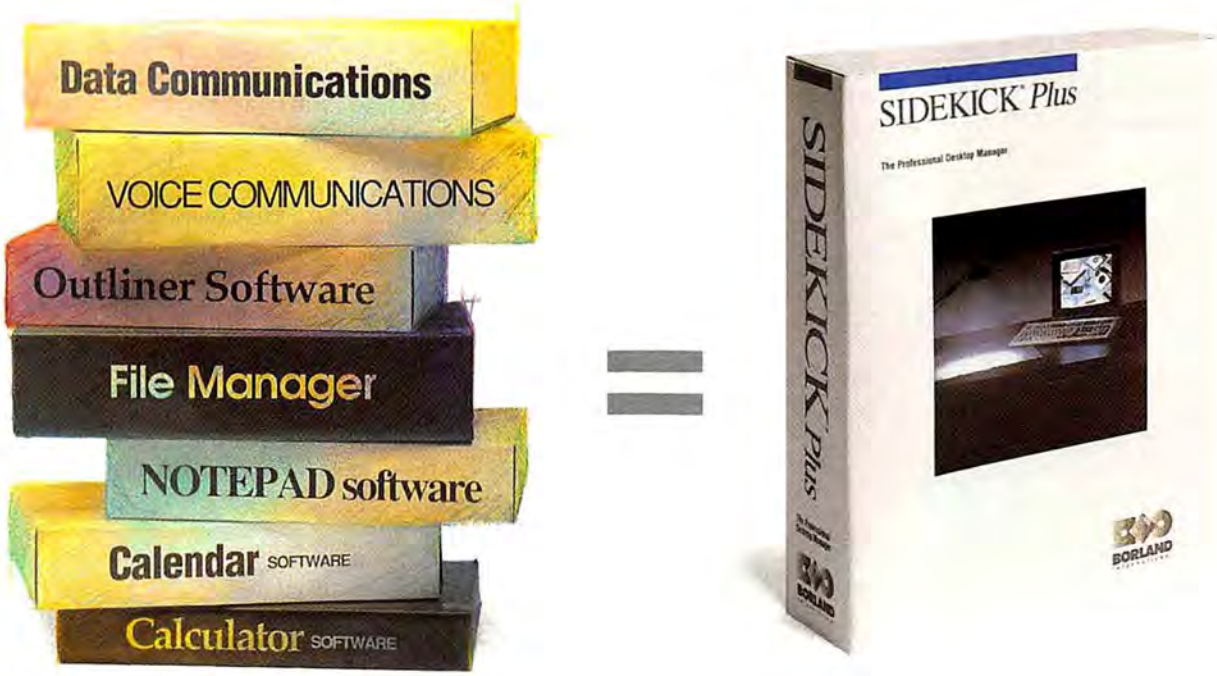
For a brochure, the dealer nearest you, or to order
Call (800) 543-7543

Minimum System Requirements: For IBM PS/2, IBM family of personal computers and all 100% compatibles. Operating system: PC DOS (MS DOS) 2.0 or later. Minimum system memory: 384K bytes. Minimum resident memory size: 64K. Hard disk required.

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

All Borland products are trademarks or registered trademarks of Borland International, Inc. Other brand and product names are trademarks of their respective holders. Copyright ©1988 Borland International, Inc. (B1275)

Only one helps you work smarter...



SideKick Plus!

"What I like most is new ideas in software. Historically, one of the best new ideas was Borland's SideKick. SideKick Plus is a much more powerful program than the original. It adds a lot of new features and gives you a lot more flexibility over how you use its many features.

Michael J. Miller, InfoWorld"

BORLAND INTERNATIONAL

Circle 21 on reader service card

PC WORLD

The year's best:
World Class Awards,
page 182

REVIEW

108 **Compaq and IBM: Faster, Top to Bottom**
Eric Knorr
Compaq unveils its red-hot Deskpro 386/25 and low-cost 386S; IBM puts a 386 on the desktop with the PS/2 Model 70 and adds zip to the Model 50 Z.

116 **Remote Assistance**
Judy Getts
Remote communications packages *Carbon Copy Plus, Close-Up, Co/Session,* and *Co-Compute* let you control PCs from across town or across the country.

122 **Fax Times Seven**
TJ Byers
We review seven low-price PC fax boards that let you send disk-based files to stand-alone fax machines.

134 **The Hardware Shelf**
Edited by Michael Goodwin
- Considering a 386? Take a gander at Dell's blazing 20-MHz 286 system
- Microsoft's Mach20 accelerator board breaks the PC slot barrier, but it won't win any speed contests
- Xerox's 4020 ink jet printer—an office workhorse at a reasonable price
- NEC's MonoGraph full-page paper-white monitor—a publishing natural

156 **The Software Shelf**
Edited by William Rodarmor
- *PageMaker 3.0* handles long documents like a pro
- *Draw Applause 1.0* brings showstopping color to business graphics
- New editing tools let *Manuscript 2.0* conquer complex documents
- *DataPerfect 2.0* may find friends only with *WordPerfect* fans
- *Forecast Pro* gives you a statistical glimpse into your firm's future

NEWS

13 **Top of the News**
Mike Hogan
- Steep dealer discounts for PS/2s
- Caere launches full-page scanner
- *Xerox Ventura Publisher* goes "professional"
- Sun buys TOPS, sales soar

71 **Industry Outlook**
Edited by Eric Bender
- Will the Presentation Manager's graphic user interface be a hit?
- DOS-based software thrives despite OS/2
- Software viruses: menace or myth?
- Erasable-optical Maxtor superdrives due this year

82 **Preview**
Xerox offers a skillful upgrade to *Ventura Publisher* plus a powerhouse extension that reaches to the stars.

87 **Product Outlook**
Mike Hogan
- The STEP 386/25's innovative memory caching speeds performance
- The ErgoPrint 610 laser printer handles paper like a copy machine
- *D the Data Language* is a fully relational data base manager for nonexperts
- *PicturePower* marries video images and text on the cheap
- *Music/386* is a low-cost, easy route to DOS-compatible multiuser processing
- *Screen Extender* cuts *WordStar*'s on-screen type down to size
- *Back to Basics: Professional*—accounting for the home-business user

94 **Briefly Noted**
- V-RAM VGA may just be the speediest graphics board around
- Smartmodem 9600 joins LANs to mainframes
- *R:base for DOS Runtime* offers a true compiler
- AMI 386 AT Mark 2 Motherboard, with disk caching

98 **Update**
- *PFS: First Publisher 2.0*
- *Norton Commander 2.0*
- *DacEasy Accounting 3.0, Payroll 3.0, Graph + Mate 3.0*
- *Turbo Prolog 2.0*
- *Tree86 2.0*
- *10Net Plus*
- *XtreeNet*

CONTENTS

Volume 6, Number 10

October 1988

FEATURE

182 **World Class Awards—The Readers' Choice**
Wes Nihei
Meet the winners of the 1988 World Class Awards and find out which products savvy *PC World* readers call tried-and-true.

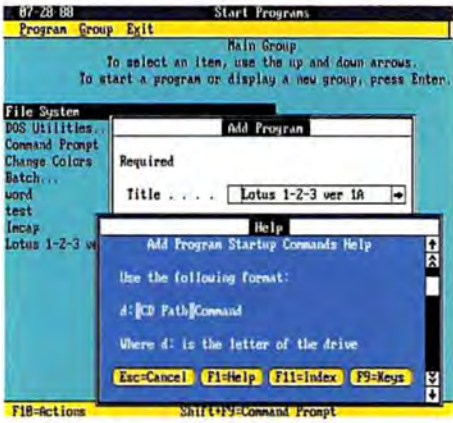
190 **Is Your PC Ready for OS/2?**
Eric Knorr
Thirty-three systems go head to head in seven OS/2 performance benchmarks.

194 **DOS Lives!**
Scott Spanbauer and Robert Luhn
DOS is alive and well and living in version 4.00, enhanced with a friendly interface and extras even OS/2 doesn't have.

196 **Buyers' Guide: On-Line Services and Data Bases**
Scott Spanbauer
Information on virtually any topic is available on line—but how do you get to it? Our guide will help you make the right connection.

HOW TO

206 **1-2-3 Menu Maker**
Richard Scoville
Create custom menus to make using your worksheets a snap, even for novices.



Inside DOS 4.00, page 194

What your PC needs in the new world of OS/2, page 196

Cover photograph by
JOHN GREENLEIGH

PERSPECTIVES

21 **Richard Landry**
DOS 4.00 proves that new technology doesn't have to hurt.

29 **Letters**
Readers air shareware cares.

39 **David Bunnell**
Software doesn't have to be boring to be good.

47 **Stewart Alsop**
With the Model 1000, Tandy buries its schlock image forever.

59 **On IBM**
William F. Zachmann
The Presentation Manager and *Windows* are stealing OS/2 Extended Edition's thunder.

314 **Another Angle**
Dan Lavin
Vendors beware: Playing to power users may not be the smartest game in town.

DEPARTMENTS

6 **In This Issue**
Readers and editors vote for the best products.

215 **Consumer Watch**
Edited by Anita Amirrezvani
User groups may provide the best support available—here's a list of over 100, nationwide.

223 **The Upgrade Path**
Edited by Robert Luhn
Tandy and PC Technologies join forces to upgrade the Tandy 1000.

229 **The Help Screen**
Karl Koessel
What's the cheapest way to increase the memory in a PS/2 Model 50?

241 **Star-Dot-Star**
Edited by Tom Swan
Microsoft leads the race to develop OS/2 software tools.

249 **Tech Notes**
Robert M. Carr
Carr demystifies personal information managers.

259 **PC World Catalog**
A convenient buying guide to PC products and services.

280 **Products Featured in This Issue**
More information for *PC World* readers.

284 **Advertisers Index**

PC WORLD

The Business Magazine of PC Products and Solutions

John Griffin
President

Richard Landry
Editor in Chief

Editorial
Managing Editor: Ed Bott
Senior Editors: Eric Knorr, Robert Luhn
News Editor: Mike Hogan (213/312-8041)
East Coast Editor: Eric Bender (617/574-9321)
Technical Editor: Karl Koessel
Senior Associate Editor: Anita Amirrezvani
Associate Editor: Michael Goodwin
Production Editor: Cynthia Brown
Senior Copy Editor: Tema Goodwin
Editorial Mgr.: Gina Vanlue
Assistant Editors: Rex Farrance (New Products), Marlene Nesary, Wesley Nihei, William Rodarmor, Scott Spanbauer, Janet Walden (New Products)
Copy Editors: Barbara Lewis, Peggy Nauts, Dan Tynan, Sally Zahner
Editorial Assistant: Otto Waldorf
Administrative Assistant: Nancy Endy
Contributing Editors: Stewart Alsop, Stephen A. Blumenthal, Eric Brown, TJ Byers, Robert M. Carr, Steven Cook, Dennis Dykstra, Judy Getts, Ken Greenberg, Michael Harper, Richard Jantz, Ted Nace, Ralph Soucie, Tom Swan, Art Wilcox, William F. Zachmann
User Ombudsman: Dan Lavin (617/969-6555)
National Software Testing Laboratories (NSTL): Michael D. Stern (President), Lawrence D. Goldstein (Vice President, Operations), Jim Hurd (Vice President, R&D), Vicki Weiss (Vice President, Testing Services), Charles Vogt (Technical Editor), Ed O'Hara (Technical Engineer), Mindy Klein (Communications Mgr.)

Art and Design
Art Director: Skip Johnston
Assistant Art Director: Donna Sharee
Senior Design Associates: Barbara Adamson, Matthew Nielsen
Assistant to the Director: Jon Christianson

Production
Senior Production Mgr.: Linda Manes
Editorial Production Mgr.: Ellyn L. Hament
Production Editor: Susan M. Ford
Lead Typesetter: Mark L. Duran
Typesetter: Barbara Tannenbaum
Assistant Production Mgr.: MaryAnn DePietro
Advertising Billing Coordinator: Kevin Greene
Production Assistant: Katie Scott

Circulation
Circulation Mgr.: Jeff Ente
Single Copy Sales Mgr.: George Clark
Single Copy Sales Rep.: Martin Garchar
Promotion Coordinator: Billie Brownell
Fulfillment Mgr.: Doug Norde

Research
Director: Cheryl Woodard
Research Mgr.: Ralph Ames
Research Analysts: Dusty Roady Pedersen, Ray Petsche
Research Assistant: Bill Segovia

Corporate
PCW Communications, Inc.
David Bunnell
Chairman
Lee Vidmer
President
James E. Martin
Vice President
Jacqueline Poitier
Vice President
Cheryl Woodard
Vice President
Andrew Fluegelman
1943-1985
Founding Editor

PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $59.80 for two years (24 issues), $89.70 for three years (36 issues) by PCW Communications, Inc., 501 Second St., San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add $18 per year for Canada and Mexico; add $25 per year for surface mail or $110 per year for airmail for all other countries. Second-class postage paid at San Francisco and additional mailing offices. POSTMASTER: Send address changes to *PC World*, Subscription Dept., P.O. Box 55029, Boulder, CO 80323-5029. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0500; CompuServe 74055,412; The Source STE908; MCI Mail PCWORLD/179-3813. *PC World*™ is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Copyright © 1988, PCW Communications, Inc. All rights reserved. The following are trademarks of PCW Communications, Inc.: PC World View, *.*, PC World. *PC World* is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the *IDG News Service* offering the latest on domestic and international computer news.

HOW TO CONTACT PC WORLD

Comments, criticism, suggestions, and complaints are always welcome. Send correspondence to *PC World*, Editorial Dept., 501 Second St., San Francisco, CA 94107. You can reach us electronically via MCI Mail PCWORLD/179-3813, CompuServe 74055,412, The Source STE908, or facsimile at 415/442-1891.

Subscription Services If you have subscriber service questions, call toll-free 800/525-0643 (303/447-9330 in Colorado) or write Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders call 800/642-9606.

Help With Your Computer or Software Do you have any questions about the IBM PC or compatibles? Send them to *The Help Screen, PC World*, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail Karl Koessel/336-4141, CompuServe 74055,412, or The Source STE908. Questions with the broadest interest will be answered in the magazine. Sorry—we can't acknowledge individual letters or offer advice over the phone.

Product Information We're always interested in new products for our news and review sections. Send press releases and product announcements to Rex Farrance, assistant editor (software), or Janet Walden, assistant editor (hardware), at *PC World*, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908.

Editorial Calendars To receive a copy of *PC World*'s Editorial Calendar, call your nearest regional *PC World* advertising sales and marketing office; a complete list of phone numbers appears opposite the "Advertisers Index."

Reprints and Permissions You must have our permission before reproducing any material from *PC World*. If you want to quote from or reprint any portion of an article or use artwork or photographs that have appeared in the magazine, send a written request to *PC World*, Reprints and Permissions, 501 Second St., San Francisco, CA 94107. Include your phone number if you need a fast response.

Writing for PC World *PC World* encourages reader submissions. For a copy of our writers' guidelines, send a self-addressed stamped envelope to the address given below. Manuscripts may be mailed, or sent electronically.

Letters. Letters should be mailed to the address given below, c/o *Letters*. All letters must include the writer's name, city, and state. They should not exceed one double-spaced typewritten page. We reserve the right to edit letters.

Star-Dot-Star. We pay $25 to $200 for each item published in *Star-Dot-Star*. Send your PC discoveries to the address given below, c/o *Star-Dot-Star*. All published submissions become the property of *PC World* and are subject to editing for length and style. Due to the volume of mail, we cannot acknowledge any submitted materials. Accepted contributions will be acknowledged by payment.

The Upgrade Path. Manufacturers offering hardware upgrade products, and readers with submissions or queries, should write to *The Upgrade Path* at the address given below.

Power Tips. Have you discovered a timesaving technique for increasing PC productivity? Share it with other readers. Send your tips to the address given below, c/o *Power Tips*. Keep submissions to 100 words or less; we'll pay $25 for each tip published.

Consumer Watch. Think you've gotten a raw deal? Send the details to *Consumer Watch* at the address given below. We'll investigate your complaint; letters with the broadest interest will be published.

General Questions About PC World
If you wish to submit material for any of the departments mentioned above, or if you have any questions, contact *PC World*, 501 Second St., San Francisco, CA 94107; 415/243-0500, MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908.

Get Sprint and you'll never be afraid of the dark!

Nothing holds a candle to Sprint!

Features ● = Yes ○ = No	Sprint 1.0	WordPerfect 4.2	MS Word 4.0	WordStar 4.0	MultiMate Adv. II, 1.0
Maximum file size	Disk	Disk	Disk	Disk	128K
Thesaurus (integrated)	●	●	●	●	●
Windows Open (maximum)	6	2	8	1	1
Files Open (maximum)	24	2	8	1	1
Cross-Reference (dynamic)	●	○	○	○	○
Indexing Options	7	1	3	3	○
Columns: Parallel	●	●	●	●	●
Snaking (chg. # same page)	●	●	Not same pg.	○	●
H-P LaserJet Support	Full	Partial	Full	Partial	Full
PostScript Support	Full	Text	Full	○	Text
Mouse Support (integrated)	●	○	●	○	○
Dynamic Shortcuts	●	○	○	○	○
Alternative User Interfaces	●	○	○	○	○
Verify Spelling as you type	●	○	○	○	○
Programmable Macro lang.	●	○	○	○	○
Save File[1]	5.9	41.1	9.7	4.4	1.0
Top to Bottom[2]	7.5	7.5	49.4	8.1	21.0
Search and Replace[3]	1.6	6.6	4.6	17.1	13.4
Find Unique Word	3.3	6.2	7.0	13.8	20.6
Suggested List Price	**$199.95**	**$495.00**	**$450.00**	**$495.00**	**$565.00**

Time tests were performed on an Acer 286 (8 MHz), 640K RAM. [1]File size 103K. [2]1636 lines. [3]14 occurrences. Times shown are in seconds. (Benchmark details available upon request.)

Prices and specifications subject to change without notice.

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

All Borland products are trademarks or registered trademarks of Borland International, Inc. Other brand and product names are trademarks of their respective holders. Copyright ©1988 Borland International, Inc.

BI 1237A

Forgetting to "Save" is a fact of life as are power outages, and it used to be that a power outage could wipe out everything you've done. Not any more. Your work is always safe when you Sprint.®

Sprint's "Auto-Save" automatically saves your words as you type, so if the lights do go out, you may be in deep darkness but not deep trouble.

Sprint's Auto-Save is more than "insurance," it's also invisible. You know it's there, but it does its job without interrupting yours.

Sprint: It's the word processor with everything!

You name it, Sprint's got it. Incredible speed, Auto-Save, a customizable user interface, and professional output. Sprint even includes a bonus pack of alternative user interfaces that make it act like WordStar,® MultiMate,® WordPerfect,® Microsoft® Word, or other familiar word processors—a $99 value free!

Sprint has all this and does all this for only $199.95 instead of the up to $600 that some companies demand. Sprint automatically saves your words; it also automatically saves your money. Sprint—The fast track to performance word processing.

60-Day Money-back Guarantee*
For the dealer nearest you
Call (800) 543-7543

BORLAND INTERNATIONAL

Circle 88 on reader service card

Everybody Loves a Winner

Editorial Manager Gina Vanlue and Assistant Editor Wes Nihei

JOHN HARDING

When *PC World* sponsored the first World Class PC Contest in 1983, readers voted for their favorite hardware and software products in a mere 14 categories. This year, contest entrants put their preferences on the line in a total of 35 divisions. Over the years, some products have remained favorites: Updated versions of *1-2-3*, *dBASE*, and *Flight Simulator* are still at the head of their respective classes on the software side, while Epson and Hayes continue to dominate the dot matrix printer and modem categories, respectively, in the hardware division.

Laser printers, laptops, desktop publishing software, and local area networks are just a few of the categories that have come into their own in the intervening five years. Through it all, *PC World* readers have developed strong opinions and fierce loyalties. Assistant Editor Wes Nihei coordinated this year's World Class Awards. One consistent and reassuring message emerges from the balloting, Wes reports: "Computer users expect—and reward—well-engineered hardware and understandable, functional software."

Of course, for one lucky reader there's another dimension to the World Class Awards. Editorial Manager Gina Vanlue had the pleasure of selecting our Grand Prize winner. How does it feel to give away more than $30,000 worth of hardware and software? "Great," Gina says, "although it took a few minutes to convince our Grand Prize winner that it really was his lucky day!"

While we're on the subject of winning PC products, *PC World*'s Best Buy recommendations deserve mention. In the past six months more than 30 products, from companies large and small, have qualified as Best Buys. What does it take to earn the seal of approval from *PC World*'s editors? Raw speed or a long list of features alone is not enough. It takes an extraordinary balance of features, performance, ease of use, and price—in short, *value*—to earn the Best Buy label. And when companies display this sort of respect for users, everybody wins.

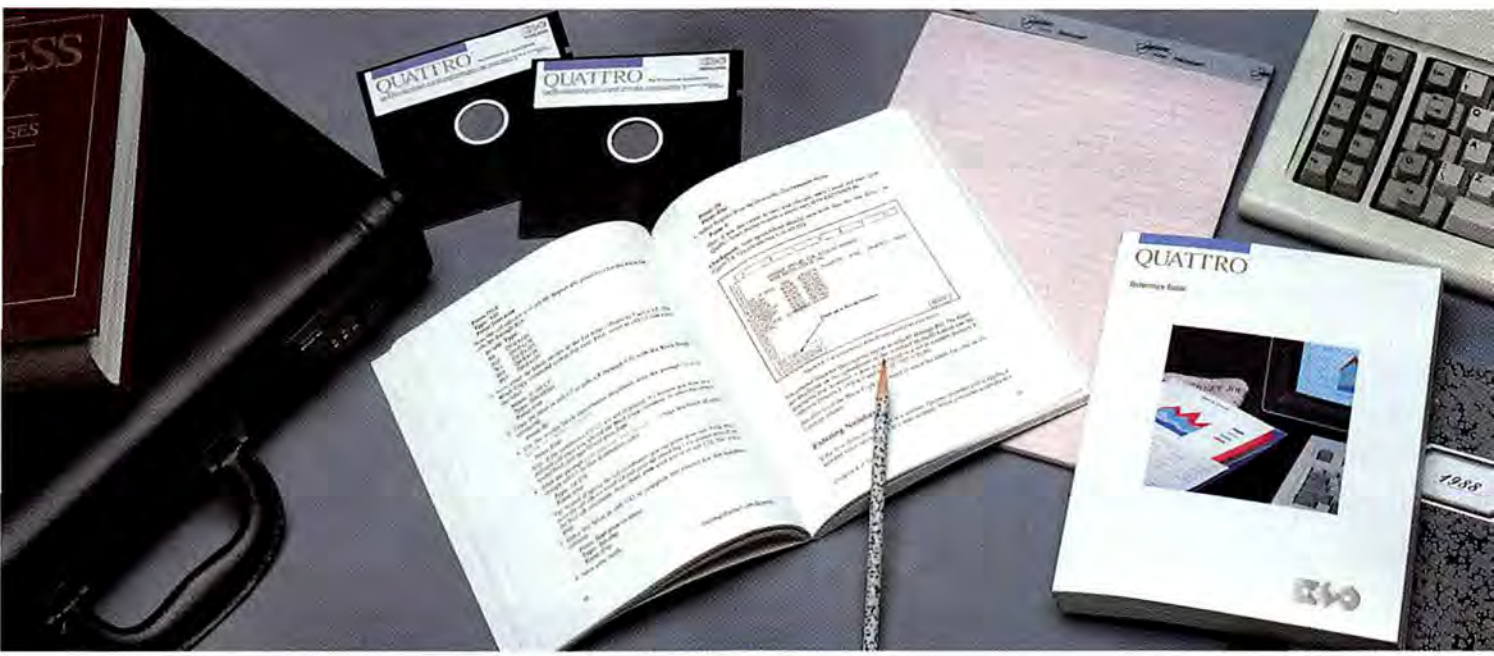
Also in this issue: Senior Editor Eric Knorr and NSTL team up to answer the question: "Is Your PC Ready for OS/2?" Contributing Editor TJ Byers ("Fax Times Seven") reviews the latest generation of boards that promise to put the office fax machine in your PC. Four intriguing new systems battle it out in "Compaq and IBM: Faster, Top to Bottom." DOS 4.00 is a shell of its former self, and that's good news, as Senior Editor Robert Luhn and Assistant Editor Scott Spanbauer ("DOS Lives!") discover. Finally, our buyers' guide to on-line services proves that information—of any kind—is only a phone call away. ●

Ed Bott

Ed Bott
Managing Editor

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

—John Walkenbach, InfoWorld



Here's what InfoWorld had to say about Quattro

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

Quattro includes SQZ!* Plus data compression

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

Reprinted with permission from InfoWorld.

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

All Borland products are trademarks or registered trademarks of Borland International, Inc. SQZ! is a registered trademark of Symantec Corp./Turner Hall Publishing division. Other brand and product names are trademarks of their respective holders. Copyright ©1988 Borland International, Inc. B 12124

Features: Improving the industry standard

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

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

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

BORLAND INTERNATIONAL

Performance: Markedly superior to 1-2-3

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

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

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

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

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

60-Day Money-back Guarantee*
Includes 3½" and 5¼" disks.

For the dealer nearest you or a brochure call (800) 543-7543

Circle 87 on reader service card

Born to run.

Most computers struggle to develop a talent for music. One was born with it:

The Yamaha® C1 Music Computer.

It's all wired for MIDI—with two INs, one THRU and eight OUTs. It even knows SMPTE, IN and OUT.

The C1 gives you access to thousands of programs for music and business—with a high-resolution 640×400 screen.

The C1 has a separate internal timer devoted to music applications. Keys conveniently marked with music symbols. And two programmable sliders, for greater MIDI control.

Of course, the C1 talks business as well as it does music. It's IBM-compatible, with a 286 processor and a full megabyte of memory (with room for 1.5MB more). Giving you access to thousands of the most advanced MS-DOS programs.

Choose from two models: one with a pair of 3.5″ disk drives, another with a single drive and built-in 20MB hard disk.

Either way, it can easily travel from stage to studio to office to living room. And it grows—with ports for monitor, modem, printer, mouse, even Toshiba-style expansion devices.

C1 for the road. It even comes with its own carrying case.

So whether you are sequencing, designing new sounds or simply trying to keep track of your vast wealth, call 800-333-4442 for your nearest authorized Yamaha C1 dealer.

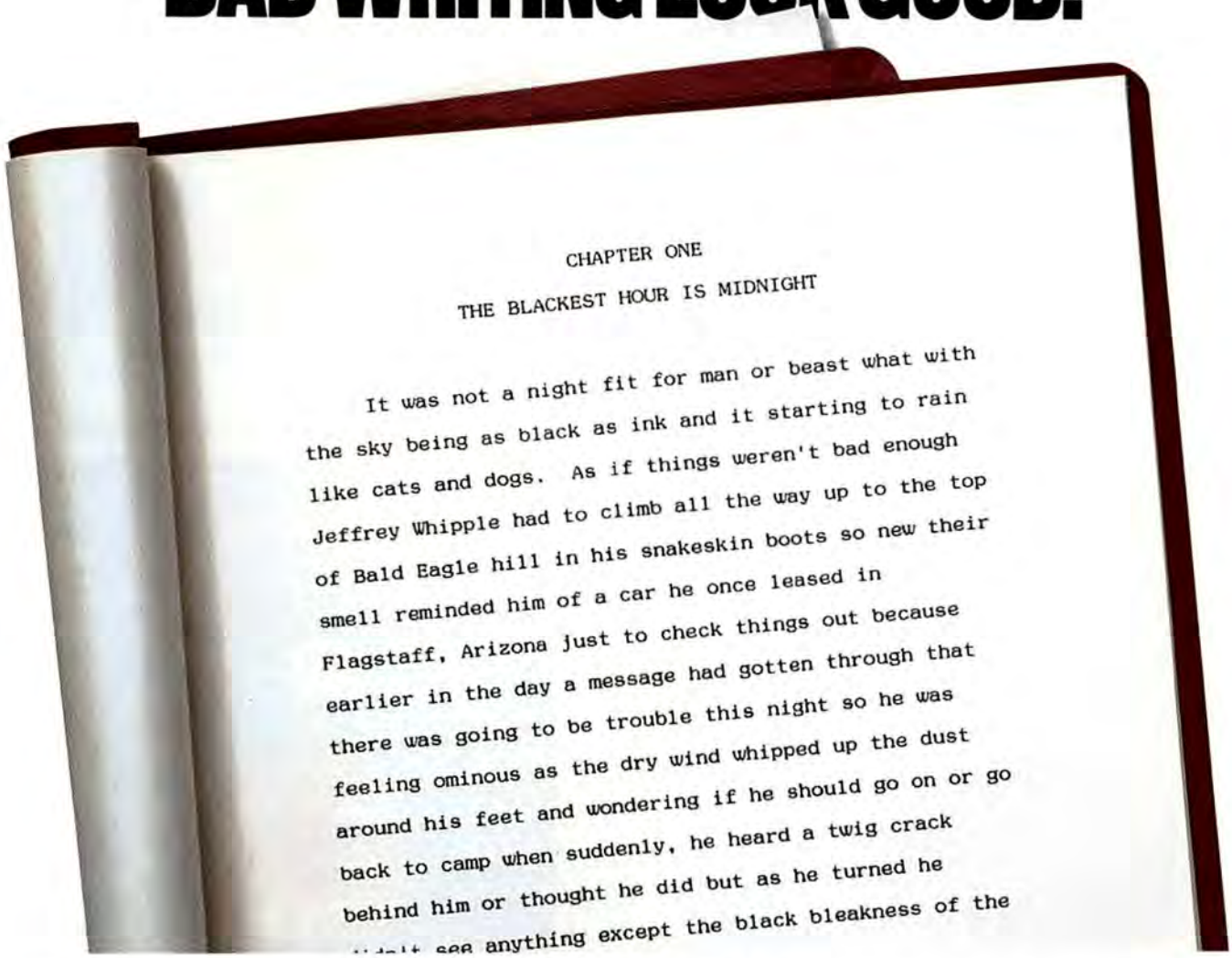
And take a screen test. Just don't be surprised by its special talent. After all, it's the product of a very musical family. **YAMAHA**®

Yamaha Music Corporation, USA, Digital Musical Instrument Division, P.O. Box 6600, Buena Park, CA 90622.
In Canada: Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario M1S3R1.

IBM is a registered trademark of IBM Corp. Excel and MS-DOS are registered trademarks of Microsoft Corp. Toshiba is a registered trademark of Toshiba America Inc.

Circle 273 on reader service card

OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.



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

The NEC Pinwriters can also enhance your writing in other ways. They have seven resident type styles. Plus four more are available on plug-in font cards. Which means you can express your thoughts with just the right typeface. You can also get an inexpensive, user-installed color option. And if graphics are part of your story, these Pinwriters produce the highest resolution of any printer you can buy.

Call NEC Information Systems at 1-800-343-4418 to see how much better our new Pinwriter P5200 and the wider P5300 can make your writing look. Whether you're a budding Hemingway, or a Hemingway & Company.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC

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

C&C Computers and Communications

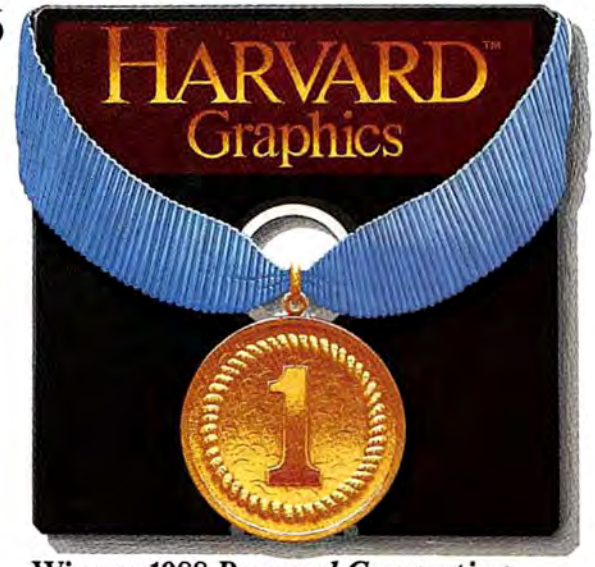
Circle 253 on reader service card

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

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

–Jim Seymour, "Best of '87" PC Magazine

"Product of the Year"–Infoworld 1988



Winner 1988 *Personal Computing* Graphics Challenge

Award Winning Performance.

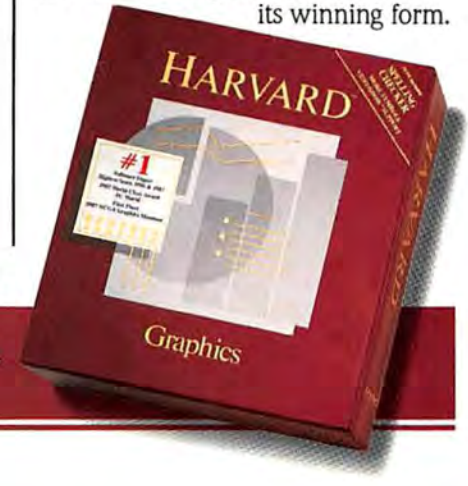
There are a number of prestigious honors in the graphics business. But only one program has captured them all. Harvard Graphics.

Harvard's flexibility, ease of use, and high quality output make it the unanimous choice of the nation's leading software evaluators.

We couldn't be more honored. But Harvard isn't resting on its laurels. New Harvard Graphics 2.1 adds a unique spelling checker, over 200 new symbols, improved editing capabilities and more.

There's one more recommendation we'd like to have. Yours.

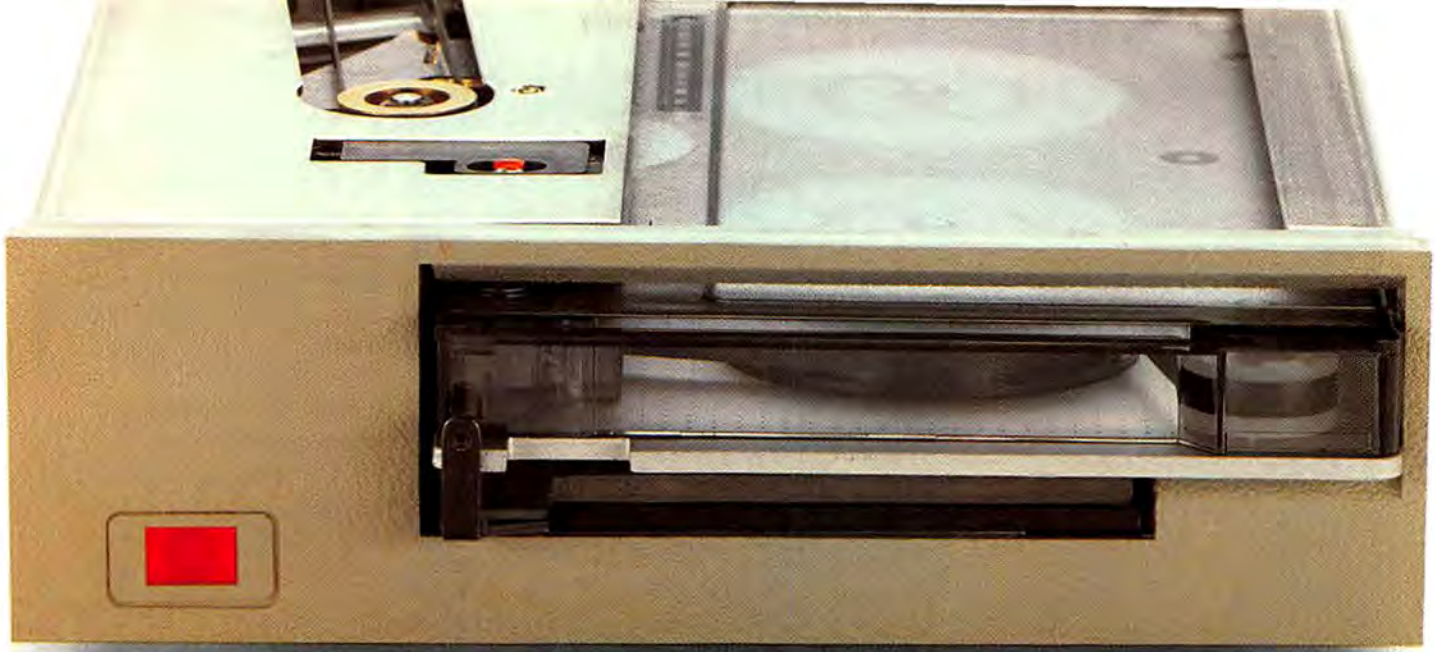
Call for a free trial disk and let Harvard Graphics demonstrate its winning form.



Graduate to New Harvard Graphics 2.1 with Spelling Checker.

For a free trial disk call 1-800-345-2888, 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.



High Tech Insurance

With Everex tape backup products, users of IBM® PC™/XT™/ATs®, compatibles or PS/2s™ can insure that the valuable information stored on their system hard disks is never lost. A variety of options are available including 40MB to 125MB capacity in cartridge, cassette or mini-cartridge drives—all at affordable prices.

Everex has been an industry leader since 1984, providing a variety of tape backup systems to meet your data security needs. Our external tape units are perfectly suited for sharing among several users because they can be easily transported from desk to desk. The popular half-height, internal units are designed to fit inside 5 1/4-inch disk drive slots. There's even a mini-cartridge drive that fits right into a disk drive slot and runs off an existing floppy controller.

With Everex tape systems, you have the flexibility to save or restore all information on your hard disk, including DOS and all other operating systems. Backup can be done file-by-file or as an entire mirror image, and you can restore individual files from image backups. You can also backup and restore data over Novell® networks, including bindery and trustee files that contain Novell network security information. If you have an assortment of PC/XT/ATs, compatibles and PS/2s, you can cut down on your backup costs by using one Everex tape backup unit. Just put a special controller card in each computer and share the tape unit among them.

When you buy an Everex tape backup system you get everything you need including manuals, software, blank tape, a cable and a controller card. This isn't true with other tape units on the market today—their extra costs can add as much as $250 to a system.

When it comes to insuring your data, it's easy to see why **Everex has the answer.**

For more information or the name of your nearest Everex dealer please call:

in USA **1-800-821-0806**

in Calif. **1-800-821-0807**

EVEREX

EVER for EXcellence ®

415-498-1111 **48431 Milmont Drive, Fremont, CA 94538**

EVEREX is a trademark and EVER for EXcellence is a registered trademark of Everex Systems, Inc. IBM and AT are registered trademarks and PC, XT and PS/2 are trademarks of International Business Machines Corp. Novell is a registered trademark of Novell Inc. ©1988 Everex Systems Inc. All rights reserved.

Circle 244 on reader service card

ORACLE® sets world performance record—265 TP1 transactions per second

On July 18th, 1988, ORACLE made history by setting performance records in every major computing environment. Using the industry standard TP1 benchmark, ORACLE set speed records on IBM mainframes running MVS, DEC VAX minicomputers running VMS, and minicomputers running UNIX.

ORACLE set the world record for performance by running 265 TP1 transactions per second (tps) on a 3090 model 600E class mainframe running the IBM MVS operating system. This breaks the old record of 240 TP1 tps set by a cluster of 16 Tandem computers.

ORACLE also set the record for DEC minicomputers by running 49 TP1 tps on a VAX 6240 running VMS. This breaks the previous VAX/VMS record of 29 TP1 tps set on a VAX 8700 connected to a VAX 8800. Not only is ORACLE's performance nearly twice as fast as this previous record, but ORACLE's cost per transaction is almost four times better than that of the other system. And ORACLE's results were audited and verified by the Codd and Date Consulting Group.

ORACLE set a UNIX record of 110 TP1 tps on a large minicomputer from Sequent as well. These results were achieved processing a 1.1 gigabyte database containing 11 million rows of data. Once again, the results were independently verified by the Codd and Date Consulting Group.

ORACLE has long been recognized as the technology leader in DBMS portability. (ORACLE is still the only DBMS in the world that runs on MVS, VMS and UNIX.) Now ORACLE is the clear technology leader in performance as well. Your DBMS decision just got a little easier. Call us at 800-345-DBMS and run the portable performer.

Copyright © 1988 by Oracle Corporation
ORACLE is a registered trademark of Oracle Corporation. Other companies mentioned own numerous registered trademarks

ORACLE®

COMPATIBILITY · PORTABILITY · CONNECTABILITY

Call 1-800-345-DBMS, ext. 146 today.

20 Davis Drive, Belmont, CA 94002 • World Headquarters (415) 598-8000 • Calgary (403) 265-2622 • Ottawa (613) 238-2381 • Quebec (514) 337-0755 • Toronto (416) 596-7750 • ORACLE Systems Australia 61-2-959-5080 • ORACLE Europe 44-1-948-6911 • ORACLE Systems Hong Kong 852-5-268845 TRBA

PS/2s Being Discounted

IBM's Gamble on Micro Channel Architecture Brings Low Return

Once sold at a premium, IBM microcomputers are being steeply discounted, reports market researcher StoreBoard, Incorporated. IBM blames the price cutting on its sales bonus program for PS/2 dealers, which it has now discontinued. But StoreBoard marketing manager Bob Grenier blames IBM's abandonment of industry standard bus architecture (ISA) in favor of Micro Channel Architecture. "Prices of PS/2s had to be lowered, and dealers were pushed to carry a lot of inventory, which in essence made them push PS/2s out the door at a lower price," he explains. Until six months ago, IBM models had sold at top dollar, with Big Blue's share of market revenue far outstripping its unit share. This year, however, as the PS/2's novelty has worn off and ISA models have continued to dominate sales, IBM's revenue and unit shares have converged. Both accounted for 32 percent of all dealer sales at the end of the second quarter, compared with 46 percent for revenue and 43 percent for units during the same quarter a year earlier, reports Grenier. Meanwhile, Compaq Computer has been charging a premium for its ISA systems and is still gaining market share; Compaq sold only 17 percent of all units but garnered 25 percent of market revenue during the second quarter. "Market data indicates that acceptance of IBM PS/2 products remains stalled," crows Compaq vice president Mike Swavely. Of course, the dealer channel accounts for only 35 percent of sales, and IBM does better distributing directly to large accounts. However, *PC World* interviews with some large corporate buyers substantiate Grenier's and Swavely's contention.

Scanning a Page at a Time

Caere calls OmniPage a Scanner Software Breakthrough

Caere Corporation is shipping what it describes as the first page-recognition software for the personal computer. Unlike current optical character recognition (OCR) packages, Caere's *OmniPage* "recognizes" a whole page at once, regardless of the mix of graphics and typefaces involved, claims Director of Office Products Larry Miller. Compatible with both IBM PC and Macintosh scanners, *OmniPage* employs artificial intelligence to recognize 8½-by-11-inch or 11-by-17-inch pages; columns; indentations; and a wide number of fonts, as well as to teach itself new fonts as it encounters them. The $1995 IBM-compatible version of *OmniPage* ships with a run-time version of *Microsoft Windows 2.0* and a Motorola 68020-based coprocessor board with 2MB of memory. The board handles most of the computation-intensive scanning processing at 40 to 115 cps, freeing up the computer's main processor. Compatible with the new Apple Scanner, Hewlett-Packard's ScanJet, and Canon's IX-12, *OmniPage* also reads bit-mapped and TIFF files created by other scanners and can convert ASCII text into the formats of most popular word processors and desktop publishers. This is the first retail product for Caere, a supplier of OCR and bar-code scanners that was established by Intel founder Robert Noyce 15 years ago. *OmniPage* is being comarketed by both Hewlett-Packard and Apple.

Xerox Builds a Family

Xerox's Ventura Publisher Gets Network Version and New "Professional" Features

Xerox has expanded *Ventura Publisher* into what it calls a family of products and has added more than 70 new features. In addition to *Xerox Ventura Publisher 2.0*, it has introduced *Xerox Ventura Publisher: Network Server* and *Xerox Ventura Publisher: Professional Extension*. The former brings the software to work groups using the most popular LANs, while the latter has new "professional" features such as expanded memory support, automatic vertical justification, and WYSIWYG equation generation. (For product highlights, see the preview in this issue.) Xerox claims that these additions to its line enable the company to compete in the professional publishing and technical engineering arenas heretofore dominated by Interleaf's family of high-priced publishing products. However, *Ventura Publisher 2.0* lacks the dedicated word processing, graphics, and other integrated capabilities of the $2500 *IBM Interleaf Publisher*. Xerox marketing manager Randi Doeker characterizes the Interleaf product as "a dramatic change, a way of life," adding that her company prefers to let users choose their own complementary applications and keep its $895 core package. *Professional Extension* will retail for $595, while *Network Server* includes one file server version of 2.0 for $1295. Xerox expects to sell two-thirds of the 150,000 full-feature desktop publishing units estimated to ship for the PC this year.

TOPS Takes Off

Sun's Networking Acquisition Zooms to 500,000 Network Nodes This Year

TOPS Corporation is experiencing an explosive growth in demand for its *TOPS* distributed networks. The company, which has grown from 30 employees to 230 and shipped 500,000 network nodes since Sun Microsystems purchased it 15 months ago, shipped 70,000 copies in June alone. The subsidiary's financials are mixed with Sun's, but TOPS general manager Rich Shapero reveals that TOPS gained almost 50 percent of its revenues in its last quarter, half of that during the last month of the fiscal year ended June 30, 1988. *TOPS*' soaring sales have boosted it to the number three slot behind *1-2-3* and *WordPerfect* on the Micro D bestseller list. Founded by entrepreneur Nat Goldhaver two years ago, TOPS had shipped about 20,000 units in the six months before being acquired by Sun. "By an infusion of capital, more formal planning, and building a management team, Sun has taken it to the next plateau," explains Shapero. *TOPS* differs from server-based competitors like 3Com's *3+* and Novell's *Netware* in that it distributes files across all nodes. *TOPS* is better for mixing Macintoshes and PC compatibles on a single network thanks to its file interchange software, and a *TOPS* node can function as a gateway into server-based LANs. *TOPS* lists for less than $300 per Mac node and for around $425 per PC node, with street prices at half of list.

AST Attacks

Nouveau System Maker Targets IBM's and Compaq's 286 Market Share

Having turned potential disaster into a computer-making success story, former board maker AST Research is now after IBM's and Compaq Computer's market share. AST capped off its first full year of making computers with a groundbreaking for a new $30 million headquarters in Irvine, California, and a $2.2 million television advertising campaign that aired during the recent summer Olympics. Broad-based consumer advertising is rare for PC industry companies, and AST's 15- and 30-second Olympic spots indicate that the company "has arrived," says Senior Vice President James Ashbrook. This advertising pull is being complemented by lower prices on most models and deeper discounts for AST dealers. The system maker, which recently signed volume purchase agreements with the MicroAge and ComputerLand chains, believes that IBM and Compaq are focused on 80386-based computers, providing the opportunity for AST's Premium/286s to squeeze onto more first-tier dealers' shelves. "We're focusing our sales force and marketing programs on the 286," says Ashbrook, who claims that the Premium/286 is already the third most popular brand behind comparable IBM and Compaq models. AST has shipped more than 130,000 of the machines. Diversification into systems had depressed AST's balance sheet and stock price at the end of 1987. But the company closed fiscal year 1988 on June 30 with a 100 percent increase in revenues to $412.7 million, and $15.1 million in profits, more than half of which came in the fourth quarter.

Tandy Consolidates DeskMate

New Single-User and LAN Versions Enhanced

Tandy Corporation has consolidated the various versions of its *DeskMate* environment/desktop utility into a single upgraded package with a network extension. "It was getting too confusing," says Vice President of Software Design Scott Cutler, referring to all iterations of *Personal DeskMate*, *DeskMate II*, and *Professional DeskMate* that have evolved since 1984. *DeskMate 3.0* will work on all Tandy machines and be resident in ROM on the new Tandy 1000 TL and 1000 SL. In addition to its bit-mapped graphic user interface, *DeskMate 3.0* includes a text editor with a 90,000-word spelling checker, a spreadsheet, a communications module, a drawing program, a card file, an auto-dialer, a calendar, and a to-do list. On a LAN, *DeskMate Workgroup Companion* adds a shared address book, the ability to redirect output to different printers, remote access to the computer by modem, and a central phone-messaging capability. Also added is an "action item" capability that lets multiple work-group members comment on a topic in a single file. More than a dozen third-party vendors have announced applications for the *DeskMate* environment. In addition, 3Com has announced plans to bundle selected portions of *DeskMate Workgroup Companion* with some of its networking products. *DeskMate 3.0* retails for $99.95, while *DeskMate Workgroup Companion* is $149.95.

The Bus Stops Here!

Introducing Wells American's CompuStar® Multi-Bus Business Computers. The world's first and only multi-processor, convertible bus™ microcomputers.

Ask any computer expert about what type of system you should buy nowadays and you'll likely get a "pass the bus" response. Something like — "Well, uh, the PC/AT* bus is your best buy but, then again, the new PS/2* bus may become the next industry standard." Great advice, right? If trying to decide on a processor weren't tough enough, now you're expected to pick a bus, too.

RELAX, NOW THERE'S COMPUSTAR®.

The all new CompuStar® from Wells American not only lets you interchange microprocessors, you can also mix and match buses — a PC/AT bus, a PS/2 bus or. . .both. As your computing needs change, simply snap in a new processor or add an extra bus. You'll never again have to worry about buying the *wrong* computer system!

FOUR COMPLETE SYSTEMS IN ONE.

The CompuStar can be configured with any of four microprocessors — an 8086, an 80286, an 80386SX, or an 80386. The processor and up to *16* megabytes of user memory have all been combined, using the latest VLSI technology, on a single, plug-in CPU module. Plus, any time during the first year of ownership, CompuStar users can "trade-in" the CPU module they initially selected toward the purchase of any of the other more powerful modules. *Nobody* but Wells American gives you this kind of value.

CONVERTIBLE BUS? YOU'RE KIDDING!

No, we're not. In fact, it may well be the most practical microcomputer innovation ever. Say you've selected an AT compatible CompuStar and later want to add PS/2 compatibility. No problem! Snap in a PS/2 Bus and Adapter Module and you can use *both* buses in the same system. Likewise, if you've selected a PS/2 compatible CompuStar and decide you want to add an AT bus, just snap in an AT Bus Module. Depending on configuration, the CompuStar can have up to *13* bus expansion slots — all AT slots, all PS/2 slots or a "split-bus" of AT *and* PS/2 slots. Best of all, you can reconfigure your CompuStar whenever you want.

$1995

The CompuStar is also easily expanded. That's because there are *seven* CompuStar disk/tape compartments — six accessible from the front and an additional full-height bay inside. All this in a sleek, compact tower design that actually leaves *more* room on your desktop than any of the so-called "desktop" models.

A NEW IDEA FROM AN OLD COMPANY.

The CompuStar® Multi-Processor, Convertible Bus™ Microcomputer. It's no surprise that our engineers invented it. After all, we've been making microcomputers longer than anyone else. . .even longer than IBM! And if that kind of experience doesn't impress you, CompuStar's service programs surely will. You can select an optional overnight module swap-out plan or on-site service from General Electric Corporation — one of the most respected names in consumer electronics. And, of course, every CompuStar carries a full one-year factory warranty.

FINALLY, AFFORDABLE TECHNOLOGY.

Think all this technology sounds expensive? It's not. CompuStar 20MHz 80286 systems start as low as $1995†. There are also inexpensive 8086 and powerhouse 25MHz 80386 systems available. Plus, there is a wide variety of CompuStar display, tape and disk options including a one gigabyte erasable optical disk. You can choose a factory preconfigured CompuStar or custom design one yourself. Just unlock the front panel and literally "snap-in" a bus, CPU or disk module in a matter of seconds. It's system flexibility never before available. . .at *any* price.

While one of our competitors (we won't mention any names) threatens you with "missing the bus," most simply *pass* the bus. Our new CompuStar however, *eliminates* the bus problem altogether. Not to mention the processor problem. Even the expansion problem. Prove it to yourself. Call today about our CompuStar 31-day trial offer. Oh, and by the way, the next time anyone asks, tell 'em you know where the bus stops.

Wells American

Corporate Headquarters: 3243 Sunset Boulevard • West Columbia, SC 29169 • 803/796-7800 • TWX510-601-2645

*Personal Computer AT, AT and PS/2 are trademarks of International Business Machines Corporation. †Photograph depicts optional equipment. Complete price list available upon request. CompuStar 80286 base system ($1995) includes built-in VGA/EGA display adapter, one diskette drive with controller, two serial/one parallel/one mouse port, keyboard and 220 watt power supply.

Circle 216 on reader service card

386SX Models Pick Up

Intel Predicts 30 to 50 Introductions Before Year-End

It could be an 80386SX Christmas. Based on PC manufacturer commitments, Intel Corporation 80386SX product manager Marc Rayacich expects between 30 and 50 manufacturers to introduce 386SX models before year-end, including "about 10 household names. In fact," says Rayacich, "I can't think of any of our PC customers who aren't looking very hard at the 386SX." Compaq was the first out, introducing its 386S shortly after the SX chip's mid-June announcement. In recent months, NCR Corporation has announced a 386SX add-in board for upgrading its current systems, and NEC Information Systems has introduced both a PowerMate SX for the desktop and the PowerMate Portable SX. The chip can run the same 32-bit software at the same speed as the standard 16-MHz 386 but has somewhat slower 16-bit external data pathways. It costs less and can be integrated into current 286 designs relatively easily, says Rayacich. Intel can now supply all the chips that manufacturers need and expects "a few hundred thousand units" to ship before year end. The challenge for next year, adds Rayacich, will be to bring 386SX system prices down to the neighborhood of similar 286-based configurations and to keep up with expected demand: "I will be extremely disappointed if we get less than 2 million orders and shocked if we get more than 4 million."

Borland Gets the Bugs Out

Turbo Pascal, Turbo C, and Assembler Finally Get a Debugger

Borland International has begun shipping the long-awaited debugger for its Turbo Pascal and Turbo C languages, which have sold more than 1.2 million copies since Borland first shipped Turbo Pascal in 1983. Versions 2.0 of Turbo C and 5.0 of Turbo Pascal have integral debuggers for compiling, editing, and linking smaller programs. But Borland has also introduced a more versatile debugger with an assembler—called *Turbo Assembler & Debugger*—that product manager David Intersimone claims is easier to use and more powerful than the *CodeView* debugger for Microsoft languages, Borland's principal competition.
In addition to providing the ability to set global breakpoints, *Turbo Assembler & Debugger* lets the programmer use conditional statements to set an unlimited number of local breakpoints and features a key-event logger to record all or portions of debugging sessions on disk for easy return. The debugger uses nested pulldown menus with point-and-shoot command selection, plus overlapping windows for up to 12 views of key program elements such as source module, variables, breakpoints, and active functions. It also provides various ways to reserve conventional memory for the debugged program. It supports LIM EMS 3.2 and can run in extended memory on an 80386 machine or even on a remote machine connected via serial cable. The program usually requires 200K of conventional memory, although the symbol table and other files can reside in high memory.

Wells Clones the PS/2

Company to Offer Both AT-Style and MCA-Compatible Buses in One Box

Mail-order computer supplier Wells American has introduced what it bills as "the world's first and only...convertible bus microcomputers," featuring both MCA-compatible and standard AT-style buses. The floor-standing CompuStar can be fitted with up to 13 AT-style expansion slots, 10 MCA-compatible expansion slots, or a combination of 7 AT-style and 5 MCA-style slots. In addition, the easily reconfigurable line features a passive backplane architecture that accommodates CPU cards with either Intel 8086, 80386, or 80386SX processors or an 80286 CPU from Harris Corporation. "The two dilemmas—which processor and which bus to use—are the key to most people's buying decision," says Product Manager Mike Hoyle. "The CompuStar gives users freedom from the dilemma." But Wells legal counsel Kenneth King demurs when asked if the company has a license from IBM to clone MCA, responding that "CompuStar in its present state infringes no known patents." However, MCA-compatible chipset makers maintain that 100 percent compatibility with MCA can be achieved only by copying portions of the architecture and that IBM's permission is needed to do so. Wells is now shipping a CompuStar with the 80286 6/20-MHz Harris chip and an AT-style bus. An 8086 CPU card will be available in October, and 80386 versions will be available in November in 8/16-MHz, 10/20-MHz, and 12.5/25-MHz configurations. ●

How To Fill Your Days With Fantasy, Adventure, Perception, Finance, Information, Excitement, And Much, Much More... Every Month.

SHARPEN YOUR PC SKILLS

► Subscribe to Big Blue Disk, a monthly collection of the finest software available, designed specifically for the IBM™ PC. Month after month, you will learn more about your PC and its capabilities than you would have ever thought possible. And have fun doing it!

BUILD A GREAT SOFTWARE LIBRARY

► Each issue is packed with easy-to-use programs including telecommunications, utilities, role-playing games, accounting, spreadsheets and more. With a subscription, you'll use your IBM PC or compatible every day for entertainment, education, and home and business management. And you'll have a great software library before you know it!

TWO ALL-NEW PROGRAM-PACKED DISKS EVERY MONTH

► Every month, Big Blue Disk packs the best software available, letters to the editor, product reviews, helpful hints and more – all on two 5¼" disks that are delivered right to your door. Now, all of this is available to you through a Three-Month Trial Subscription Offer of only $19.95. That's only $6.65 per month! Where else can you get unprotected, top-quality programs for less than a dollar each? Join the thousands of Big Blue Disk subscribers. Call to get your subscription started today!

YES! Please rush my free "Best of BIG BLUE DISK" and start my three-month subscription to BIG BLUE DISK for my IBM PC or compatible for only $19.95 postage paid. I understand that this is a trial subscription and that I am under no obligation to continue beyond three months. (Canada/Mexico $24.95, Overseas $27.95) Make checks payable to Softdisk, Inc., in U.S. funds.

FREE "Best of Big Blue Disk" – Nine of our best programs from recent issues, just for taking advantage of our Three-Month Trial Subscription Offer. SATISFACTION GUARANTEED – If you are not satisfied with your purchase for any reason, return your first issue for a full refund. The "Best of Big Blue Disk" is yours to keep.

_____ BIG BLUE DISK™ (5¼" disk) or _____ BIG BLUE DISK™ (3½" disk)

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____ PW 108

TELEPHONE _____

_____ Visa/MC _____ AmEx _____ Payment Enclosed (Louisiana Residents add 4% Sales Tax)

CARD # _____ Exp. Date _____

SIGNATURE _____

SOFTDISK INC. · P.O. BOX 30008 · Shreveport, LA 71130-0008

CALL TOLL FREE
1-800-831-2694

IBM IS A TRADEMARK OF INTERNATIONAL BUSINESS MACHINES, INC.

Circle 66 on reader service card

A D V A N C E D | R E V E L A T I O N

This wasn't supposed to happen until the year 2000.

A thrilling leap forward for database management

Advanced Revelation™ brings remarkably powerful tools, infinite flexibility and vastly increased productivity to the PC environment.

Making it the developers' choice when handling sophisticated network applications such as sales, personnel and asset management.

Yet it's simple enough for non-technical users to build applications after one day's training.

As you read on you'll see: with Advanced Revelation, database management is *already* everything you'd like it to be.

Data Dictionary eliminates source code

The gateway to Advanced Revelation's power is our central, active data dictionary. It contains everything you need to define the attributes of each field and bring life to your applications.

No other system has anything like it. When you change, add or delete fields, the dictionary remembers and records it for you. Without programming or coding.

Environmental Bonding™ improves all your existing capabilities

Environmental Bonding brings Advanced Revelation's powerful features to your existing applications.

Making your investment in systems—PC based, Mini or Mainframe—provide even greater returns.

Because for the first time, this breakthrough technology lets you use your existing information—read and write from other systems—with Advanced Revelation's Application Tools.

Seamlessly. Which means no disruptive data conversions, duplicate data or cumbersome and time-consuming import/export requirements.

Variable Length Fields extend your flexibility

With other DBMS's, once you define the number of characters in a field, it's set in stone.

Not so with Advanced Revelation's variable length fields. Where you can enter virtually any number of characters into a field. Making it especially nice for text-oriented information.

What's more, variable length fields are only as long as the information they hold. Using an average of 40% less disk space than any fixed length system.

Help is always near

You can set the degree of on-line help you need with Advanced Revelation. From simple, context-sensitive help that automatically appears each time you enter a new tool or program. To no help whatsoever.

Meanwhile, Revelation Technologies provides all the levels of help necessary for today's business users. From our customer service hot-line. To our Advantage Programs for volume users and developers.

It's all part of the forward thinking our customers have come to rely on.

Support. Technical innovation. Continuing commitment.

So your wishes come true a lot sooner than you expected.

Call Toll Free
1-800-327-0216

RevelationTechnologies

We think like you do.

Two Park Avenue, New York, NY 10016 (212) 689-1000 3633 136th Place SE, Bellevue, WA 98006 (206) 643-9898 Note: Advanced Revelation is compatible with the IBM PC-AT, IBM PS/2 and other 100% compatibles; it supports the DOS and OS/2 operating environments and all major PC networks. Advanced Revelation and Environmental Bonding are trademarks of Revelation Technologies Inc.

Circle 167 on reader service card

INTENSE COMPETITION HAS A WAY OF BRINGING OUT THE BEST.

In the computer industry, manufacturers fight to make their machines faster, friendlier, and more powerful than everybody else's. But as you may have noticed, the most successful competitors build their systems around the same chip: Intel's 386™ microprocessor.

Why has this one chip become the common denominator in computing? Not just because it gives their machines blazing performance. But because it's fully compatible with the broadest range of software available today.

And tomorrow.

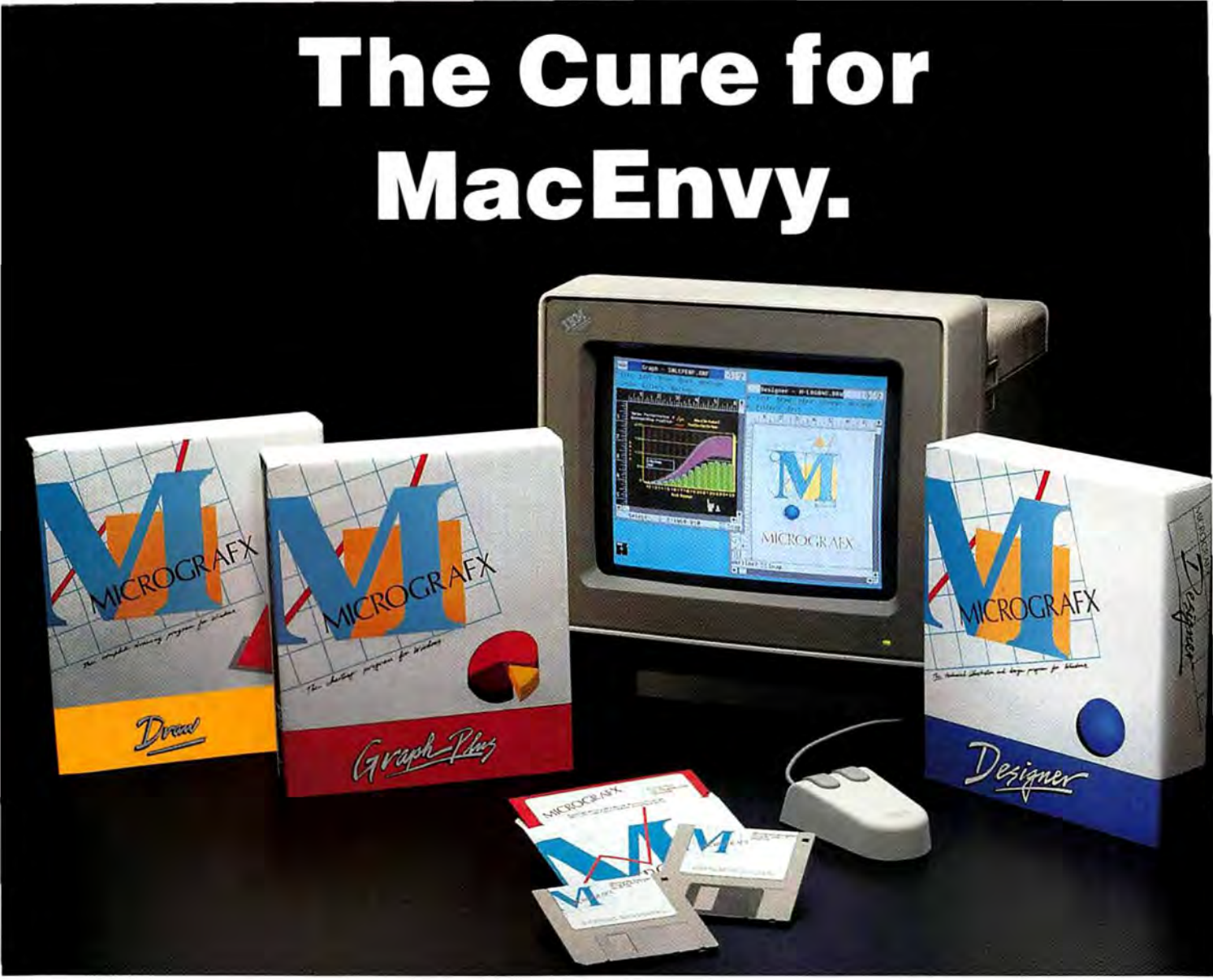
So before you buy a new machine, make sure it has our 386 chip inside. After all, if these major companies wouldn't try to compete without it, why should you?

intel®

386 is a trademark of Intel Corporation. ©1988 Intel Corporation.

Circle 272 on reader service card

The Cure for MacEnvy.



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.

Enter Micrografx.

With the Micrografx family of applications, you don't have to trade in your PC. Micrografx software turns your computer into a complete graphics studio for desktop design, publishing, and presentations.

Allow us to illustrate.

Micrografx Designer lets you go from rough concept to finished art, giving you the power to bring your ideas to life. Micrografx Graph Plus™ is packed with easy-to-use charting features for the business user. Micrografx Draw™ gives you control and simplicity in a basic drawing program. And Micrografx software supports hundreds of printers like HP's LaserJet™ and PaintJet.™ All PostScript™ devices, too.

And there's more. Micrografx ClipArt™ libraries contain volumes of professionally designed symbols and illustrations. Micrografx Convert™ translates between the PIC and DXF file formats.

So take a bite out of the argument that PCs can't do superior graphics, and get the cure for MacEnvy. Ask your dealer for a demonstration or call us for more information.

Micrografx. The picture of success.

MICROGRAFX

1820 N. Greenville Ave. • Richardson, TX 75081
214/234-1769 • 800/272-3729
Telex 650309-3890 • FAX 2142342410

More Power to You

Twists in technology don't have to be painful. DOS 4.00 means simpler, more powerful DOS applications and a smoother transition to OS/2.

Richard Landry

FRED STIMSON

There's an old saying, You can tell the pioneers by the arrows in their backs. Most PC users have felt the sting of those arrows at one time or another. But the darts have never flown so thick and fast as during the last year, when IBM set out to convince unwary users not only that the AT bus was dead but that OS/2 was about to make their massive investments in DOS applications obsolete too.

Since then the news on the hardware front hasn't gotten any better. One look at our breakthrough OS/2 multitasking report from NSTL (see "Is Your PC Ready for OS/2?" in this issue) should convince any would-be pioneer that the next generation's OS/2 applications will require a different kind of system than those now on most users' desktops. PCs armed with 386 chips, plenty of 32-bit RAM, memory caching, and super-fast hard disks will be standard equipment to run tomorrow's software. But how many people have such a system today? And what guarantee do buyers have that today's "next-generation" systems will be up to tomorrow's tasks?

IBM must have gotten a clear message from the large number of users who are balking at PS/2 purchases, because the newly released DOS 4.00 is a marvel of conservatism (see "DOS Lives!" in this issue). Besides finally cracking the 32MB barrier for hard disk partitions (a feat even OS/2 doesn't manage), DOS 4.00 includes a number of features guaranteed to extend the life of the old operating system well into the next decade: a shell to make file and program management easier, a character-based interface that mimics the high-end Presentation Manager, and support for the EMS 4.0 expanded memory specification.

There's a certain irony to these improvements, because they confirm trends that IBM's been bucking all along. When Lotus, Intel, Microsoft, and AST announced EMS 4.0 last fall, for example, Big Blue was nowhere in sight (see my column for December 1987). Instead, perpetual upstart Quarterdeck Office Systems touted its support for the spec in *Desqview*. Microsoft followed suit with *Windows*, and later Borland jumped on the bandwagon with *SideKick Plus*.

Now it's clear that owners of today's PCs, ATs, and PS/2s can get more mileage from their hardware and software investments simply by adding an EMS 4.0–compatible board to their systems and matching it up with software that exploits the spec.

(continues)

With *Windows* or *Desqview*, multitasking old applications is a relative snap. With *SideKick Plus*, DOS becomes an environment with the kind of multitasking power you might reasonably expect from OS/2.

But support for a robust expanded memory spec is only part of the story. Ever since OS/2 was announced, IBM has been trying to put distance between its Presentation Manager interface and *Microsoft Windows*. DOS 4.00 does two things to demolish that strategy.

First, DOS 4.00 ensures that a host of interface improvements will bridge the DOS and OS/2 worlds. Like other large software firms, Lotus says it intends to move its character-based applications (such as *1-2-3*) to the DOS 4.00 interface. Products like Symantec's *GrandView* already incorporate the look of *Windows*, but in character mode. And Microsoft's not sitting still, either. Expect future *Windows* upgrades to sport a more functional version of the DOS 4.00–style shell, with the Presentation Manager's ability to group multiple applications together in "sets" that can be opened with a single keystroke. Expect *Windows* and the Presentation Manager to share a common, environment-wide macro language that will permit users to build powerful, customized systems from a menu. And finally, expect transparent data sharing between *Windows* and Presentation Manager applications.

Second, some of EMS 4.0's more esoteric features are designed to speed *Windows*' performance and extend its power to a level that rivals the Presentation Manager. For example, Microsoft is reportedly hard at work on ways to let *Windows* applications crack the 640K barrier. When that advancement finally makes the scene, the differences between *Windows* and OS/2 will be far less significant than the differences between character-based software and its graphics-based counterparts.

It doesn't take a crystal ball to see that in the next few years application software will split into three price/performance tiers: character-based DOS 4.00 software for owners of 8088 machines; *Windows* software for owners of 286 systems and for 386 owners who want a smooth transition from character mode to graphics mode; and 16-bit OS/2 software for users who can't solve their problems by any other means. All these directions will finally converge in a 386 version of OS/2 that will incorporate *Windows/386*'s ability to multitask DOS applications.

I recently met a prominent *Windows* developer who gave me this assessment of today's Presentation Manager: "It's just like *Windows* was two years ago—slow and buggy." Pioneers take note! Though you shouldn't expect the arrows to stop flying, it's heartening to know that even Big Blue pays attention when users say, Enough!

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. ●

POWER TIP NO. 11

MultiMate Puts Fonts at Your Fingertips

With *MultiMate Advantage II*, you can display the fonts available for your laser printer—and bypass the print options screen—by pressing <Alt>-C? when creating or editing a document.

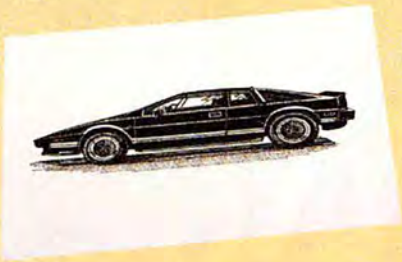
Irene Patti
Ashton-Tate,
East Hartford,
Connecticut

POWER TIP NO. 12

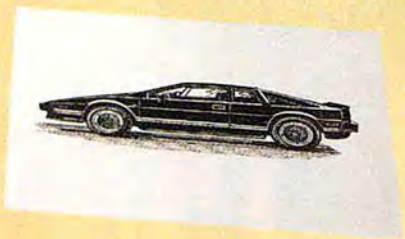
Fast Caps With Word

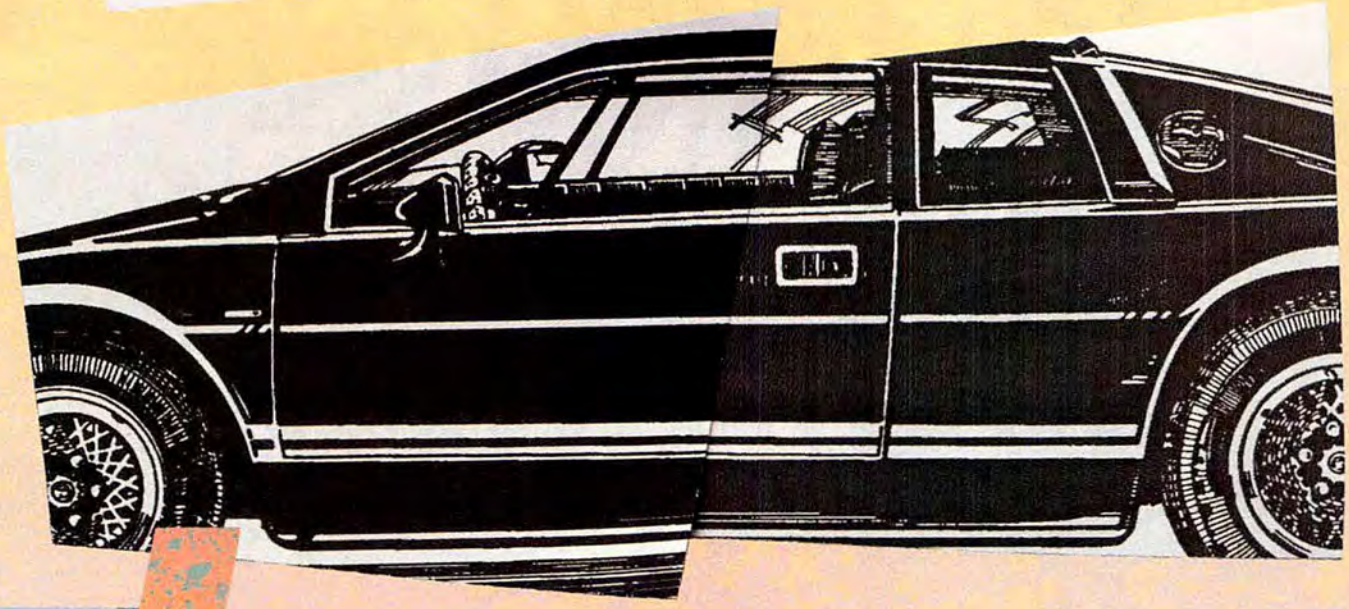
Microsoft Word doesn't have a command that capitalizes text. But there's a shortcut. Highlight the text and press <Alt>-K, the small-caps command. With some printers, you'll get ¾-size capital letters. But with some laser printer fonts, most dot matrix printers, and all daisy wheel printers, you'll get normal-size caps. This quick trick adds a feature that *Word* lacks, but shouldn't.

Robert Luhn
Senior Editor



These unretouched print samples show the superior print quality of QMS-PS 810 over printers using first-generation print engines.





ntroducing the PostScript laser printer that blacks out at high speeds.

The new QMS-PS® 810 can compose and print the most complex pages in record times, with richer, more saturated blacks than ever before. All with the desktop publishing power of Adobe PostScript®, and the superior print know-how of QMS, an industry leader.

Under the hood QMS ASAP™ (Advanced System Architecture for PostScript) is proprietary technology that helps eliminate the hardware bottlenecks that hinder other PostScript printers. As a result, QMS-PS 810 boasts processing speeds remarkably faster than other PostScript printers in its class. And faster output means greater productivity. In addition, the QMS-PS 810 laser printer's new Canon® SX® print engine covers solid areas and prints fine detail better than previous-generation engines.

The new 8-page/minute QMS-PS 810 laser printer

Fast start, strong finish You can adorn your documents with one or all of the 35 Adobe typefaces. Thanks to PostScript, there's an infinite number of font variations available. You can also make type as large or as small as you want. And put it anywhere on the page. In fact, with PostScript you enjoy total control over the design of your page. It gives you the complete desktop publishing power to do things that would otherwise be virtually impossible. So you get high-quality output exactly how you want it.

Along with PostScript, the HP LaserJet+™, Diablo® 630 and HP-GL™ printer emulations are added for your non-PostScript software.

The QMS-PS 810 laser printer is easy to use, maintain, and comes with a one-year warranty. It's available from Laser Connection dealers. Laser Connection is a sales and marketing subsidiary of QMS. For the dealer nearest you call **1-800-523-2696**.

LASER CONNECTION™

A QMS® company

The following are trademarks of their respective companies: QMS, QMS-PS, ASAP, Laser Connection of QMS, Inc. PostScript of Adobe Systems, Inc. Canon, Canon SX of Canon, U.S.A. LaserJet+, HP-GL of Hewlett-Packard. Diablo of Xerox Corp.

© 1987 Laser Connection

Circle 102 on reader service card

PRESENTING AMERICA'S HOTTEST NEW CORPORATE JETS.

FIVESTAR'S fleet of powerful business computers have really taken off in the last three years. That's because they're built for corporations that want to get where they're going in a hurry.

We build a full line of high-powered performers that not only provide *total* PC compatibility and advanced business capabilities, but also offer American-made ingenuity, quality and value.

In fact, when you *really* compare, you'll find that FIVESTAR Computers leave the competition far behind.

FIVESTAR 286's.
The performance to fly through heavy workloads.

FIVESTAR 286's provide the features and performance aggressive companies need to reach higher corporate goals. In fact, they're designed to run future as well as current operating systems.

The 286/10 is powered by an Intel 80286 microprocessor that operates at a fast 10 MHz, with zero wait states. With 640KB memory and 1.2MB floppy disk drive, you'll soar through today's popular business applications. Serial, parallel and game ports, and an enhanced 101-key keyboard, provide in-flight convenience.

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!

FIVESTAR 386's.
Don't forget to fasten your seat belt.

The incredible speed and power of FIVESTAR 386's have made them a leading choice of corporations across America for multitasking and sophisticated applications, including CAD. In fact, there's so much performance and value built into our 386's, it can take your breath away.

The 386/16 is fast. Very fast. That's because it features an Intel 80386 CPU operating at 16 MHz, with zero wait states. And its 1024KB memory and 1.2MB floppy disk drive will keep you airborne for long distances. Serial/parallel/game ports and a smooth performing 101-key keyboard are standard equipment.

Prices:
The 286/10 – from $1099.
The 286/14 – from $1499.

The 386/20. It's made for those who want to fly to the outer limits. With an Intel 80386 microprocessor operating at 20 MHz (with zero wait states) it'll move through the most complex applications with astounding ease. And you won't have to worry about running low on memory either. It not only features 1024KB of RAM and a 1.2MB floppy disk drive, it also has a 64KB cache memory. Naturally, it comes equipped with serial/parallel/game ports and a 101-key keyboard, too.

Customize your FIVESTAR to meet your own specifications.

All FIVESTAR 286 and 386 Computers are available with hard drives, from 20 to 320 MB, as well as a choice of monochrome, EGA, VGA or super-high resolution paper-white monitors. Whatever the requirement, FIVESTAR can meet it.

Prices:
The 386/16 – from $1999.
The 386/20 – from $2999.

Unmatched reliability. Unbeatable ground support.

Because every FIVESTAR Computer is tested and certified to meet the highest standards of quality, you can count on years of reliable performance.

Once you've purchased your FIVESTAR computer, you'll get all the support you'll need. Just call our highly-trained service department *toll-free*. Most difficulties can be resolved within minutes.

For companies with critical applications, a comprehensive on-site service contract is available for just $99. In most cases, service calls are made within 24 hours.

Order by phone today. And move your company to higher levels of performance.

To order a FIVESTAR 286 or 386 Computer, or for more information about our full line of high-powered computers, call us TOLL FREE. We'll have your hot new corporate jet parked in your hanger in no time!

1-800-752-5555

FIVESTAR COMPUTERS

America's hottest new corporate jets.

All prices and specifications are subject to change without notice.

FIVESTAR and Intel are registered trademarks.

0710008

Circle 253 on reader service card

Utilities So Good W

Go A Round With PC Tools™ Deluxe Version 5 For Just $25.

If you own any other utility package, the best way to convince you PC Tools Deluxe has more punch is to put them in the ring together. Which is why we're making this special offer.

Just mail us $25* and the original manual page 1 (or any other proof of purchase) from any version of Norton™ Utilities or Commander, Sidekick® or Sidekick Plus, X-TREE,™ Fastback,™ Disk Optimizer, or Mace™ Utilities, and we'll send you the complete PC Tools Deluxe Version 5 package.

Take a look at all our new features. **Even if you don't own one of our competitors' products, PC Tools Deluxe is still an exceptional buy at $79**–that's less than practically any one of these other products.

*Current registered customers can get an update for just $15.

Yes, show me the champ. Offer ends December 31, 1988.

☐ Here's $25 and proof of purchase of Norton Utilities or Commander, Sidekick or Sidekick Plus, X-TREE, Fastback, Disk Optimizer, or Mace Utilities.
☐ Here's $15 and the original page 1 from my PC Tools Deluxe manual to update to Version 5. (We'll send you a complete new manual.)

Name _____
Street Address _____
City _____ State _____ Zip _____
Phone _____
Computer Brand _____ Model _____

☐ Check enclosed ☐ Visa ☐ MasterCard
_____
Exp. date _____
Signature _____

WE'VE MOVED! Mail to: Central Point Software, 15220 N.W. Greenbrier Parkway, #200, Beaverton, OR 97006 **503-690-8090**

PC Tools Deluxe is a trademark of Central Point Software, Inc. All other company and product names are trademarks of their respective companies or manufacturers.

e're Challenging The Competition.

NEW! Version 5

PC Tools Deluxe Version 5 Features:

The best resident DOS SHELL/ENHANCER package anywhere with full mouse and color control, plus split screen/multiple directory and tree display ▪ Up to 15 RESIDENT NOTEPADS with spell-checker and mail merge ▪ OUTLINER ▪ APPOINTMENT SCHEDULER ▪ CLIPBOARD ▪ Valuable DATABASES–including rolodex with autodialer ▪ Financial, algebraic and programmer's CALCULATORS ▪ MACRO-PROCESSOR ▪ BACKGROUND COMMUNICATIONS ▪ HARD DISK BACKUP every bit as fast, reliable and feature-packed as Fastback Plus ▪ Super-fast DISK OPTIMIZER that dramatically improves hard disk performance ▪ The best file UNDELETE available for recovering data from even fragmented files ▪ Life-saving UNFORMAT for rescues from the ultimate disk disaster ▪ A SAFE FORMAT program for hard and floppy disks ▪ FILE ENCRYPTION AND COMPRESSION for the ultimate in data security and control ▪ And all this takes much LESS RESIDENT MEMORY than ever before.

If you're using any other DOS utility, you can be sure of one thing. A knockout by PC Tools Deluxe in the first round.

Circle 155 on reader service card

Central Point Software INCORPORATED
15220 N.W. Greenbrier Parkway, #200
Beaverton, OR 97006
(503) 690-8090

PC Tools Deluxe.

Not just another pretty face

Sure, you're going to love the new look of Sigma Designs' LaserView Display System.

But the real beauty is in how well it handles your desktop publishing, spreadsheets and word processing.

Quite simply, LaserView offers the sharpest image anywhere: an eye-opening 1664x1200 (115 dpi) resolution for detail drawings, half-tone images, or even 6-point type. And an additional resolution mode of 832x600 for text-based work (for the Macintosh II and SE).

So what you'll get is the performance of a workstation in a PC environment. A full 19" monitor that's easy on the eyes, thanks to its high contrast screen; easy on the body because of its tilt/swivel base; and easy to work with, since you can view anything from a two-page spread to an engineering drawing.

Put it all together and you have a single monitor solution for IBM PCs and Macintosh II or SE. With full software compatibility.

LaserView allows you to see your work the way it was meant to be seen. No matter what software you're using — Ventura Publisher, Pagemaker, Excel, or whatever.

Want a closer look? Visit your nearest authorized Sigma Designs dealer. Or call Sigma Designs today at 415-770-0100.

Then see why the newest screen star isn't just another pretty face.

Sigma Designs, Inc.
46501 Landing Parkway
Fremont, CA 94538

LaserView: TM Sigma Designs, Inc. IBM: ® International Business Machines Corp. Macintosh: TM Apple Computer, Inc. Ventura Publisher: TM Ventura Software Inc. Pagemaker: ® Aldus Corp. Microsoft Excel: ® Microsoft Corp.

Circle 97 on reader service card

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

LETTERS

Reactions and responses from the PC World community

Hot Button

I would like to present another angle to Michael Covington's "Shareware or Greedware?" [*Another Angle, PCW,* July 1988]. I agree with his assertion that we need more of a giving spirit in the PC world. Many programs currently marketed as shareware should instead have been donated to the public domain. I call these programs "what-the-heck–ware" because the author reasons: What the heck—if I put a shareware notice on it, someone might just pay for the program. This hurts the entire community by diluting the overall quality of the shareware market.

However, Mr. Covington does shareware a great disservice by ignoring the vast amount of good it has accomplished. Besides contributing to the elimination of copy protection and a general decrease in commercial software prices, shareware has allowed millions of people to purchase quality software at very low prices, with the added luxury of trying out the programs before buying them.

I challenge Mr. Covington to name one public-domain program of the same caliber as *ProComm, AutoMenu, PC-Write,* or *PC-File+*. None of these programs would have seen the light of day except as shareware, and the PC community would be worse off without them.

Jim Button
CEO
ButtonWare
Bellevue, Washington

It's a Job

I am outraged at Michael Covington's article in the July issue. He talks about giving free software to his students with no strings attached—who does he think he's kidding? Those students pay tuition to the University of Georgia to attend classes, and Mr. Covington is compensated for teaching the class, right? As a professional programmer I am compensated for writing software that, I hope, people will use to increase their productivity. Why shouldn't programmers use shareware as a marketing channel for innovative, low-priced software? Is it too much to ask $10 or $20 for a program that might save hours of manual work?

Jon L. Postyn
Forest Hills, New York

In Defense of Demoware

Michael Covington seems to have his wires crossed. The software he is complaining about is not shareware, nor is it in the public domain; rather it is a new animal called demoware. Having noticed

(continues)

ANTHONY RUSSO

What local area network comes without the cards, without the screwdriver, without the hassle factor,

for the cost of a nice file cabinet?

The Nicely Affordable LANLink 5X.™

A really nice file cabinet costs about $600. For the same price, you can get the state-of-the-art technology of LANLink 5X, which lets you file away unnecessary hardware like network boards. And screwdrivers.

Since it's software driven, installing LANLink 5X is like installing any other application... easy. And, for about the same cost as a network board, you can be operating a five-user network—in less than two hours.

LANLink 5X takes advantage of standard parallel ports, so data transfer takes place very quickly. Users share data, programs, files, and peripherals, just like on a hardware network. LANLink 5X comes with a server and a satellite module, plus the network operating system. You also get a money-back guarantee to insure your satisfaction.

Get the fastest software-driven network available—LANLink 5X. And close the file on your search for a network.

For more information about LANLink 5X and the name of the authorized dealer nearest you, call 1-800-451-LINK.

THE SOFTWARE LINK
3577 PARKWAY LANE • NORCROSS, GEORGIA 30092
INSIDE GEORGIA: 404-448-5465 • FAX: 404-263-6474

LANLink 5X is a trademark of The Software Link, Inc. All other brand names are the trademarks of their respective holders.

Circle 77 on reader service card

We have one thing to say to the people who keep getting personal about PROCOMM PLUS.

"Right now, PROCOMM PLUS is the definitive telecom program and the one I personally use and recommend."
John C. Dvorak, columnist, PC Magazine

People who review software have a very tough job. They see hundreds of new programs every week. But the ones who have seen the new PROCOMM PLUS communications software are doing more than writing rave reviews about it. They're getting personal. They're using it at work and at home.

Maybe it's because PROCOMM PLUS is so easy to use it's "intuitive." Or perhaps it's because PROCOMM PLUS has an extremely powerful script command language, context sensitive help, 16 terminal emulations with keyboard re-mapping, 12 file transfer protocols, a fully-automated dialing directory, and advanced host mode with electronic mail.

But one thing is for certain. If PROCOMM PLUS is the personal choice of the people who review software, you can be sure that PROCOMM PLUS is right for you.

It's time you got personal about PROCOMM PLUS. Stop by and see us at booth 341 today. Or, call 314-474-8461.

Thank You.

Circle 279 on reader service card

that most people don't pay for the shareware programs that they use, some authors, like me, distribute demo versions of programs that are limited either in functionality or in the length or frequency of access allowed. Registered users receive fully operational versions of the software.

Of course, a few misguided souls forget to mention limitations in demoware documentation, and some shareware distributors aren't up-front with their customers about which of the programs they offer are demoware and which are fully operational. Then some folks get upset when they find out that the $50 package they paid $5 for is only worth $5—but that's a small price to pay to find out if a program is useful.

I take exception to Mr. Covington's remark that my software, which took me more than a year to write, is a petty attempt to make money without incurring expenses. Who does he think paid for my computer, my rent, my food?

Bill Fitzpatrick
Veneta, Oregon

Besides the letters above, I got dozens of CompuServe messages. Lots of people argued with things I didn't say. For example, I never said it was OK to violate copyrights, nor that programmers shouldn't get paid. But it amazed me how hostile people were to the idea of occasionally *giving software away.*

The Association of Shareware Professionals is currently working to correct some of the problems I pointed out, including the widespread misconception that shareware is free and the vagueness of shareware license statements. But what we really need are software publishers to which authors can submit programs in the same way writers submit books to book publishers. Authors would then collect royalties on copies sold without having to do the publishing themselves. —Michael Covington

News You Can't Use

Your *Product Outlook* item on the Canon Bubble-Jet BJ 130 printer ["High, Wide, and Handsome," *PCW*, March 1988], complete with photos, prices, and specs, sent me on a wild-goose chase after a product that didn't exist. The BJ 130 sounded great, so I rushed out to my authorized Canon dealer—who had never heard of it. She called Canon's Canadian office, where the printer was also unknown. Then I went to a different dealer who twice phoned Canon's United States office in search of the BJ 130; the calls went unanswered.

Certainly, informing *PC World* readers about what's new on the market means you can't always wait to see production models or shrink-wrapped packages before going to press. Still, you must protect your readers from vaporware and from wasting their time searching for products that do not yet or in some cases never will exist.

Don Greenwood
Scarborough, Ontario

As Product Outlook's *tagline points out, the column reports on "product announcements and upcoming releases." However, you can be assured that* Product Outlook *items are not just industry rumor; most prod-*

(continues)

NOW OVER 43% OFF!

Add PC World To Your Management Reading List

ACT NOW! Take advantage of these Special Savings and we'll BILL YOU LATER!

☑ YES! Bill Me Later

Rush me one year (12 monthly issues) of PC World for only $19.97. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

4CG94

☑ YES! Bill Me Later

Rush me one year (12 monthly issues) of PC World for only $19.97. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

4CG94

Give Now—We'll Bill You Later

A one year subscription (12 monthly issues for just $19.97) will be sent to the person listed below. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

Send Gift from:

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE ZIP

Send Gift to:

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE ZIP

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

2AMM4

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

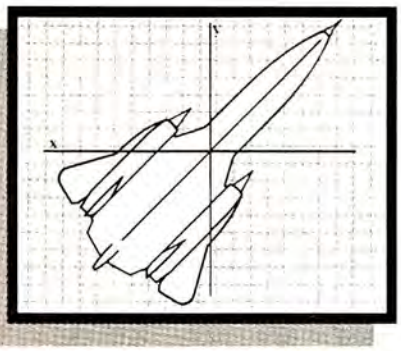
BUSINESS REPLY MAIL

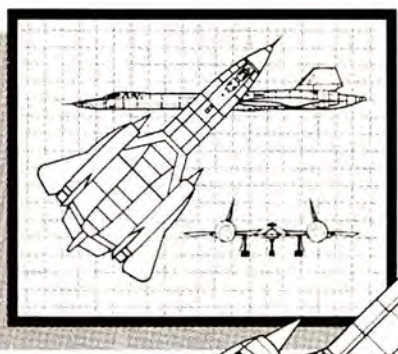
FIRST CLASS PERMIT NO. 1262 BOULDER, CO

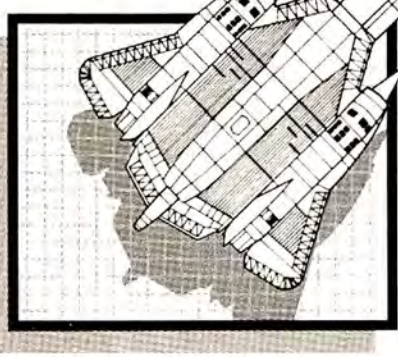
POSTAGE WILL BE PAID BY ADDRESSEE

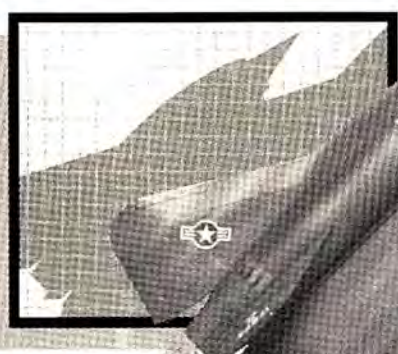
PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

At only $299, DesignCAD is the simplest way to get some very sophisticated results.









You can spend thousands of dollars for a CAD software package without getting the kind of power and performance that DesignCAD delivers for only $299...complete! With the DesignCAD's easy-to-use, easy-to-learn single keystroke commands, you'll be producing ultra-sophisticated results in no time at all.

The Features You're Looking For

The options you normally have to purchase separately with other CAD programs, aren't options with DesignCAD. They're built in.

- Expanded Memory Support
- Selection of Character Fonts
- Symbol library with over 500 symbols
- Bill of Materials utility
- Finest curve fitting in the industry
- Extensive snap features
- True Auto Dimensioning with several formats
- Extensive layering features
- Full zoom, pan and rotate capabilities
- And many other features

In addition, DesignCAD's extensive file transfer utilities allow you to read and write different formats. DesignCAD allows you to: transfer documents to and from IGES, DXF, HPGL, transfer to GEM and Postscript, and to read ASCII text files and X,Y Coordinate files.

DesignCAD re-defines Compatibility

Virtually any printer, plotter or graphics adapter compatible with IBM PC is compatible with DesignCAD. DesignCAD is also compatible with most other CAD systems, large and small.

For all of the capability, compatibility and ease-of-use you need in a CAD system, get DesignCAD – only $299! See your local computer dealer, or contact:

American
Small Business Computers, Inc.
327 S. Mill St., Pryor, OK 74361
(918) 825-4844 FAX 918-825-6359
Telex 9102400302

Call or write for a detailed brochure and a free demo disk.

DESIGNCAD

Circle 306 on reader service card

With 3M's new formatted diskettes you never have to stop

Circle 257 on reader service card

ucts covered are on the market before the magazine is. In the case of the BJ 130, Canon announced the printer in the fall of 1987 and informed PC World *at press time that it would ship by March 1988. Canon subsequently delayed United States shipments until late April, but due to a change in the company's production facilities, significant quantities of the printer weren't available until June. Canadians are still waiting for the BJ 130: Canon's separate distribution organization there reported that the printer is not expected until September.* PC World *regrets any inconvenience this may have caused its readers. —Ed.*

Satisfied User Testifies

"Share the Wealth!" [*PCW*, June 1988] confirmed my overwhelmingly positive experience in using Cosmos's *Revelation*. Four years ago, fresh out of college, I was hired to schedule court appearances and allocate personnel in a busy law firm. After two months of trying to tame the enormous manual system, I looked for a data base to automate the task, and *Revelation* stood out. Using it, I developed a case management system that tracks the firm's every case, client, and court date. Unfortunately, the system was so successful that attorneys began to abandon their own systems and to depend entirely on me for case information.

The advent of *Advanced Revelation* solved that problem by letting the firm's secretaries, paralegals, and attorneys track every aspect of the litigation process themselves. Now I am free to explore the program's tremendous ability to project future caseloads, company costs, and cash flow.

C. Clark Landale
Cranford, New Jersey

Terminally Picky

The benchmarks included in "Share the Wealth!" failed to measure the most important aspect of multiuser data base performance: the change in response time when multiple users enter data from different terminals. Although the review did measure batch transactions running on multiple-terminal systems, batch processing programs are not commonly run concurrently in this type of application. A more realistic benchmark would time people entering data at workstations—the way these programs are actually used.

Also, the review made no mention of the abysmal performance of all three systems, which suffer degradation in speed as the number of workstations increases. Contrast that with a Pick multiuser operating system, which actually gets faster when running concurrent jobs due to its intelligent resource sharing.

Brian Gulino
Encinitas, California

It's the Frequency That Counts

Although *The Help Screen*'s answer to John Madell's question about foreign electrical power [*PCW*, July 1988] probably satisfied him, I want to clarify a couple of points.

First, when Mr. Madell used the term *transformer/converter*, what he probably meant to say was *voltage* transformer/*frequency* converter. Second, Technical Editor Karl Koessel erred when he described ±110- and ±220-volt peaks. Alternating current voltages are expressed as rms (root mean square) averages, and the peaks are therefore ±155.5 and ±311 volts, respectively.

David S. Mayo
Mountain View, California

You're correct about expressing AC voltages as rms averages. Although the numbers in **FIGURE 1** *of July's* Help Screen *are incorrect, this does not affect the explanation or the type of power converter required. Mentioning frequency conversion, however, reminds me that I failed to discuss problems users might encounter with monitors such as older CGA models that base their scan rates on the frequency of the AC power source. They will operate properly only when using the frequency for which they were designed. —Karl Koessel*

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

in the middle of what you're doing to format a diskette.

No one likes to be interrupted. Especially by a diskette.

So, we're introducing 5¼ inch formatted diskettes for IBM® PCs and compatibles. They eliminate all formatting hassles, so you won't have to be interrupted anymore.

They're compatible with DOS versions 2.0 and higher. And our Mark Q™ process assures you of our usual product standards. Exceptional durability, consistency, reliability and performance.

So next time you're saving data and don't want to waste any time, make sure you have 3M formatted diskettes.

We guarantee you'll never have to stop in the middle of what you're doing again.

For more information, call 1-800-888-1889, Ext. 40.

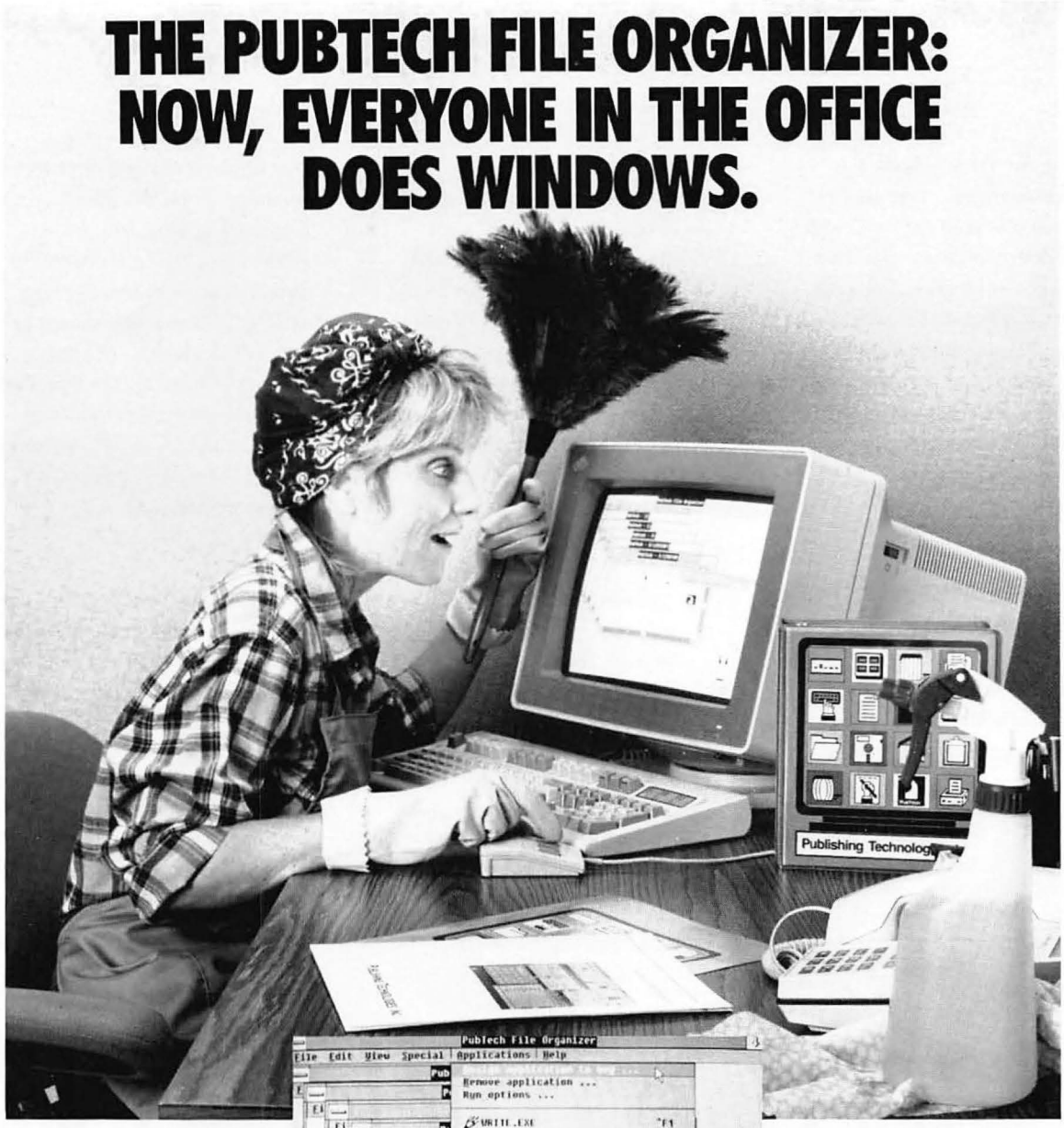
Supporting the dream

3M

©3M 1988 IBM is a registered trademark of International Business Machines Corporation. Mark Q is a trademark of 3M.

Circle 257 on reader service card

THE PUBTECH FILE ORGANIZER: NOW, EVERYONE IN THE OFFICE DOES WINDOWS.



IBM PC/ATs,™ PS/2s™ and compatibles now sparkle with a new look. It's the PubTech™ File Organizer. With it, you can harness the power of Microsoft Windows™ in an intuitive, icon-based manner. It's like having an entire desktop of computer functions laid out for you. So you can take full advantage of your hardware and software. Ready to use with mouse-oriented control that anyone can understand.

Access frequently used tasks instantly by touching a key. Create your own "hot-key" applications menu. Manage your files and directories singly or in groups by clicking and dragging icons across the screen. Undelete files. Search for files or for text within files. Edit with power — you can even create a new document by appending copy to the PubTech File Organizer clipboard. Manage your disks and printers. Backup and restore selected files and directories. Remap your keyboard to emulate familiar systems — so the learning curve is minimal. Most users can be productive within an hour. Between the icons and pull-down menus, you've got all your functions presented at once for instant, understandable use.

For all that power — over eighty functions — the price for the PubTech File Organizer is just $145. Bundled with the LOGITECH™ M8 serial mouse or with Microsoft Windows 2.1, it's $195. And if you want the PubTech File Organizer, the mouse, and Microsoft Windows 2.1, it's only $245. We bundle with Microsoft Windows/386 as well. Volume discounts are also available.

So take a bite out of computer complexity. Make computing simple with the PubTech File Organizer.

Publishing Technologies, Inc.

PUBTECH™

Call 1-800-PUBTECH

7719 Wood Hollow Drive, Suite 260, Austin, Texas 78731

© 1987, 1988

Microsoft Windows is a trademark of Microsoft, Inc. Microsoft is a registered trademark of Microsoft, Inc. IBM is a registered trademark of International Business Machines Corporation. PC/AT and PS/2 are trademarks of International Business Machines Corporation. LOGITECH is a trademark of LOGITECH, Inc. PubTech is a trademark of Publishing Technologies, Inc.

Circle 218 on reader service card

Tandy® Computers: The broadest line of PCs in America.

The Tandy 4000 LX

Get the power and performance of Intel's 80386 ...at 20 MHz.

To complete business tasks on schedule, turn to the Tandy 4000 LX. With its 32-bit Intel® 80386 microprocessor operating at 20 MHz, the 4000 LX delivers a new level of performance to sophisticated database management and spreadsheet analysis.

Two megabytes of zero wait-state memory make the 4000 LX ready to use with MS® OS/2, as well as MS-DOS® software. With this much memory standard, the Tandy 4000 LX is also ready to use as the hub of a powerful multiuser office system running SCO® XENIX® software. And as a network file server in a 3Com® workgroup, the 4000 LX provides 20 MHz performance for exceptionally high-speed data transfer.

The Tandy 4000 LX is highly expandable. Three front-panel device slots and eight expansion slots give power users the flexibility needed in configuring the optimum system.

And for entry-level 386™ power, we offer the original Tandy 4000. Using an 80386 processor that operates at 16 MHz, the 1MB Tandy 4000 is the perfect low-cost choice for the heavy power user.

The new generation Tandy 4000 LX. From the best-selling family of PC compatibles made in America.

Send me a 1989 RSC-20 computer catalog.

Mail to: Radio Shack, Dept. 89-A-150
300 One Tandy Center, Fort Worth, TX 76102

Name _____

Company _____

Address _____

City _____ State _____

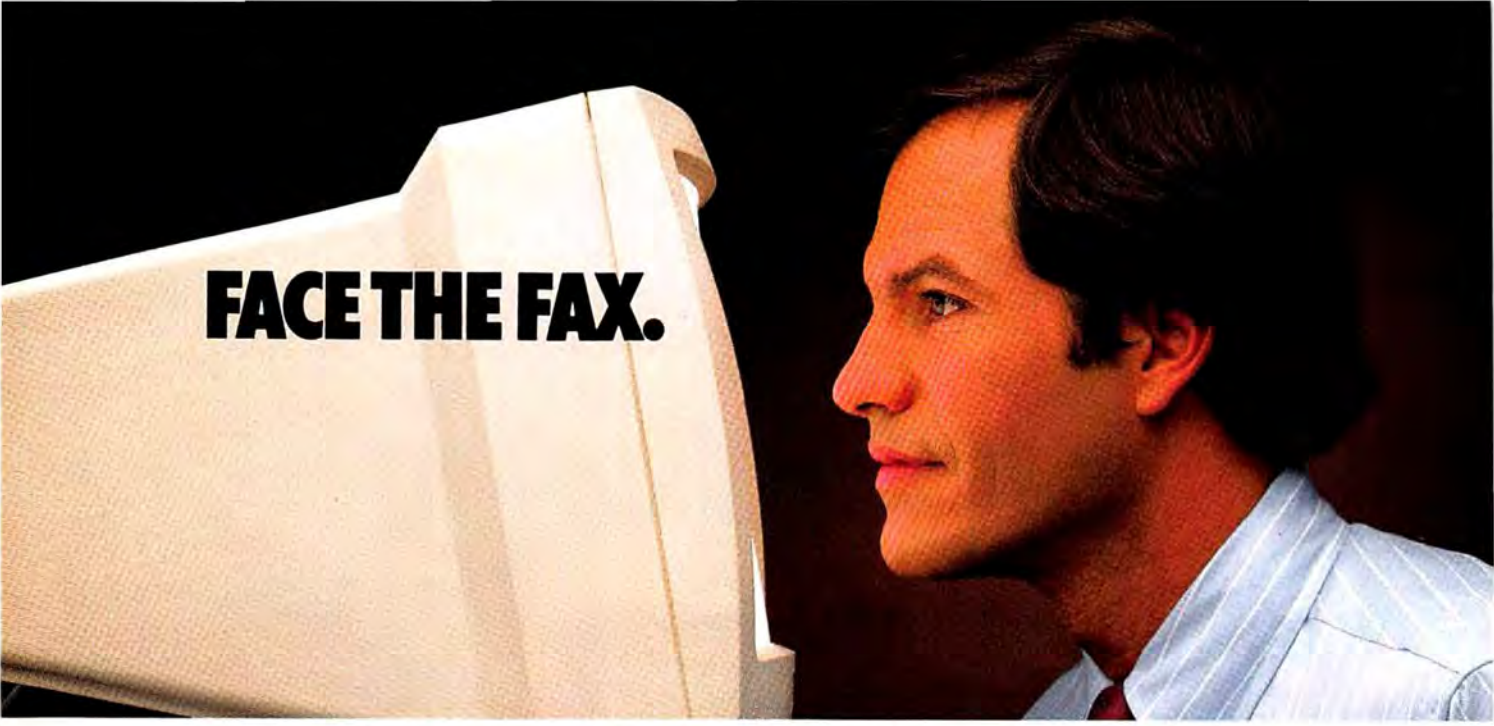
ZIP _____ Phone _____

Tandy Computers: Because there is no better value™.

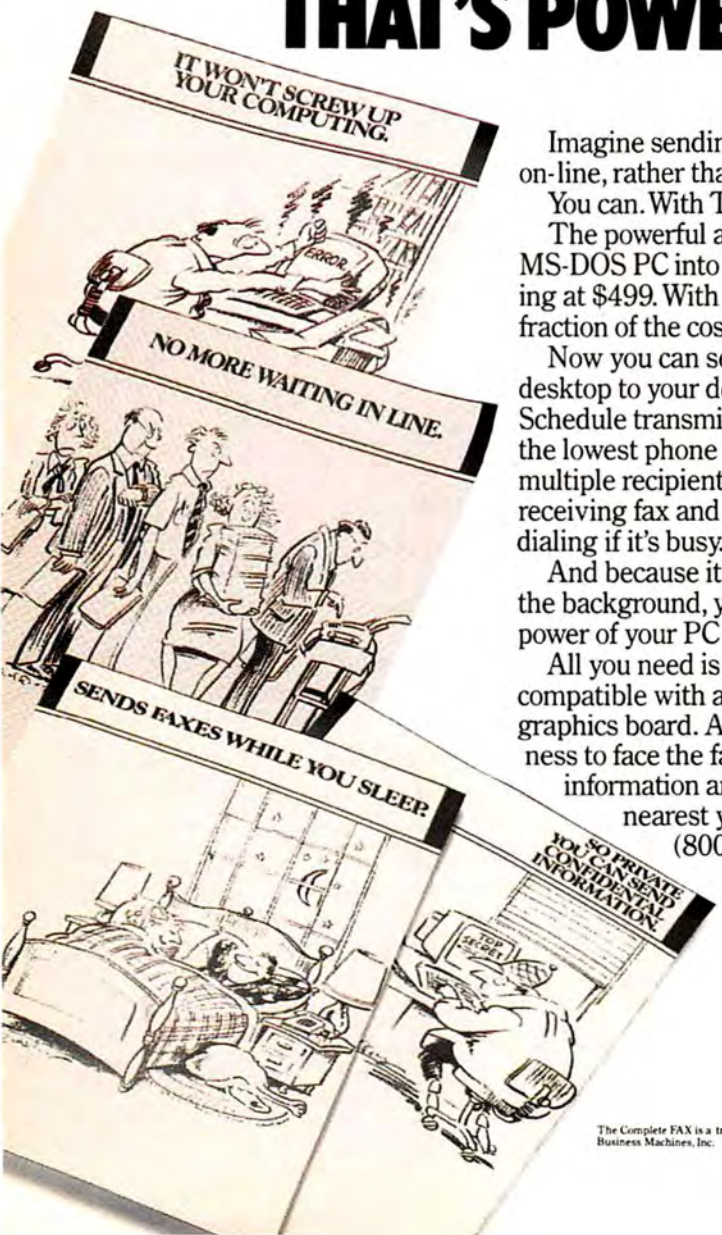
Intel/Reg. TM and 386/TM Intel Corp. MS, MS-DOS and XENIX/Reg. TM Microsoft Corp. SCO/Reg. TM The Santa Cruz Operation. 3Com/Reg. TM 3Com Corp.

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Circle 197 on reader service card



INTRODUCING THE $499 FAX THAT'S POWERED BY YOUR PC.



Imagine sending and receiving your faxes on-line, rather than standing in line.

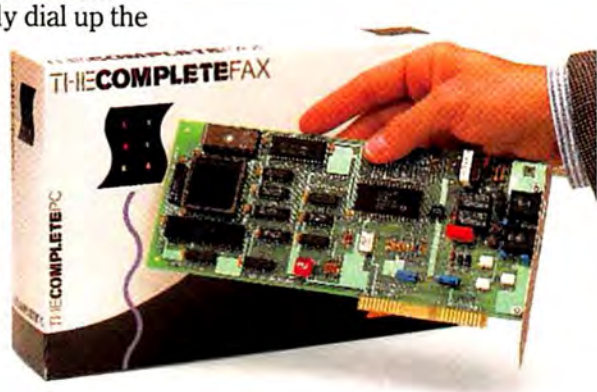
You can. With The Complete FAX.

The powerful add-in boards that turn your MS-DOS PC into a Group III fax machine. Starting at $499. With a two-year warranty. At a fraction of the cost of regular fax machines.

Now you can send messages from your desktop to your destination in complete privacy. Schedule transmissions to take advantage of the lowest phone rates. Broadcast faxes to multiple recipients. Automatically dial up the receiving fax and keep on dialing if it's busy.

And because it's all done in the background, you have all the power of your PC to boot.

All you need is an IBM PC or compatible with a hard disk and graphics board. And a willingness to face the fax. For more information and the dealer nearest you, call (800) 634-5558.



THECOMPLETEPC

521 Cottonwood Drive, Milpitas, CA 95035 (408) 434-0145 FAX: (408) 434-1048

The Complete FAX is a trademark of The Complete PC, Inc. MS-DOS is a registered trademark of Microsoft Corp. IBM and IBM PC are registered trademarks of International Business Machines, Inc.

Circle 44 on reader service card

Is There Life After Spreadsheets?

The search for intelligent software in the universe is picking up some exciting signals. Here are some breakthroughs you should know about.

David Bunnell

Have you noticed that most of the spreadsheets, data bases, and word processing programs on the market today are called "feature rich"? The phrase reminds me of car sales lingo. Each year, new models roll off the assembly line differing little from the previous year's version except for some new options—a new dashboard doodad, a new seat heater. We're supposed to think we're getting something new and improved. In fact, each version of software, like each year's new car model, often doesn't provide a great deal of change from what came before.

But I'm looking for genuinely new kinds of software—new applications, new categories—and I'm beginning to see some promising developments of late. In particular, I'm excited about the wave of personal information managers (PIMs). They include Lotus Development's *Agenda*, Valor Software's *Info-XL*, Symantec's *GrandView*, and Persoft's *IZE*, among others.

PIMs are ingenious information organizers that provide you with a broad overview of the miscellaneous data you've fed into your computer, along with the ability to connect that data instantly (see this month's *Tech Notes*). PIMs are a great leap forward for data bases. You can structure and manipulate the information as you're entering it. With a traditional data base, you've got fixed fields and records. Even a powerful data base with numerous fields is somewhat rigid. A personal information manager allows you to move data and create as you go. I like that concept and the freedom it provides.

Another exciting development is a new program for academic computing called *Mathematica*, which promises to change the way engineering and mathematics are taught. Developed by Stephen Wolfram of Wolfram Research in Champaign, Illinois, *Mathematica* can do for algebra and calculus what the calculator did for arithmetic. You can write a command in English, and the program will translate it into the right algebraic or geometric formulas. It has the added ability to produce two- and three-dimensional graphs and simulations that illustrate equations and even concepts.

Though *Mathematica* is not yet available on the PC, IBM recently endorsed the program and announced that it would be available for the AIX/RT workstation.

A third tantalizing area of software development, existing between desktop publishing and

(continues)

AnthroArm®
PC
Put your monitor exactly where you want it. Have room to spread out. Be comfortable. The AnthroArm PC. Strong. Adjustable. Well designed.

Call us for more information:
800-325-3841 (in USA and Canada)

The AnthroArm PC is available in a variety of mounts, including AnthroCart mount.

Shown with keyboard holder option. Arm holds 60 lbs. Tilts ± 10°. Rotates 360°. Adjusts 7 3/4" to 12" above desktop.

5 YEAR WARRANTY

ANTHRO

Anthro® Technology Furniture®
3221 N.W. Yeon St.
Portland, OR 97210
(503) 241-7113
Telex: 940103

AnthroArm and Technology Furniture are registered trademarks of Anthro.

computer animation, is called desktop video. While applications for the Macintosh have taken the lead in this field, I don't think PC-compatible software will be far behind.

Desktop video allows owners of relatively inexpensive systems to create sophisticated graphics effects previously possible only on high-end workstations. This development has revived interest in the Commodore Amiga, which has the program chips and hookups for VCR systems. If you've heard of desktop presentations, you probably understand how charts and graphs can add punch to strategy meetings. Desktop video promises to expand this notion radically within a few years. Before long, you'll be able to present your marketing plan in video form, complete with sound effects.

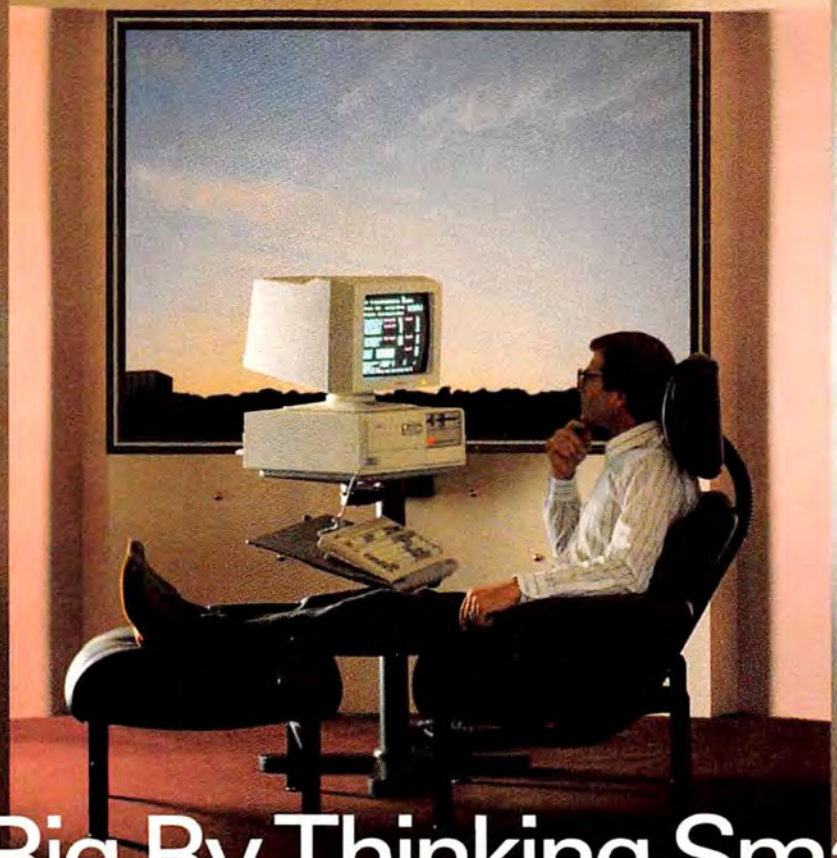
I keep hearing people say we're in a slump in terms of creativity as well as sales. If we can step clear of the usual "options galore" sales talk and follow these and other exciting developments in software, we won't have to settle for a dull parade of "new" features. Software doesn't have to be boring to be good. ●

POWER TIP NO. 13

Repeat Word Text and More

In *Word 4.0*, pressing <F4> repeats all the text you've typed since you last moved the cursor. You can also use <F4> to repeat commands such as Copy, Delete, Insert, Replace, Search, and Undo.

Evelyn Morrison
New York City



Acer
910
&
710

We Got Big By Thinking Small.

♦ At Acer, we focus on the little things that make a big difference. Our customers needed PCs that delivered maximum power in minimal space, so we created the Acer 910 and Acer 710. Offering big PC power and speed in a computer 40% smaller than comparable systems.

♦ Like all Acer systems, the 910 and 710 have been designed with attention to detail. Little things like placing power and reset buttons in front. And designing an AT standard keyboard with the finest tactile touch.

♦ It is this painstaking attention to detail that has allowed Acer to grow 100% a year, for the past 10 years. We're also big on delivering quality products at an affordable price.

♦ Take the Acer 910 for example. This 286-based PC is 25% faster than IBM's PC/AT. Offering one megabyte of on board expandability, full multitasking capabilities and six expansion slots. The Acer 910 is designed to handle even the most advanced business tasks. From complex spreadsheets, and financial applications to large data bases. All for a small price that allows you to maximize your return on investment.

♦ And if you're thinking smaller, think about the Acer 710. Sleek and economical, the 710 runs twice as fast as IBM's PC/XT. And with both 10 and 4.77 MHz operating speeds, your Acer 710 can run a full range of popular software programs. Making it ideal for word processing and other routine applications.

♦ As with all Acer systems, the 910 and 710 are serviced and supported on-site by TRW nationwide.

♦ To find out how our reduced footprint systems can give you big performance at an affordable price, give us a call at **(800) 538-1542.** In California, call **(800) 782-1155.**

Acer Technologies Corp.
401 Charcot Avenue
San Jose, CA 95131
(408) 922-0333

Acer 710 Acer 910

Acer
The Word for Value

Canada: *Acer Technologies Corp., Tel.: (416) 674-2211.* ***W. Germany:*** *Acer Computer GmbH, Tel.: (0211) 6508-0.* ***Japan:*** *Acer Japan Corp., Tel.: (03) 865-0191 2.* ***Taiwan:*** *Acer International Corporation, Tel.: (02) 713-2252.*

©1988, Acer Technologies Corp. Acer 910 and Acer 710 are trademarks of Acer Technologies Corp. IBM, PC/AT and PC/XT are trademarks of International Business Machines Corp. TRW is a trademark of TRW, Inc. Jefferson Chair by Sunar Hauserman.

Circle 49 on reader service card

Scan Anything...

Let's Not Mince Words...
Let's face it, the art of *Page Recognition* has not advanced all that much since the days of the Egyptian Pharaohs. Text and graphics never seem to come out right. M's looking like inverted W's. Multi-column documents looking like Sanskrit. It's virtually impossible to mind your P's and Q's when the level of technology has not advanced beyond *electronic alphabet soup.*

Scan To New Heights...
OmniPage,™ the most advanced page recognition software available today, lets you transcend the clutter that abounds to work more efficiently. Easily accessible to most users, *OmniPage* is based on advancements made in *artificial intelligence* technology. *OmniPage* lets Macintosh® and IBM® PC users put their scanners to work immediately. Scan multiple fonts and font sizes, whatever the page format, including multiple rows and columns. You can now scan virtually any printed page of text, and without all the rough edges. You can even export your data to the many compatible file structures, such as *Microsoft Word 3.0*,™ *MacWrite*,™ *Excel*™ and *PageMaker 3.0*.™

Power To The Desktop Publishers...
The advent of desktop publishing may have enabled you to develop *spiffy* newsletters, brochures, manuals and directories—great strides have been made with respect to *output*. But one fact remains. There are still far too many strokes for most folks. For the first time you can avoid *excessive key stroking** by approaching the scanning or *input* side of desktop publishing with a new level of confidence. *OmniPage* lets you save time by quickly processing your data—whatever the font or column format—with a level of accuracy not possible until now. With the special *Partial Page* feature, you can even select the section of the document that is important to you—financial statements, complex insurance and legal documents—all readily accessible.

Store And Retrieve Data Of All Sorts...
Store your data in a personal data base. Manipulate text and graphic images. And that's any text, including spreadsheets. Build a personal library of relevant professional articles, ideas or general information—all within mouse range. Move data in and out of your sys-

Well Almost Anything

Ro-set-ta Stone. (Ro-z et a)
A basalt tablet, inscribed with a decree of Ptolemy in 196 BC. Inscribed in Greek, Egyptian hieroglyphic, and Demotic. Discovered in 1799 near the town of Rosetta, Egypt. Considered by most scholars as the key to deciphering the ancient Egyptian hieroglyphics.

tem in less time than it takes to say Ramses II. *OmniPage* has set a whole new standard in page recognition software. The creative possibilities are in fact endless.

OmniPage may not yet allow you to scan the *Rosetta Stone*, the Dead Sea Scrolls or that menu at your favorite Chinese restaurant. Not now—anyway. But most conventional business and professional scanning needs are in fact possible—for the very first time at an affordable price.

Learn More About The Ultimate Scan...
Take the *OmniPage Challenge*. Bring one of your favorite documents (any document) to one of our authorized dealers and see how powerful this exciting technology really is—and if for any reason, you're not satisfied with the results—we'll think of something. Remember, this "challenge" does not apply to esoteric defunct languages, foreign lexicon or paleolithic wall reliefs.

Call: 1-800-535-SCAN
Or Write:
Caere Corporation
100 Cooper Court
Los Gatos, CA 95030

omniPAGE™

CAERE®

OmniPage is a registered trademark of Caere Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. IBM is the registered trademark of International Business Machines. Microsoft Word 3.0 and Excel are registered trademarks of Microsoft Corporation. MacWrite is a registered trademark of Claris Corporation. PageMaker is a registered trademark of Aldus Corporation. The model of the Rosetta Stone courtesy of the Rosicrucian Society. ©Copyright 1988 Caere Corporation*

*Note: Excessive Key Stroking (EKS) has been known to cause "spastic quivers" and ever so slight knee jerks in software engineers, data entry clerks and desktop publishing fanatics. Avoid whenever possible by using *OmniPage*.

Circle 17 on reader service card

FAX 24 hours with your PC'S power OFF

Introducing... **SMARTFAXplus**

the intelligent PC-FAX system featuring ***Auto Wake-Up***

Now you can Send/Receive faxes:
* With your PC power off
* In true background without interruption
* With user-friendly, full featured software including text & graphics editor, a variety of file conversion and software interfaces, and even a MailMerge for mass faxing
* With a variety of printer and scanner support

Options Include:
* Auto Wake-Up
* Fax machine interface
* Hayes Compatible Modem
* Scanner Interface
* DES encryption
* Hardware Compression

Call (818) 578-1339
Fax (818) 578-1264

AMERICAN DATA TECHNOLOGY, INC.
44 W. BELLEVUE DR., SUITE 6, PASADENA, CA 91105, USA

SMARTFAXplus Does It All!

Circle 52 on reader service card

New dimensions in Bible study.

THE WORD processor
The most comprehensive and the most used Bible study program. Version 4 includes the text of the NIV, RSV, KJV or NKJV Bible for just $199.95. You can search for any word or text string and build indexes to record your study.

Our family of products include Greek and Hebrew transliterators! And our add-on products include topical cross references, a personal commentary, a chronological Bible and a chain reference system. Our new memory resident VERSE TYPIST transfers verses to your word processor. Our INSTANT ACCESS product finds any word instantly!

Bible Research Systems (512)251-7541
2013 Wells Branch Parkway #304, Austin, Texas 78728
Postage extra. For IBM, MSDOS, Macintosh, Apple II ProDOS.

Circle 20 on reader service card

Next in

PC WORLD

November

Supporting Your Business Strategy

LAN E-mail

Interoffice mail finally works—thanks to local area networks and electronic mail. And the latest generation of E-mail software is for everybody, not just power users. *PC World* looks at four LAN E-mail packages that go beyond what network vendors offer in ease of use and features—two even run under *Windows*.

Groupware

As PC users hook up to local area networks, mild interest in group productivity software is becoming keen demand. The wave began with network word processing software that offered multiuser features. Now, software packages that help users cooperate on dozens of tasks are poised to enter the market.

386 Environments

Who says you need OS/2 for multitasking? Four operating environments let you harness the power of your 386 to run multiple DOS programs at once. *PC World* evaluates *Windows/386, Desqview, VM/386,* and *PC-MOS/386*. The choice is yours.

Get your work done before 1991?

The future of personal computing is clear. More powerful PCs. Easier to use PCs. With graphics and character-based programs working side by side. Talking to each other. Multitasking. Windowing. Menuing. Mousing. Getting your work done easier and faster.

Have it all now.

DESQview™ is the operating environment that gives DOS the capabilities of OS/2.™ And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap to the productivity of the next generation. For not much money. And without throwing out your favorite software.

Add DESQview to your PC and it quickly finds your programs and lists them on menus. So you can just point to the program, using keyboard or mouse, to start it up. DESQview knows where that program lives. And what command loads it.

For those who have trouble remembering DOS commands, it adds menus to DOS. It even lets you sort your files and mark specific files to be copied, backed-up, or deleted—all without having to leave the program you're in.

Best of all, DESQview accomplishes all this with a substantial speed advantage over any alternative environment.

Multitask beyond 640K.

When you want to use several programs together, you don't have to leave your current program. Just open the next program. View your programs in windows or full screen. Open more programs than you have memory for. And multitask them. In 640K. Or if you own a special EMS 4.0 or EEMS memory board, or a 386 PC, DESQview lets you break through the DOS 640K barrier for multitasking. You can start 1-2-3 calculating and tell Paradox to print mailing labels while you're writing a report in Word Perfect, or laying out a newsletter in Ventura Publisher, or designing a building in AutoCAD.

For programmers, DESQview's API, with its strengths in intertask communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.

DESQview even lets you transfer text, numbers, and fields of information between programs.

Fulfill the 386 promise.

For 80836 PC users, DESQview becomes a 386 control program when used in conjunction with Quarterdeck's Expanded Memory Manager (QEMM)-386—giving faster multitasking as well as virtual windowing support.

And when you use DESQview on an IBM PS/2™ Model 50 or 60 with QEMM-50/60 and the IBM Memory Expansion Option, DESQview gives you multitasking beyond 640K.

Experts are voting for DESQview. And over a million users, too.

If all of this sounds like promises you've been hearing for future systems, then you can understand why over a million users have chosen DESQview. And why *PC Magazine* gave DESQview its Editor's Choice Award for "The Best Alternative to OS/2," why readers of *InfoWorld* twice voted DESQview "Product of the Year" why, by popular vote at Comdex Fall for the last two years in a row, DESQview was selected as "Best PC Environment" in *PC Tech Journal's* Systems Builder Contest.

PC MAGAZINE EDITOR'S CHOICE NOV. 24, 1987

INFO WORLD 1986 AND 1987 PRODUCT OF THE YEAR

DESQview lets you have it all now.

DESQVIEW SYSTEM REQUIREMENTS:
IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2• Memory: 640K recommended; for DESQview itself 0-145K• Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards• Disk: two diskette drives or one diskette drive and a hard disk• Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA). IBM Enhanced Graphics (EGA). IBM Personal System/2 Advanced Graphics (VGA)• Mouse (Optional): Mouse Systems, Microsoft and compatibles• Modem for Auto-Dialer (Optional): Hayes or compatible• Operating System: PC-DOS 2.0-3.3; MS-DOS 2.0-3.2• Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.03, GEM 1.1-3.0, IBM TopView 1.1• Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

YES! I need increased productivity now!

Qty	Product	Format	Price Each	Totals
	DESQview 2.0	❑5-1/4 ❑3-1/2	$129.95	
	QEMM-386	❑5-1/4 ❑3-1/2	$59.95	
	QEMM-50/60	❑5-1/4 ❑3-1/2	$59.95	
		Shipping & Handling	$5 in USA / $10 outside USA	
		Calif Residents add 6.5%		
			Grand Total	

Name _____

Address _____

City _____ State ____ Zip ____

Payment Method ❑ Visa ❑ MasterCard Expiration ____/____

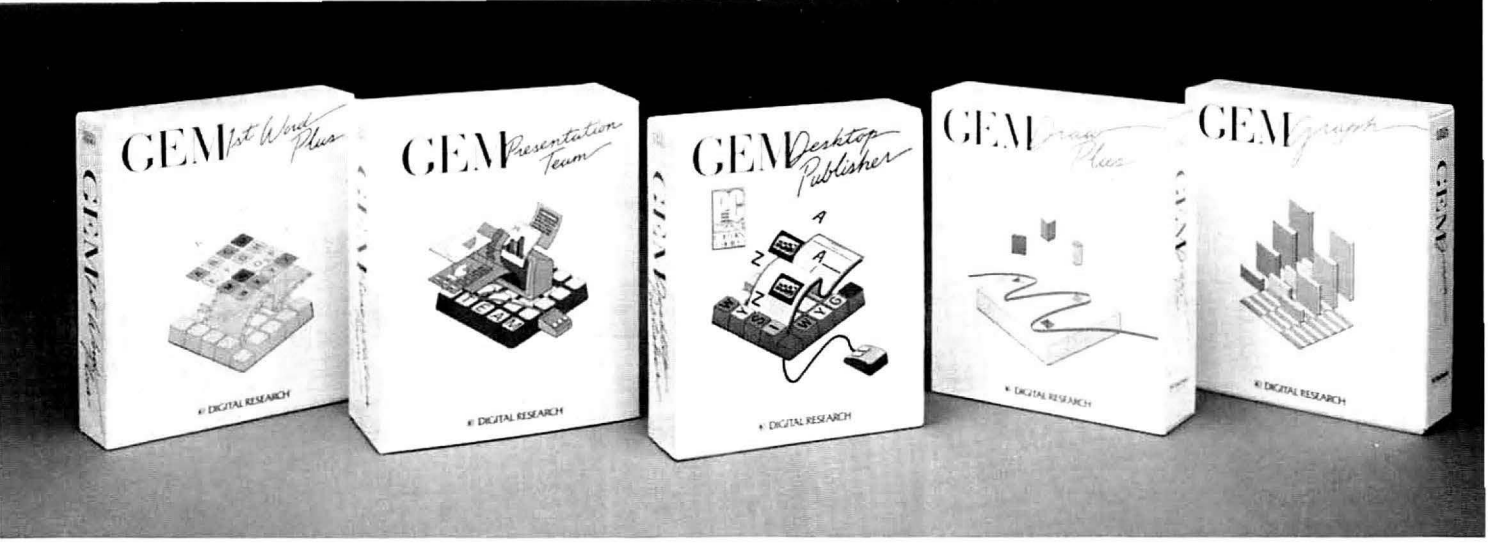
Account # ❑❑❑❑❑❑❑❑❑❑❑❑❑❑❑❑

Quarterdeck

150 Pico Boulevard, Santa Monica, CA 90405
(213) 392-9851

Trademarks are property of their respective holders: IBM, OS/2, PS/2, 1-2-3, Paradox, Word Perfect, Ventura Publisher, AutoCAD, Intel, Above Board, AST, RAMpage, Advantage, Hercules, Mouse Systems, Hayes, Microsoft, Windows, TopView.

Circle 159 on reader service card



WE'RE WANTED BY THE AUTHORITIES.

GEM® Desktop Publisher™

"An easy-to-use graphics-based WYSIWYG desktop publishing system that includes a text editor. Its style sheets are a particularly strong feature... Choose GEM Desktop Publisher for its simplicity and ease of use." Editor's Choice Award.

PC MAGAZINE/April, 1988

GEM® Presentation Team™

"...an excellent all-around graphics package whether or not you use it with Ventura Publisher or GEM Desktop Publisher. If you do use one of those programs, you'll find that GEM Presentation Team's familiar menu structure and compatible graphics file format clearly make it the best choice of all."

PUBLISH!/July, 1988

GEM Presentation Team

"...a reasonably priced business graphics tool with versatile charting styles and powerful drawing capabilities..."

PC WORLD/July, 1988

GEM® Draw Plus™

"...the fastest drawing program for the PC. Lightning speed, even on a standard PC or XT, and ease of use are its biggest assets."

PERSONAL PUBLISHING/April, 1988

GEM® Graph™

"...a great program for converting data to graphic form in a quick and easy way. The program's strengths lie in its simplicity and intuitive interface."

PC MAGAZINE/March, 1988

GEM® 1st Word Plus™

"There is much to like about GEM 1st Word Plus, especially the way it performs sophisticated operations through the use of pull-down menus and pop-up dialog boxes."

COMPUTER SHOPPER/May, 1988

Whether you're an authority or a novice, the GEM® product line provides fast, friendly and affordable applications for PC publication and presentation graphics. Contact your nearest dealer or call 1-800-443-4200 for more information.

GEM PUBLICATION AND PRESENTATION GRAPHICS

DIGITAL RESEARCH®

GEM, Digital Research, and the Digital Research logo are registered trademarks and GEM Desktop Publisher, GEM Presentation Team, GEM Draw Plus, GEM Graph, and GEM 1st Word Plus are trademarks of Digital Research Inc. 1st Word Plus is a trademark of GST Holdings, Ltd. Ventura Publisher is a registered trademark of Ventura Software, Inc. Copyright © 1988, Digital Research Inc. All rights reserved.

Circle 266 on reader service card

ROM With a View

No one will ever mistake Tandy's Model 1000 computers for Macintoshes.

But Tandy and Apple have at least one thing in common.

Stewart Alsop

FRED STIMSON

I am really excited about Tandy Corp. I never thought I would say such a thing—after all, less than five years ago, as editor of *InfoWorld*, I approved a cover story headlined, "Radio Shack Improves Its Schlock Image," and Tandy got so angry that it canceled its advertising contract. Tandy's reaction to that story reflected its sensitivity to the constant accusation that it could only serve the Joe Sixpack crowd and would never be a mainstream technology company.

Things have changed in Fort Worth. Tandy is now a mainstream PC company with a tremendously successful line of IBM PC compatibles. It has become the leading home computer manufacturer. It also sells the smallest and least expensive handheld cellular telephone in the world. It is now the only American manufacturer of televisions. It has introduced an erasable optical disk that looks like a sure bet if the company can actually produce what it has promised. And the company is confident that it no longer has to worry about a schlock image.

Most important to personal computer users, Tandy has managed to become the first PC compatibles manufacturer that understands how to make computers as usable and sexy as the Apple Macintosh without abandoning the IBM standard: specifically, the Tandy 1000 SL and TL, introduced in late July.

Tandy has achieved this feat by outROMming the Macintosh. Whether or not you believe the Macintosh is a good computer, Apple is selling them as fast as it can make them. And the reason is the software—the user-interface toolbox and operating system—permanently imprinted within the computer's 256K of read-only memory, or ROM.

Most computer industry executives will tell you it's foolish to put your operating system into ROM, because burning software into a chip makes it difficult to upgrade. But Apple has discovered that the benefits far outweigh the headaches. First, burning software into ROM means that it is much more closely associated with the personality and packaging of the computer, giving it more of the feel of an integrated system. Second, ROM-based software becomes so much a part of the computer that software developers would rather not work around it. The result is a relatively uniform and standardized family of applications software and a computer that's much

(continues)

harder for competitors to reproduce. Third, taking the step of committing your operating software to permanent memory sends a message to users and other important parties that you are really confident about the quality and permanence of your operating software.

Tandy has studied this phenomenon and begun to adapt it to its own line of computers. A year ago, the company introduced the Model 1000 HX, complete with a 128K ROM chip containing the operating system (DOS 2.10) and a small part of Tandy's own *DeskMate* user-interface package. The primary reason for using ROM-based system software was to help the computer start up faster and eliminate the need for a second disk drive for DOS. Having taken that first tentative step, though, the company began to discover the other benefits of putting its operating software in ROM.

So this year when Tandy introduced its new computers, it quadrupled the ROM to 512K and burned in the operating system, the disk format and copy commands, the *DeskMate* user interface and a network interface, an 80,000-word spelling checker, and the video and mouse drivers. In doing so, Tandy has taken a major step toward the leading edge of computer design and begun to redefine what it considers operating software. Both Apple and Tandy include the operating system, the user interface, and the network interface in ROM. But while Apple is focusing on multimedia presentations and mainframe connectivity as new areas for its definition of operating software, Tandy is focusing on text management and communications.

This all sounds very conceptual and gee-whizzy, but in fact there are substantial benefits for the individual user. First, the new Model 1000 is up and running much more quickly than any other computer in its class, because starting software from ROM takes much less time than starting it from disk. Indeed, the Model 1000 TL, based on an 8-MHz 80286 processor, goes

(continues)

Picture Permanent.

Brilliant Color Output With IBM® Compatibility.

If you're looking for an easy-to-use color printer that delivers fast, high quality color output, with full IBM compatibility, look at the G330-70 from Mitsubishi Electronics.

A built-in video interface enables the G330-70 to create a permanent copy on glossy paper or transparency film of any image viewed on your computer monitor.

With 150 dots per inch resolution, the G330-70 is ideally suited for presentation graphics, paint-type graphic art and PC CAD. It operates smoothly in several PC environments, including the IBM PC/XT/AT and compatibles, IBM PS/2™ or the Apple® Macintosh™ II. The G330-70 can print the screen displays from popular graphics boards, including CGA, EGA, VGA and Mac II.

For fast, bold, brilliant color output directly from your monitor, specify the Mitsubishi® G330-70. At a suggested retail price of $5900, the G330-70 offers the most convenient method for high quality color output.

For product information or nearest authorized Mitsubishi Electronics sales representatives, please call 1-800-556-1234, ext. 54R. In California, call 1-800-441-2345, ext. 54R. Mitsubishi Electronics America, Inc., Computer Peripherals Division, 991 Knox Street, Torrance, CA 90502, (213) 217-5732.

The G330-70 color thermal transfer printer produces a full-color 8½" x 11" page or transparency in about 80 seconds.

© 1988 Mitsubishi Electronics America, Inc.
Mitsubishi is a registered trademark of Mitsubishi Electric Corp. Tokyo
IBM is a registered trademark of International Business Machines Corporation
Apple is a registered trademark of Apple Computer Inc.
Images printed with permission from the following companies (trademarked software package name follows company name)
ThreeD Graphics, Inc. (Persoective), ZSoft Corporation (PC Paintbrush Plus), Autodesk, Inc. (AutoShade)

Visit us at COMDEX, Booth #1128

MITSUBISHI ELECTRONICS

Circle 191 on reader service card

$35 Rebate

COREfast 2.0 backup software!

Save up to 40% on COREfast. Why pay more when you can get the best backup for less? Buy CORE*fast*, PC Magazine's Editor's Choice for backup software two years in a row, and get $35 back. That's a savings of up to 40%!

Feel Secure With the Best in Backup. CORE*fast* reliability means you'll always have a restorable backup on hand. It's easy to use, flexible and fast.

Grow With the Industry Leader. As your backup needs expand, CORE*fast* users can easily move to COREtape 40, 60/100 and 150/250MB tape backup systems. There's no need to learn new software or change backup procedures. *Standardize on CORE*—it's the only company you'll ever need for backup.

COREpower Your Backup With a $35 Rebate, Today!

Tear off the attached $35 rebate coupon and follow the instructions listed on the back. Buy CORE*fast* from your local dealer or call a CORE representative today. This offer expires November 30, 1988.

Northeast Region: 203/357-1339

Southern Region: 407/997-6055

Central Region: 312/439-0511

Western Region: 213/312-8130

International Sales: 407/997-6055, FAX: 407/997-6009

Distribution through Kenfil, MICRO D, Gates and GBC Distributors. In Canada, contact Markham International.

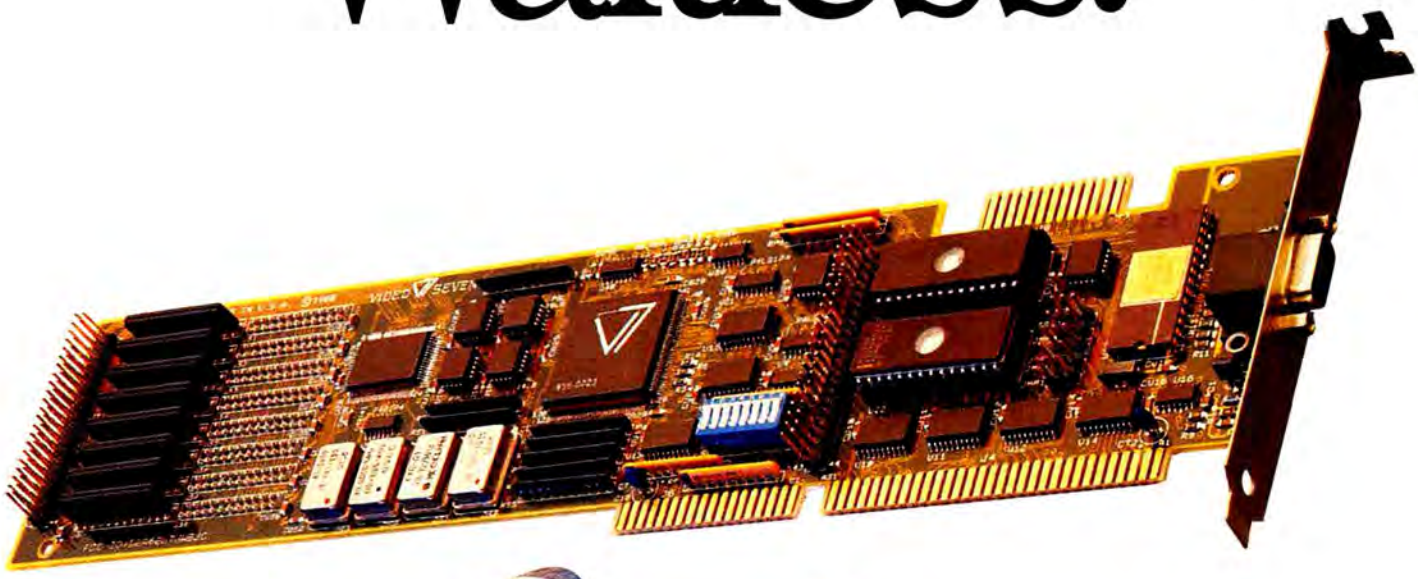
CORE® INTERNATIONAL

Circle 254 on reader service card

CORE International, CORE, CORE*fast* and COREtape are registered trademarks of CORE International, Inc.

©Copyright 1988 CORE International, Inc.

Waitless.



If you've been waiting around for a top performance, virtually zero wait state graphics card, here's some news you can't afford to take lightly.

Our new display adapters, FastWrite VGA and V-RAM VGA, are simply the fastest VGA cards available, on earth or off. They eliminate the usual graphics card "bottleneck," and that means increased speed and performance from a standard PC that's even better than a brand-new PS/2. Not to mention resolution above and beyond standard VGA—all the way up to 1024 x 768.

V-RAM VGA $799

You don't have to wait for complete compatibility, either. Not only are both FastWrite VGA and V-RAM VGA 100% register level compatible but they're the only VGA cards that are form-factor compatible. They have the same daughter card connectors as the IBM PS/2 Display Adapter to accommodate hardware add-ons in the future.

FastWrite VGA $599

There's more. Once you buy a Video Seven Display Adapter, we won't leave you hanging. You get free technical support, guaranteed VGA compatibility and a full five year warranty. All for a very down-to-earth price.

So don't wait another nanosecond. Visit your favorite dealer and find out more about FastWrite VGA and V-RAM VGA. Because once you see what they can do, you'll be walking on air.

VIDEO SEVEN

Video Seven Inc., 46335 Landing Parkway, Fremont, CA 94538, (415) 656-7800

The following are registered and unregistered trademarks of the companies listed: FastWrite VGA, V-RAM VGA, Video Seven Inc.; PS/2, Display Adapter, International Business Machines Corporation; Variable frequency monitor required for greater than 640 x 350 resolution. Video Seven reserves the right to change specifications without notice.

Circle 277 on reader service card

How we made the most powerful integrated software a whole lot easier to use.

Yes. There are ways to take something that's very powerful and make it easier to use.

Actually, with Symphony® 2.0, not only is this latest version of the world's most popular integrated program easier to use, but it's also more powerful than ever. So it can keep up with you as your capabilities grow.

For starters, since there's no copy protection, you can get Symphony up and running with much quicker and easier installation.

Once up and running, bingo, you have instant access to five key business functions: spreadsheet, word processing, database, graphics and communications. So you can prepare budgets, write memos, create inventory lists without having to go through the hassle of changing programs.

But Symphony is really more than five separate programs. Because, unlike other integrated packages, Symphony lets you dynamically integrate functions. For example, when you change spreadsheet data, your graph of that data and your memo containing the same numbers automatically reflect the changes. So you get greater efficiency, and you're able to work faster too.

Plus, the Symphony spreadsheet is the fastest and most powerful spreadsheet available in integrated software, based on Lotus® 1-2-3®, the industry-standard spreadsheet technology.

We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the word processor now has a spelling checker and text outliner. And how database and communications have been improved.

The bottom line is that Symphony is one high performance package that's made to be opened up.

Lotus Symphony 2.0

© 1988 Lotus Development Corporation. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation.

through the opening command sequence so fast that you barely see the words on screen before you get to the *DeskMate* interface. Second, you get access to special features (such as networking and spell-checking) at any time, although you can take advantage of these features only if the application software is developed specifically for the *DeskMate* interface. Third, Tandy users might end up with a reasonably well-integrated set of applications software that supports the special features of the computer, since Tandy has demonstrated enough commitment to burn these features into ROM. When the new Model 1000s were introduced, 14 companies announced that they would publish versions of one or more programs that support all of the special features of the new computers.

Indeed, my only real complaint about Tandy at this point is that it seems to have decided that the ROM strategy only works for cheap computers. In addition to the Model 1000s, Tandy also has models based on the 80286 and 80386 processors (Models 3000 and 4000, respectively), plus a new 386 computer that uses an IBM Micro Channel–compatible bus (Model 5000 MC). But none of these computers have been blessed with ROM software. Tandy, just like other companies, insists that it doesn't want to restrict the possible markets for the machines by building features that some users might not want. Unfortunately, by building what amounts to generic commodity computers (albeit fast ones), Tandy has also managed to build machines that don't appeal to any particular customer either.

Perhaps the company will learn from the certain success of its brilliantly designed new Model 1000 computers and spread some of that brilliance to its more powerful and more expensive machines. Then the company will be viewed not only as a killer home-computer company, but also as a mainstream supplier to corporate America. ●

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

it's called...
WHO WORKS WHEN 1.1

"...outstanding."
—*InfoWorld, March 15, 1988*

Schedules
Every Employee
In *Seconds!*

NOW WITH ROTATING SHIFTS!

For Businesses With Multiple:
- Shifts
- Locations
- Departments
- Work rotations
- Employee preferences
- Work assignments

Regularly $895 per copy, order yours for a limited time at **$479.** It comes complete with documentation, tutorial, online help, and a **30 day money back guarantee.**

For IBM PC/XT, PC/AT, PS/2 and compatibles.

NEWPORT SYSTEMS

P.O. Box 3705
Bellevue, WA 98009
(206) 451-0537

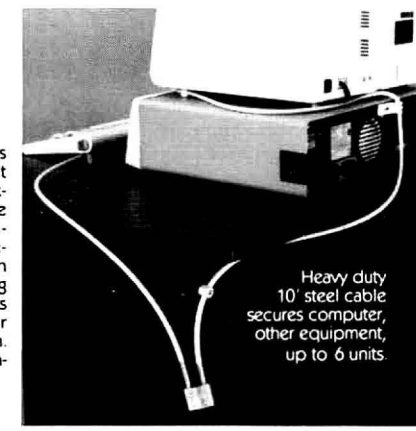
Call to receive FREE demo diskette.
1-800-782-1233
SAVE TIME & MONEY

Circle 9 on reader service card

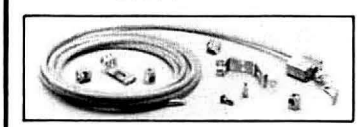
Prevent Computer Theft!

Käblit Systems

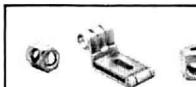
Unique Käblit fasteners attach to equipment without drilling, using existing screws. Cable passes through fasteners preventing removal. Cable is then locked. When ordering multiples, specify locks keyed differently or alike. Installs in 10 min. Over 80 college installations.



Käblit works with: ●Computers ●Printers ●Disk Drives ●Typewriters ●Stereos ●Monitors ●Lab Equip ●Televisions ●Other



$54.95 postage paid. Quantity pricing also avail. for schools, institutions, businesses, etc. Send P.O. Money back if returned in 30 days.

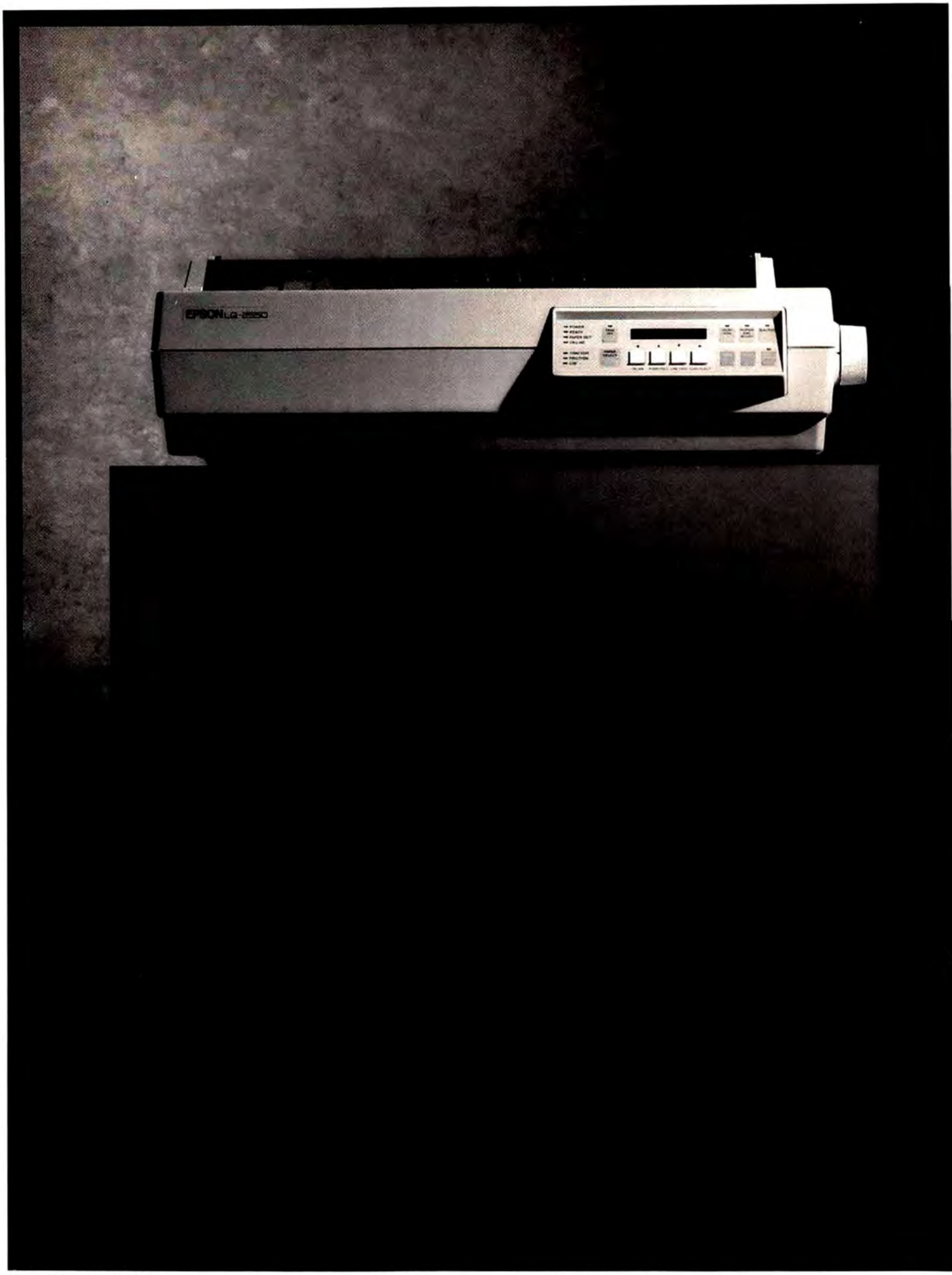


EXCLUSIVE!
Proprietary components prevent removal of mounting screws. (Pat. Pend.)

SECURE-IT Inc. 10 Center Square • E. Longmeadow, MA 01028
800-451-7592 413-525-7039
Dealer Inquiries Invited

Circle 31 on reader service card

Introducing something no other letter quality printer has ever had.



Epson LQ-2550. 24-pin; 136 column carriage; 400 CPS/draft; 133 CPS/LQ; SelecType control panel; SmartPark paper handling; 360 x 360 bit image graphics; prints six-part forms; short form tear-off; paper thickness and micro top of form adjust; optional dual-bin cut sheet feeder; 8K buffer (32K optional); one year limited warranty. Epson is a registered trademark of Seiko Epson Corporation. SmartPark is a trademark of Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505. **(800) 922-8911.**

Everything.

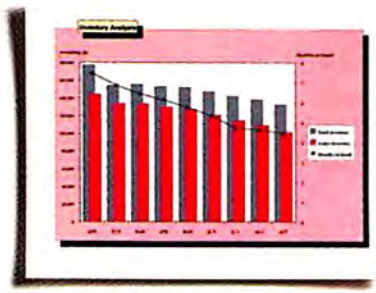
Introducing the top-of-the-line Epson® LQ-2550. It comes with every imaginable printer feature including seven striking typestyles, built-in color, SmartPark™ paper handling and time-saving macros. To touch on just a few. And with Epson's SelecType panel you can control most everything with just a touch.

The LQ-2550 also offers some rather mindful features. In fact, this printer even senses and adjusts for the thickness of your paper, automatically.

Of course, the LQ-2550 has something no one else's printer will ever have. Epson's undeniable reputation for quality, reliability and value.

EPSON

WHEN YOU'VE GOT AN EPSON, YOU'VE GOT A LOT OF COMPANY.™

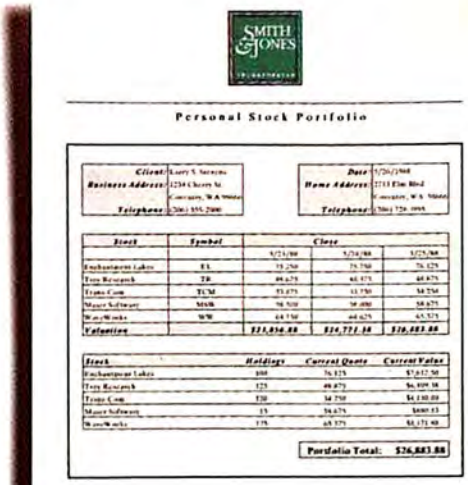


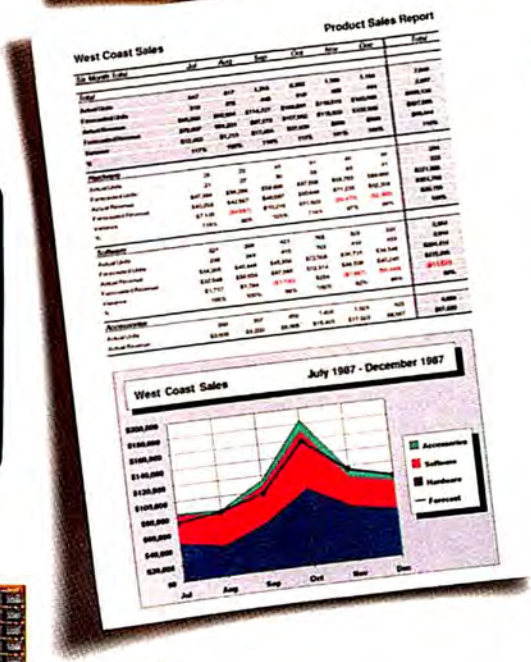
Don't waste any more time, or paper. Preview your ideas before you print them out.

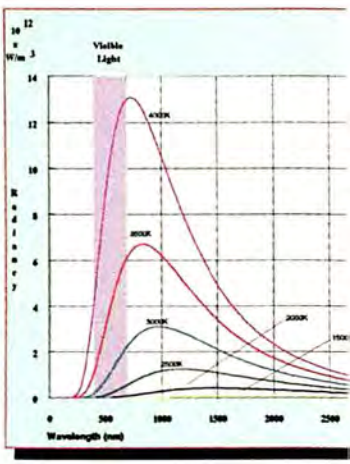
As you can see, Microsoft can make all kinds of HP printers and plotters look their best.

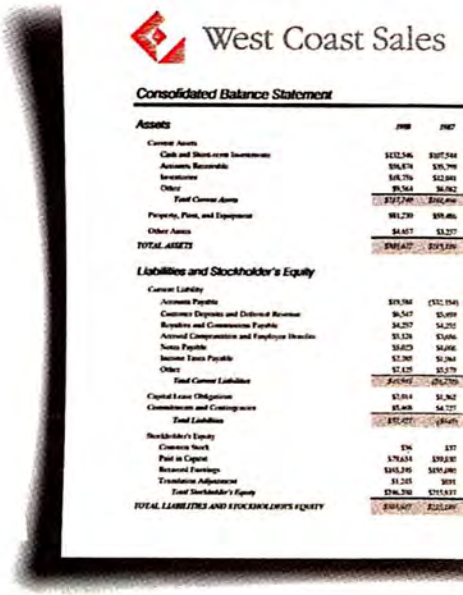
Personalize your LaserJet Series II Printer with HP fonts and memory boards.

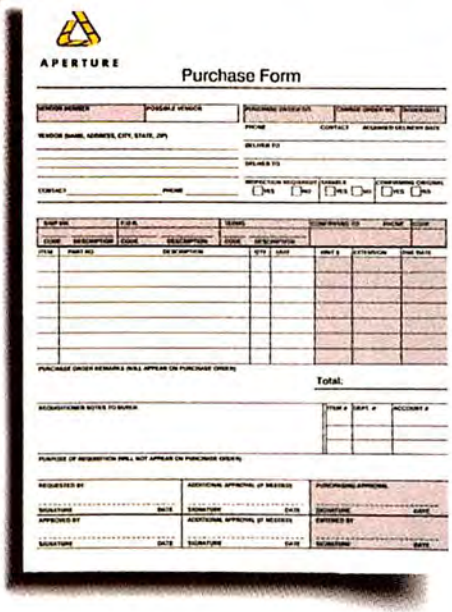
These documents were brought to you by Microsoft Excel, Microsoft Windows, and the HP LaserJet Series II, PaintJet and DeskJet printers.

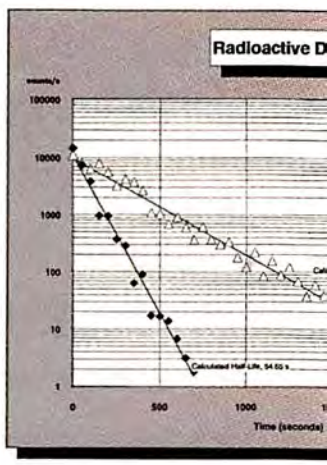


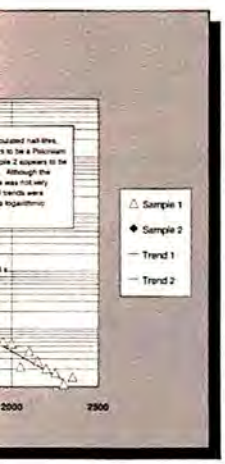












Two world leaders develop highly explosive material.

Hewlett-Packard and Microsoft just took the simple act of communication and turned it into something a bit more powerful.

Illumination.

Because to us, anything worth presenting in a spreadsheet is worth presenting more clearly, more concisely, and more forcefully. Which is exactly what Microsoft® Excel and the Hewlett-Packard® LaserJet Series II® printer let you do.

With this powerful combination of software and printer, now it's easier to take common data and make it look anything but common. With incredibly flexible font styles, font sizes, borders and shading. Incorporated into spreadsheets, charts, tables and forms that instantly make your data say more. Your numbers add up to more. Your facts, figures and ideas mean more.

And of course, HP® desktop plotters and printers, from the ColorPro® plotter to the PaintJet,® DeskJet™ and LaserJet Series II printers, can unleash the potential power inside every box of Microsoft Excel. And vice versa.

To witness a whole new world of spreadsheet output, call us at (800) 541-1261, Dept. I59 for a free copy of our booklet, "Of Power And Printers." Or simply go to your dealer. And see firsthand what happens when two explosive elements get together.

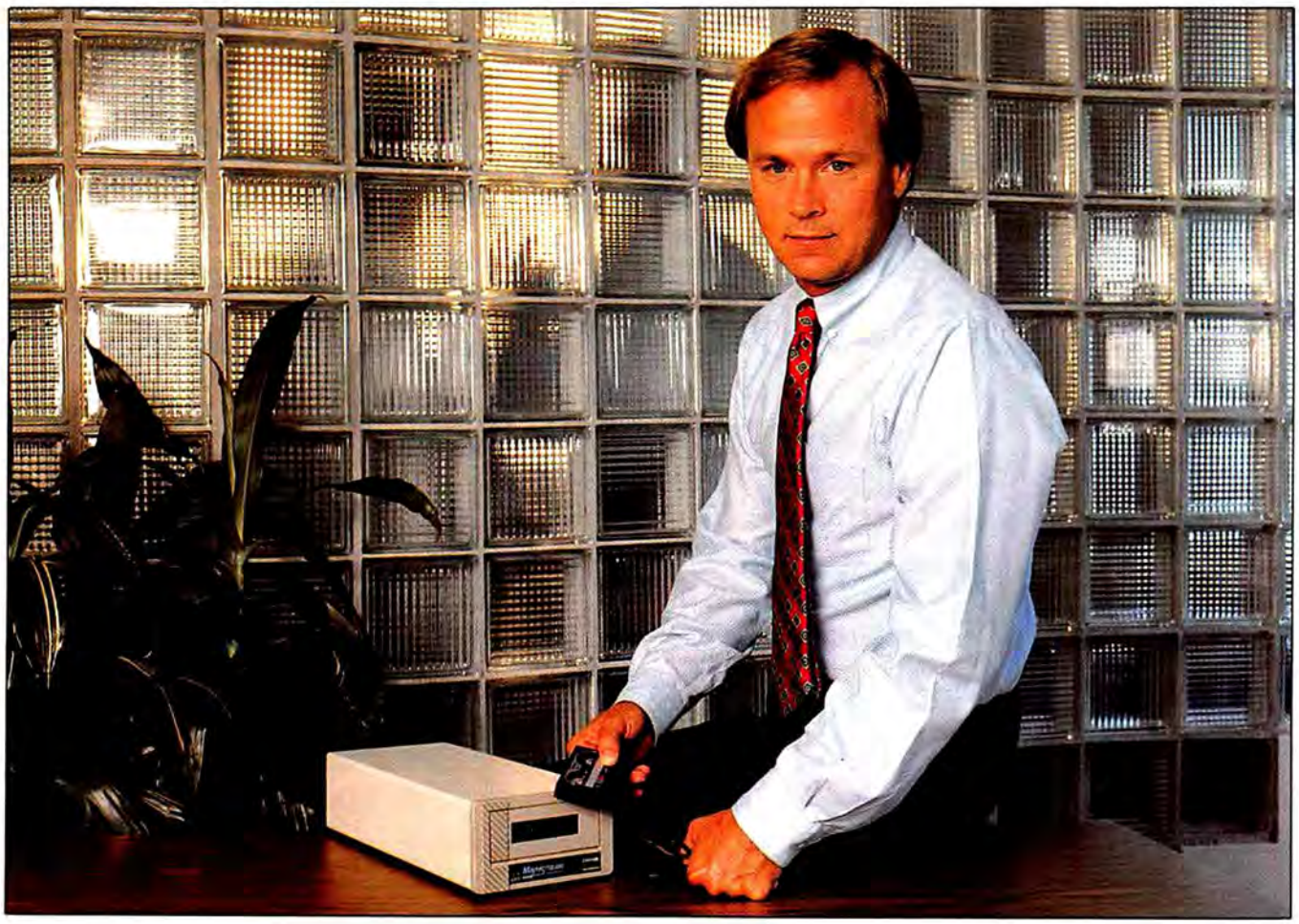
And the chemistry's just right.

HP LaserJet Series II Printer

Microsoft®

© 1988 Microsoft Corporation. Microsoft and the Microsoft logo are registered trademarks of the Microsoft Corporation. Hewlett-Packard, ColorPro, PaintJet and LaserJet Series II are registered trademarks, and DeskJet is a trademark of Hewlett-Packard Company. Customers in Canada call 1-416-673-9811, outside of North America, 1-206-882-8661. Offer good in United States only.

"THEY USED TO SAY I WAS CRAZY."



For years they told me I was crazy. First I recommended they replace those expensive word processing stations with PC's.

What happened? Secretarial productivity doubled, and every secretary now has a PC word processor on her desk.

Then I recommended we supplement our mainframe with PC-based systems for every department.

What happened? Now the vital information is easily available to everyone.

Yesterday, less than a month after I recommended we buy the MaynStream 2200HS Tape Backup System, our building was hit by lightning. It took out two of our PC servers, each with 850 megabytes of vital information.

What happened? Nothing! We simply restored the information using the MaynStream 2200HS. You see, every day without fail, we backed up those servers. Today it paid off and it will tomorrow. The MaynStream 2200HS Tape Backup System. That's not crazy, that's plain smart.

THE MAYNSTREAM 2200HS TAPE BACKUP SYSTEM.

☐ Novell Approved Software ☐ XENIX compatible ☐ 2.2 gigabytes of data on one tape ☐ Portable, allowing one unit to serve many systems ☐ Read-After-Write ☐ Password Protection ☐ 250 Kbytes/sec Transfer Rate ☐ The Editor's Choice of PC Magazine, PC World, InfoWorld, and LAN Magazine.

Call 1-800/821-8782 for a technical specification sheet.

See us at
Booth #1202 and 1208
COMDEX/Fall '88

Maynard Electronics
We're backing you one-hundred percent.
460 E. Semoran Blvd., Casselberry, FL 32707 407/331-6402

Circle 263 on reader service card

OS/2: Heard but Not Seen

OS/2 is moving slowly—

but the OS/2 Presentation Manager and its kin, Windows, will herald a new generation of applications.

William F. Zachmann

It's been exactly a year and a half since IBM introduced the PS/2 line of personal computers and the OS/2 operating system. If IBM's announced delivery schedules are met, the "real" OS/2 versions, complete with Presentation Manager, should be available this month (with IBM OS/2 Standard Edition 1.1) and next (with Extended Edition 1.1).

As the clouds of vaporware finally begin to clear, it's becoming easier to discern the real look and feel of tomorrow's software landscape.

First, there's a growing recognition that OS/2 will not displace DOS any time soon. That's guaranteed by the enormous installed base of 8088- and 8086-based systems (including IBM's PS/2 Models 25 and 30) that will never be able to run OS/2 in any form.

Furthermore, 286-based systems running OS/2 at 8 MHz, 10 MHz, or 12 MHz deliver what is at best barely adequate performance, as the benchmark tests elsewhere in this issue plainly show. Test results confirm what has long been obvious to anyone who cared to look at the matter objectively: Existing 286-based systems (including IBM's PS/2 Models 50, 60, and 50 Z) just don't have the horsepower to be effective OS/2 platforms.

Although running OS/2 on a 286-based system is certainly possible—given enough memory and disk space—doing so offers no clear advantage over relying on any of several DOS alternatives. For the majority of 286 users, *Microsoft Windows/286* delivers more useful capabilities than OS/2 and at a much lower price. Other products, like Digital Research's *Concurrent DOS* and Quarterdeck's *Desqview*, also provide alternatives.

OS/2's high cost and its sluggish performance on a 286 machine make it unlikely that IBM's new operating system will be used on more than a very small percentage of 286 machines—perhaps 10 percent, although it wouldn't surprise me if the actual number were even lower.

Practically speaking, then, OS/2 requires a 386-based system like the PS/2 Model 70 or Model 80, the Compaq Deskpro 386, or similar machines from Acer, AST, Dell, Hewlett-Packard, Tandy, Zenith, and others. What's definitely not required is IBM's Micro Channel Architecture, which offers no significant performance or functional advantages for running OS/2 or anything else.

(continues)

Even on 386-based systems, however, OS/2 will not necessarily outshine DOS alternatives. Many users who have 386 systems equipped with ample memory and storage will obtain more from a product like *Microsoft Windows/386* than from OS/2. For this reason, OS/2's penetration of the installed base of 386s will fall far short of 100 percent for some time to come.

The net result is that, for now, DOS dominates—and will continue to dominate—the world of IBM and compatible personal computers. Only as 386-based systems come to prevail during the next few years will OS/2 begin to have a significant impact on desktop computing.

Under these circumstances, IBM's proprietary OS/2 Extended Edition (EE) is likely to achieve approximately the level of success attained by the company's *TopView* and PCjr. Even hungrier for resources than OS/2 Standard Edition, OS/2 EE is unlikely to be used by anyone but IBM's most dedicated corporate customers—and even then, only by those with unlimited budgets. In themselves, Extended Edition's communications and data management components offer less than do a host of competing entries in the DOS world.

Yet despite OS/2's slow initial acceptance, it would be a serious mistake to discount its impact on application software. Though OS/2 itself will remain a relatively minor presence in personal computer systems for some time, early evidence suggests its impact on applications will be widespread and quickly noted.

The reason is simple. OS/2's influence on applications is only incidentally tied to its multitasking capabilities or its access to address space beyond the DOS 640K limit. Its real impact lies in the Presentation Manager's graphic interface, which is, of course, also basic to the various versions of *Microsoft Windows*.

So while OS/2 will be adopted slowly, it has already stimulated interest in *Windows*. Equally important, this new operating system has defined the intersection of *Windows* and the OS/2 Presentation Manager as the true meeting ground of innovative software development.

Indeed, it's not OS/2 alone but rather the Presentation Manager coupled with *Windows* that es-

Diamond Scan 14
Auto-Tracking
800 x 600 pixels (digital, analog, monochrome)
330 x 500 pixels (composite NTSC)

Diamond Scan 20A
Auto-Tracking
800 x 600 pixels (digital, analog, monochrome)
1024 x 800 pixels (maximum)

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

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

Actual unretouched screen images

A Clear View To Monitor Quality

tablishes the real watershed in application software for PCs, PS/2s, and compatibles. Together, they're creating a key transition point, which will prove more important than IBM's introduction of the PC and DOS back in 1981.

For compelling evidence one need look no further than the results of this year's *PC World* World Class Awards. *PC World* readers not only awarded *Windows*-based *Excel* Most Promising Newcomer status by a wide margin (19 percent, to OS/2's 3 percent) but also placed it a remarkably close second to Lotus's king of the hill, *1-2-3*, in the spreadsheet category—possibly the best showing by any *1-2-3* challenger ever.

Meanwhile, the number of products written for *Windows* and/or the Presentation Manager mushrooms. The list is formidable: desktop publishing packages like Aldus's *PageMaker*, Manhattan Graphics' *Ready-Set-Go*, and Xerox's *Ventura Publisher;* related products like Z-Soft's *Publisher's Type Foundry* and T/Maker's *ClickArt* collections; graphics programs like Micrografx's *Designer*, *Graph Plus*, and *Windows Draw*, Computer Support Corporation's *Arts & Letters*, and Zenographics' *Pixie;* utilities like Access Softek's *Prompt*, R's *Hammer & Vise*, Columbia Software's *FormBase*, and hDC's *QuickStart;* and such diverse offerings as Financial Feasibilities' *CFO Advisor*, Palantir's *WinText*, Gupta's *SQL Windows*, Omnis's *Quartz*, and Neuron Data's *Nexpert Object*.

The proliferation of all these OS/2-related programs, along with *Excel*'s impressive showing among *PC World*'s readers (clearly a leading-edge group), indicates potential shifts in software usage akin to those that enabled *1-2-3* to take the crown from *VisiCalc* in the PC's early days. During the next year or two, software written for *Windows* and the Presentation Manager is all but certain to make major gains against older, character-mode DOS applications.

This turn of events, however, means the virtual collapse of IBM's attempts to use OS/2 as a weapon against competitors. It's also a blow to the PS/2 hardware line's clear proprietary direction. Inasmuch as the new software development environment

(continues)

Only one supplier of color monitors offers the widest selection of features and operating flexibilities in the market today.

That company is Mitsubishi Electronics.

Mitsubishi® delivers the reliability and performance that can meet your color information display requirements today as well as tomorrow. Larger screen sizes, truer colors, and optimum resolutions make your work easier—and far more productive.

Whether your requirements call for fixed-frequency graphics standards, like EGA and VGA, or multiple-frequency performance, Mitsubishi has the color monitor with the resolution and size to fit *your* specific needs. This includes the Diamond Scan Series of 14", 16" and 20" auto-tracking monitors, some with microprocessor-enhanced programmable display settings. All at very competitive prices.

To get a clear view of monitor quality and value, look to Mitsubishi.

For product information or nearest authorized Mitsubishi Electronics sales representatives, please call 1-800-556-1234, ext. 54M. In California, call 1-800-441-2345, ext. 54M. Mitsubishi Electronics America, Inc., Computer Peripherals Division, 991 Knox Street, Torrance, CA 90502, (213) 217-5732.

Mitsubishi Model	Screen Size (inches)	Horizontal Scan Frequency (kHz)	Mask Pitch (mm)	Compatibility/Resolution							
							VGA				
				NTSC	CGA	EGA	Std.	Ext.	Apple Mac II	1024 x 768 (48 kHz)	1280 x 1024 (64 kHz)
Diamond Scan 14 (AUM1381A)	14/13V	15.7 – 36 auto-tracking	0.31	•	•	•	•	•	•		
Diamond Scan 16L* (HL6605TK)	16/15V	30 – 64 auto-tracking	0.31				•	•	•	•	•
Diamond Scan 20A (HA3905ADK)	20/19V	15.7 – 36 auto-tracking	0.31		•	•	•	•	•		
Diamond Scan 20L* (HL6905TK)	20/19V	30 – 64 auto-tracking	0.31				•	•	•	•	•
XC1429C	14/13V	31.5	0.28				•				
XC1410C	14/13V	22 or 15.75	0.40		•	•					
XC1430C	14/13V	22 or 15.75	0.31		•	•					

*Microprocessor-enhanced programmable display settings

XC1429C
VGA Compatible
640 x 480 pixels

XC1410C/XC1430C
EGA Compatible
640 x 350 pixels

Visit us at COMDEX, Booth #1128

MITSUBISHI ELECTRONICS

And Value.

© 1988 Mitsubishi Electronics America, Inc.
Mitsubishi is a registered trademark of Mitsubishi Electric Corp., Tokyo

Screen images produced with permission from the following companies *(trademarked software package name follows company name)*: Autodesk, Inc. *(AutoShade)*; Computervision Corporation *(Personal Designer)*; Computer Friends, Inc. *(Modern Artist)*; SuperMac Software *(PixelPaint)*; ThreeDiGraphics, Inc. *(Perspective)*; Microsoft Corporation *(Excel Version 2.0)*

Circle 232 on reader service card

What if there were more powerful forces at work?

Exceptional power.

That's the defining characteristic of Hewlett-Packard's full line of industry-standard Vectra PCs.

From the 20-megahertz 80386-based system, through the 12-megahertz 80286, to our entry-level and portable models.

And this line not only has the speed to get the job done, but the expandability, too.

For instance, the memory of our 12 MHz 80286-based model can be expanded up to 8 megabytes. And, importantly, all 8 can be accessed at the same 12 MHz for faster performance.

With eight expansion slots and up to 620 megabytes of mass storage, the 80386 models' built-in expandability will handle your most demanding applications.

But there's more than just power. There's the compatibility to meet today's standards while anticipating tomorrow's.

Mid-level, 80286 based

Entry-level, 8086 compatible

Both desk-top and floor-mount models support 5.25" and 3.5" internal flexible drives, while the 80286 and 80386 machines will run OS/2.

And every single HP Vectra PC offers something no other PC can: HP's

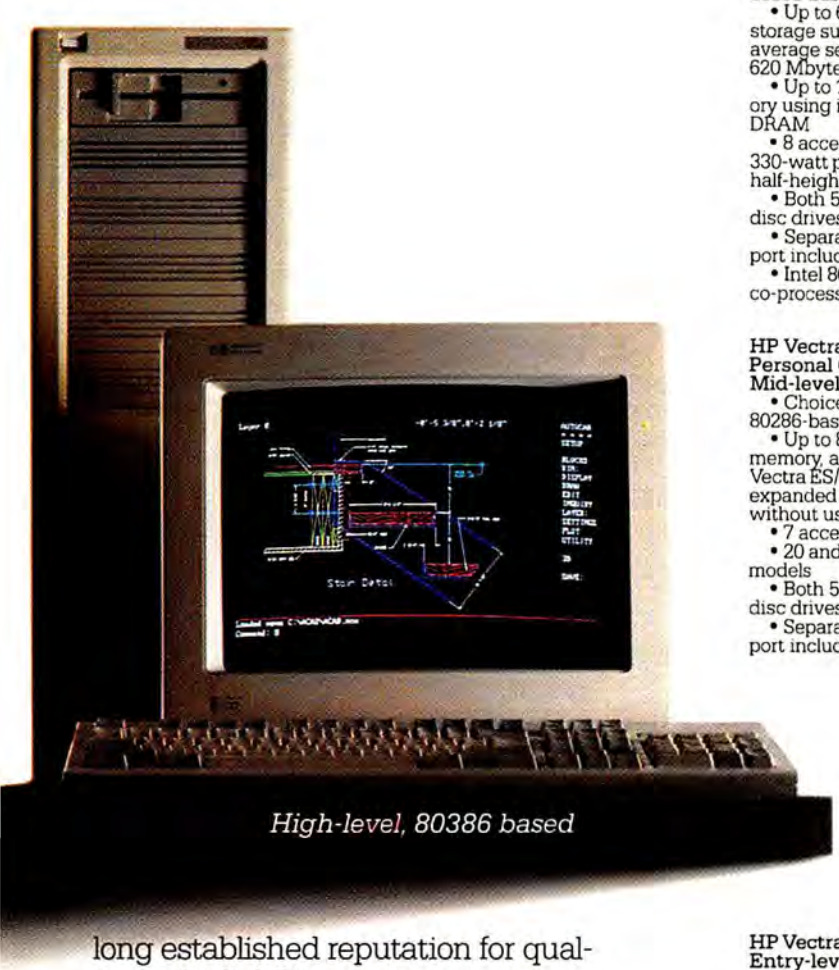
© Hewlett-Packard Co. 1988 IS02834

we never stop asking

"What if...?"

HP Vectra RS/16 and RS/20 Personal Computers
High-level, 80386 based
- Choice of 16 or 20 MHz, Intel 80386-based microprocessors
- Up to 620 Mbytes hard disc storage supported—17 millisecond average seek time for 100 through 620 Mbytes
- Up to 16 Mbytes of 32-bit memory using interleaved page-mode DRAM
- 8 accessory slots for expansion, 330-watt peak power supply, and six half-height mass storage shelves
- Both 5.25 and 3.5 inch flexible disc drives supported internally
- Separate mouse/graphics tablet port included
- Intel 80387 and Weitek 1167 co-processor support

HP Vectra ES and ES/12 Personal Computers
Mid-level, 80286 based
- Choice of 8 or 12 MHz, Intel 80286-based microprocessors
- Up to 8 Mbytes of expanded memory, accessed at 12 MHz in the Vectra ES/12 PC, supporting LIM 4.0 expanded memory specification without using I/O slots
- 7 accessory slots for expansion
- 20 and 40 Mbyte hard disc models
- Both 5.25 and 3.5 inch flexible disc drives supported internally
- Separate mouse/graphics tablet port included



High-level, 80386 based

long established reputation for quality and reliability.

Advanced surface-mount technology and VLSI are just two examples of how this reputation is being upheld.

Portable, 8086 compatible

PCs like this are the product of a philosophy that never stops asking "What if...?" to create a better computing tool for your business.

Just call for the location of your nearest HP sales office or dealer at: 1 800 752-0900, Dept. 710A.

More power to you.

HP Vectra CS Personal Computer
Entry-level, 8086 compatible
- 7.16 MHz, 8086-compatible microprocessor with zero wait states
- Up to 8 Mbytes of expanded memory, addressable via LIM 3.2 expanded memory specification
- 7 accessory slots for expansion
- 20 Mbyte hard disc model
- Both 5.25 and 3.5 inch flexible disc drives supported internally

HP Portable Vectra CS Personal Computer
8086 compatible
- 7.16 MHz, 8086-compatible microprocessor with zero wait states
- Up to 6 Mbytes expanded memory, addressable by LIM 3.2
- Four I/O slots
- Supports two 3.5 inch flexible disc drives
- 20 Mbyte internal hard disc model available
- Up to 10 hour battery life
- IBM style keyboard

AutoCad is a U.S. trademark of Autodesk, Inc.
PageMaker is a U.S. trademark of Aldus Corp.

HEWLETT PACKARD

will rely on OS/2 Standard Edition 1.1 (rather than IBM's proprietary Extended Edition), OS/2 Presentation Manager, and *Microsoft Windows*, IBM's efforts to seize the initiative from its hardware competitors are doomed to failure. ●

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

POWER TIP NO. 14

1-2-3 to dBASE III Plus Transfer

To convert a *1-2-3* .PRN file to a *dBASE III Plus* SDF (system data format) file, load *1-2-3*, select /Print File, and enter the file name. Then select Options and set all margins to zero. Next, issue Other Unformatted Quit Go to print the file, and select Quit to return to Ready mode. Exit *1-2-3* and load *dBASE III Plus*. To create a corresponding SDF file in *dBASE III Plus*, type the command Use *filename*.DBF at the dot prompt and press <Enter>. Then, type Append From *filename*.PRN SDF and press <Enter>. This conversion works only for fields no more than 239 characters long. *1-2-3* creates an extra carriage return/linefeed at 240 characters.

Roy Moore
Director of Technical Support, Ashton-Tate
Torrance, California

A clear line separates us from the competition.

For clear, clean transmission even over the noisiest phone lines, choose the Acer 2424 modem with Microcom Networking Protocol.™

This fast 2400 bps modem is available in both internal and stand alone versions. And it's just part of a full line of modems that speak to all your communication needs.

Want the "best bps per dollar ratio in a 2400 bps modem"? That's what PC Magazine calls the Acer 2400/PC modem. When compared to the Hayes® Smartmodem 2400™ running at 2400 bps, PC Magazine found "...the Acer modem was clearly superior."

But maybe you want PS/2™ compatibility also. Then the clear choice is the Acer 2424/MC modem with the same fast 2400 bps performance.

And for the best price/performance ratio at 1200 bps, you're talking the stand alone Acer 212A modem or the in-board Acer 1212PC modem.

All Acer modems come with BitCom software™ and are fully Hayes compatible, so they work with Smartcom III,™ Procomm+™ and Crosstalk.® And they're all backed by a one year warranty from Acer, the value leader in personal computers and peripherals.

Acer modems purchased with any Acer system also receive full service and support from TRW.™ On-site and nationwide.

So if you're tired of hearing static from other modem manufacturers, give us a call at (800) 538-1542. In California, (800) 782-1155.

Acer
The Word for Value
Acer Technologies Corp.
401 Charcot Avenue
San Jose, CA 95131
(408) 922-0333

© 1988, Acer Technologies Corp. Acer, 2424, 2400/PC, 2424/MC, 1212/PC and 212A are trademarks of Acer Technologies Corporation. MNP is a trademark of Microcom, Inc. PS/2 is a trademark of International Business Machines Corporation. Hayes, Hayes Smartmodem 2400 and Smartcom III are registered trademarks of Hayes Microcomputer Products, Inc. Crosstalk is a registered trademark of Digital Communications Associates, Inc. BitCom Software is a trademark of Bit Software, Inc. Procomm+ is a trademark of Datastorm Technologies, Inc. TRW is a trademark of TRW, Inc.

Canada: Acer Technologies Corp. Tel.: (416) 674-2211
Japan: Acer Japan Corp. Tel.: (03) 865-0912
W. Germany: Acer Computer GmbH. Tel.: (0211) 6508-0
Taiwan: Acer Inc. Tel.: (02) 713-2232

Circle 131 on reader service card

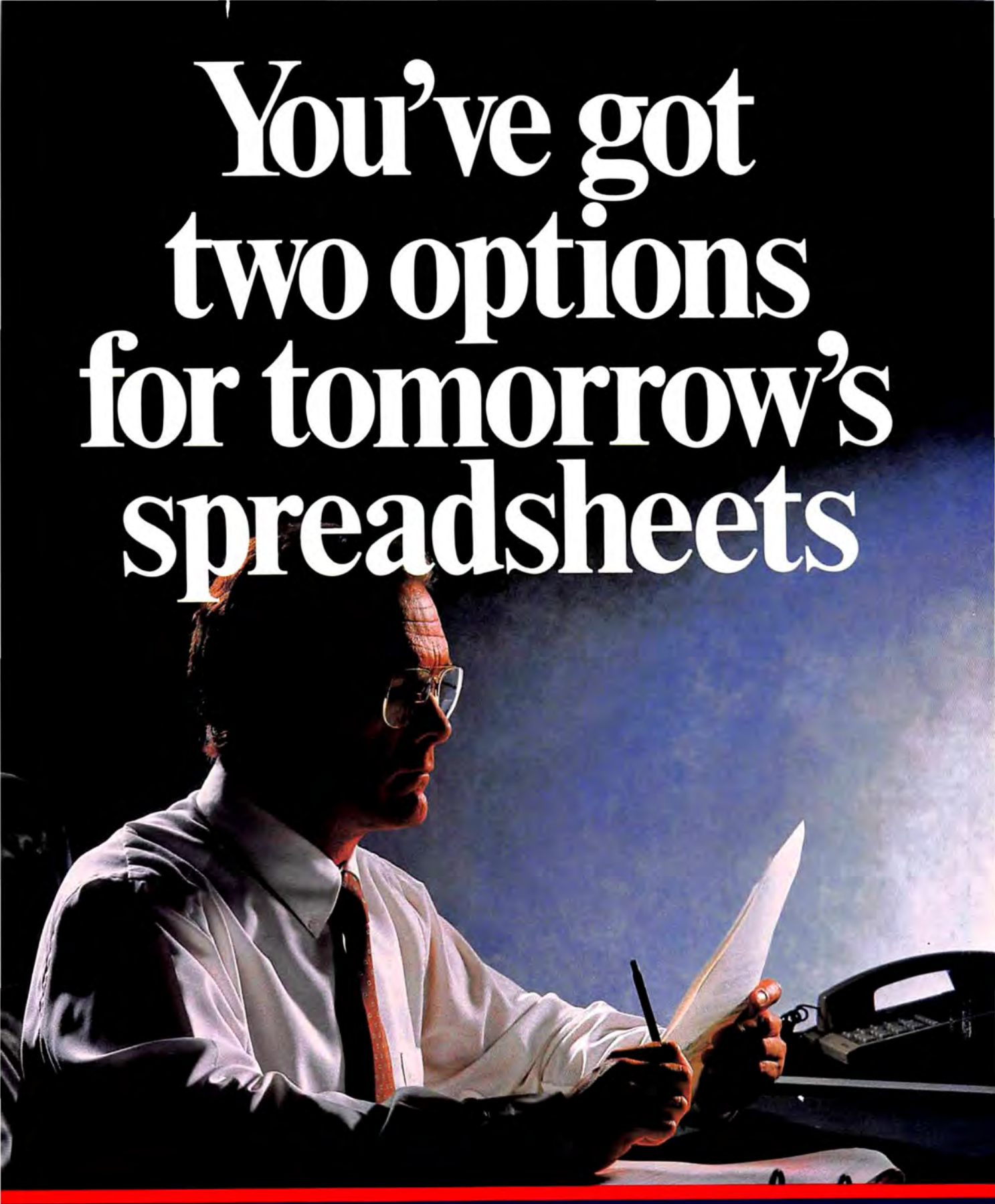
KNOWLEDGE IS POWER.

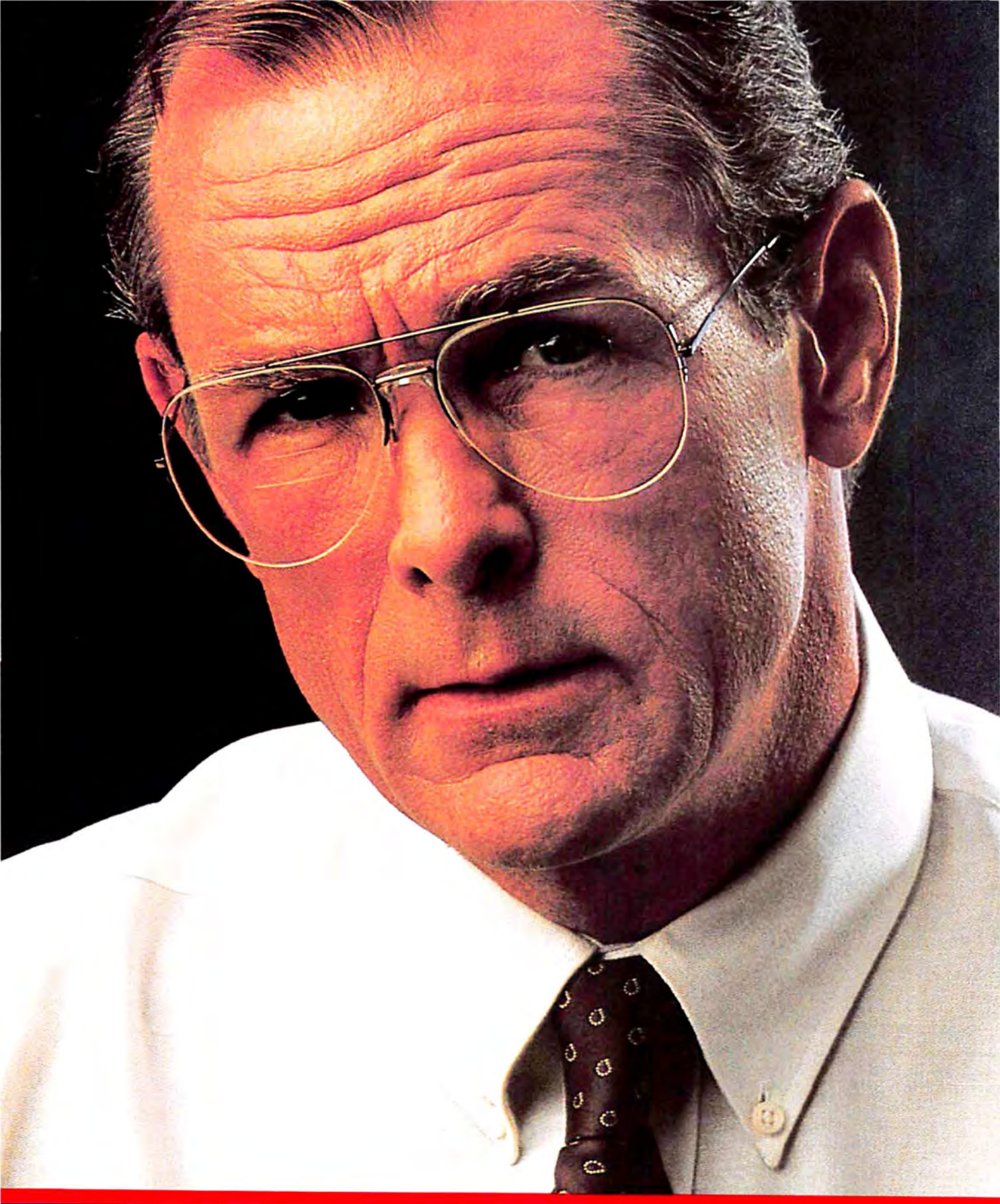
That's why you read *PC World*, and why you should use our handy, postage-paid Reader Service Card to get more information about the products you want now.

You'll find one at the back of this issue.

PC WORLD
The Magazine for PC Decision-Makers

You've got two options for tomorrow's spreadsheets





Justify spending at least $6,000 a workstation to your boss if you don't choose SuperCalc5 or...

How do you see tomorrow?

We see a time when software puts all of the power of your present computer to work for you. It will be a time when you enjoy a spreadsheet program that will simultaneously deal with different parts of your business on individual spreadsheets as well as provide direct links to files anywhere else in your company, even those located on a LAN or your company mainframe. You'll have powerful debugging capabilities to ensure against costly errors, and access to more memory than you ever dreamed possible at remarkably fast recalculation speeds. Tomorrow's spreadsheet will offer a smooth bridge between MS®-DOS and OS/2® and will comfortably coexist with yesterday's spreadsheets. And you'll have show-stopping presentation capabilities to bring your work alive on the page when it's presented.

Choosing the right option.

You could get a spreadsheet which delivers much of what you expect but requires that you purchase the newest high end IBM workstations today. This could also require extensive retraining and the conversion of all of your files and macros. Furthermore, coexistence with users of other spreadsheets will be anything but comfortable. This option is likely to cost at least $6,000 for every workstation.

There is another choice. It delivers everything you expect from the spreadsheet of tomorrow. The choice is *SuperCalc5.*®

Take credit for savi
a workstation by ch

Introducing SuperCalc5.
Tomorrow comes in a blue and red box. *SuperCalc5* is the spreadsheet of the future, ready for you today. Its power and flexibility are remarkable yet switching to *SuperCalc5* won't disrupt your office. First of all, it works with the hardware you most likely have on your desk right now, including all IBM PC,® XT,® AT® and PS/2™ models and compatibles with 512k memory.

In use, *SuperCalc5* holds up to 256 spreadsheets in memory and allows you to view and manipulate any three of them on the screen at any one time. Direct links can be established with spreadsheet files in memory, on disk or on a network. And these can be either *SuperCalc* or Lotus 1-2-3® files. This means with *SuperCalc5* you can access information located in spreadsheet files anywhere else in your company. There's even a version for your company mainframe called CA-SuperCalc.

But even more than this, *SuperCalc5* is designed to coexist with Lotus 1-2-3, with compatibility unmatched by any other spreadsheet. Not only does it read, write and link to Lotus 1-2-3 files automatically, *SuperCalc5* also includes an optional 1-2-3 menu and can use 1-2-3 macros. You can even move Lotus 1-2-3 macros into *SuperCalc5* and then back again if you wish.

Accuracy and speed.
Comprehensive *debugging and auditing* features are built right into *SuperCalc5.* When used along with the *undo* feature, they ensure that errors in your worksheets and macros or even an inadvertent wrong key will not cost more than you can afford.

SuperCalc5 works fast because it has *minimal and interruptible recalculation* and the ability to choose

ing at least $6,000 hoosing SuperCalc5.

recalculation ranges. This means that only changes and those areas of the worksheet which you choose are recalculated. And *SuperCalc5* automatically eliminates formula duplications, saving memory and disk space. *SuperCalc5* supports LIM Version 4.0, providing up to 32 MB of memory.

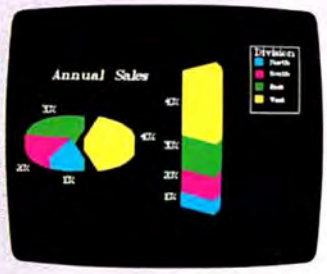
Tomorrow's spreadsheet doesn't require tomorrow's hardware.

SuperCalc5 has been designed for MS-DOS and to bridge the migration to OS/2. In fact, it performs very well under OS/2 Compatibility Mode.

So you're most likely ready to install *SuperCalc5* on your computer right now. And the comfortable coexistence with Lotus 1-2-3 means that you'll never isolate users of *SuperCalc5*.

A good beginning and a beautiful finish.

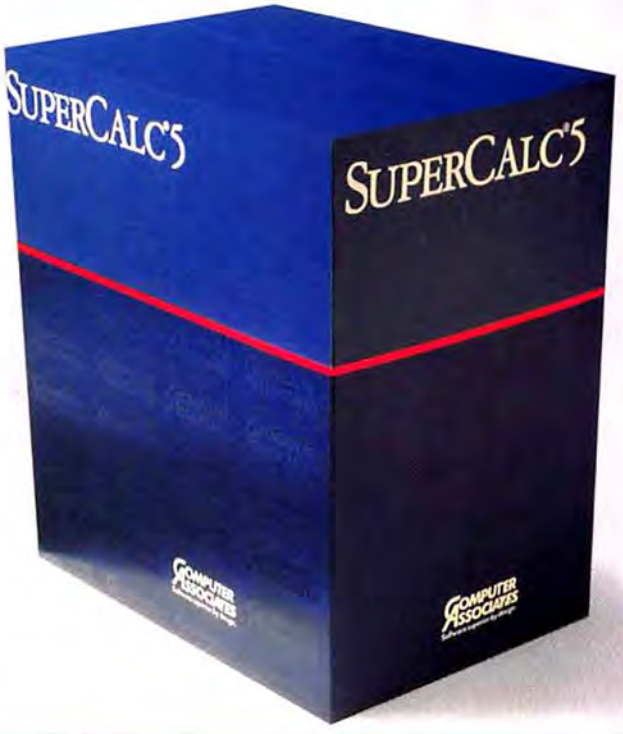
SuperCalc5 has automatic installation and its intuitive command structure means that you can be up and running in 10 minutes.



Finally, when you're ready to put your work in front of someone else, *SuperCalc5* will make it look sensational. Your presentation will spring to life on the page with a wide choice of graphics, charts, type fonts, bars, colors and shadings.

Try tomorrow free for 30 days.

Qualified prospects can take advantage of the *SuperCalc5* introductory program. For more information or the name of the participating dealer near you, call 1-800-531-5236 now, (1-800-663-6904 in Canada) and get a copy of *SuperCalc5* to use on your present computer for 30 days with no obligation. If you decide to buy *SuperCalc5,* you'll also receive a free copy of Silverado,™ the powerful relational database that works inside *SuperCalc5*. This offer expires December 31, 1988. This is your chance to experience the power, speed and sophistication of tomorrow's spreadsheet with *SuperCalc5* first hand. And find out that you don't have to justify tomorrow, you can take credit for it.

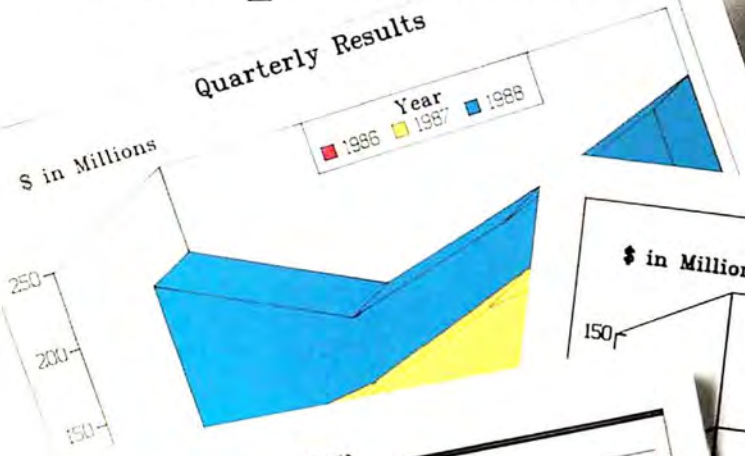


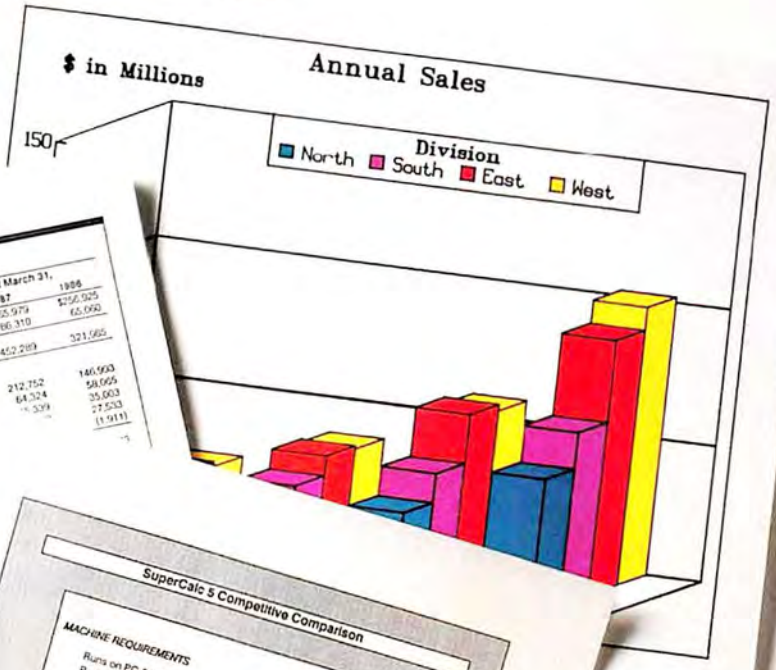
COMPUTER® ASSOCIATES
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframes, minis and micros.
- Worldwide service and support network of more than 70 offices.

Accounting Spreadsheets • RDBMS • Graphics • Project Management • Resource & Operations Management

Compare tomorrow's spreadsheets today.





Consolidated Statement of Income

COMPUTER ASSOCIATES INTERNATIONAL, INC. AND SUBSIDIARIES

Year Ended March 31,

(Dollars in thousands except per share amounts)	1988	1987	1986
Product revenue and other related income	$542,730	$365,979	$256,925
Maintenance fees	166,379	86,310	65,060
TOTAL REVENUE	709,109	452,289	321,985
Costs and expenses:			
Selling, marketing and administrative	335,811	212,752	146,903
Product development and enhancements	81,469	64,324	58,065
Commissions and royalties	65,667	[illegible]	35,005
Depreciations and amortization	58,47	[illegible]	27,553
Interest income, net (Note 5)	(2,4	[illegible]	(1,911)
TOTAL COSTS AND EXPENSES	53	[illegible]	[illegible]
Income from continuing operations before income taxes and extraordinary credit			
Income taxes (Note 7)			
Income from continuing operations before extraordinary credit			
Loss from discontinued operations			
Income before extraordinary credit			
Extraordinary credit			
NET INC			
Income (loss) per common share:			
Income from continuing operations before extraordinary cr			
Discontinued operations			
Extraordinary credit			
NET INCOME PER CO			
Weighted average common shares used in computa			
Income (loss) per common share assuming full d			
Income from continuing operations before ext			
Discontinued operations			
Extraordinary credit			
NET INC			
Weighted average common and com used in computation (Note 1)			

*Adjusted for two-for-one stock s

See Notes to Consolidated F

SuperCalc 5 Competitive Comparison

	SCS	Excel
MACHINE REQUIREMENTS		
Runs on PC & XT	Yes	No
Performs well on AT and PS/2 Model 30	Yes	No
LOTUS 1-2-3 COEXISTENCE		
Optional 1-2-3 Menu and Macros	Yes	No
Link to 1-2-3 Files	Yes	No
MULTISHEETS WITH LINKS		
3-D Spreadsheets (Pages)	Yes	No
Linked Sheets in Memory	Yes	No
Dynamic Links to Sheets on Disk	Yes	No
Spreadsheet "TrickNames"	Yes	No
DEBUGGING AND AUDITING FEATURES		
Comprehensive Debugging and Auditing	Yes	No
Auto Step-Through Macros	Yes	No
Map ("Birds Eye") View	Yes	No
PRESENTATION QUALITY REPORTS		
Complete Laser Printer Support	Yes	No
Fonts, Shading, Boxes, Grids, Lines	Yes	No
Automatic Double Underlining	Yes	No
PRESENTATION QUALITY GRAPHICS		
Production Quality Graphics	Yes	Yes
3-D Bar, Pie, Area and Line	Yes	Yes
Curve Fitting	Yes	No
OTHER FEATURES		
Silverado Relational DB Add-In Available	Yes	No
Memory Save - Eliminate Formula Duplicates	Yes	No
Auto Link to LAN Devices	Yes	No
IBM Mainframe Version Available	Yes	No

SuperCalc and Silverado are trademarks or registered trademarks of Computer Associates International, Inc. Lotus 1-2-3 is a registered trademark of the Lotus Development Corporation. IBM PC, XT and AT are registered trademarks of International Business Machines Corporation. OS/2, and PS/2 are trademarks of International Business Machines Corporation. MS is a registered trademark of Microsoft Corporation.

Edited by ERIC BENDER

Overexpectations for Integration?

Presentation Manager Readies for Graphics

Wave of Software Expected

Developing Presentation Manager applications will be worth the effort, promises Micrografx CEO Paul Grayson.

When OS/2's Presentation Manager finally materializes this month, will the graphic user interface begin to deliver what customers expect?

Like other such platforms, the Presentation Manager promises to enhance ease of use and learning, consistency among applications, and the quality of what-you-see-is-what-you-get output. Unlike its competitors, it has been blessed by both IBM and Microsoft. Riding on a robust next-generation operating system, the Presentation Manager should offer "a level of modularity and consistency users have never had before," says David Gilmour, general manager of Lotus's Advanced Products Division. "The real benefit is flexibility—allowing users to piece systems together."

The Presentation Manager offers a clearer landscape than does *Microsoft Windows*, notes Paul Grayson, chief executive of Micrografx in Richardson, Texas. For instance, the file manager lets you give applications normal English descriptions rather than DOS file names (see the preview "Windows on OS/2," *PCW*, September 1988). "The user doesn't need to know as much as under *Windows*," Grayson says.

But not everyone is overwhelmed by the Presentation Manager. "It's not a particularly graphic interface," maintains Jeffrey Tarter, publisher of the *Soft-letter* newsletter in Cambridge, Massachusetts. "When you fire up a Macintosh, you're immediately in a graphics environment that's relatively easy and intuitive to use. With the Presentation Manager, you're really still dealing with a lot of DOS commands and file directories. The machinery is only partly covered."

Those who see the Presentation Manager as twin to the Mac are living in fantasyland, Tarter feels. "A lot of the enthusiasm for the Presentation Manager comes from people who haven't seen it but have very high expectations."

"If there is any area where the Presentation Manager has been oversold, it's in the level of integration that will automatically flow to multiple vendors' applications," Gilmour says. The Presentation Manager enforces much commonality, but, says Gilmour, "some areas of functional integration among applications have nothing to do with the environment."

Most immediately, how will Lotus, Ashton-Tate, and other vendors move their entrenched, character-based interfaces into the Presentation Manager? "Lotus is caught between a rock and a hard

(continues)

ROBERT CADOW

386 Software Booms

DOS Dominates

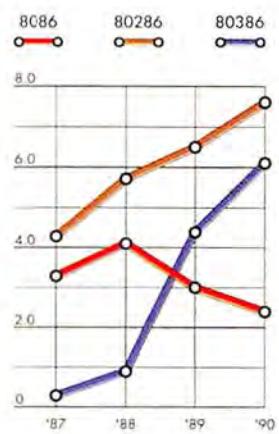
While the ballyhoo builds for OS/2, software that turbocharges DOS for 80386-based machines probably will see more customer action than OS/2 this year.

Written for Intel's 80286, Microsoft's next-generation system software ignores the 386's ability to work on 32-bit data chunks and run multiple DOS sessions. Customers are going home with the various third-

(continues on page 78)

Worldwide PC Shipments

(in millions)



Source: Dataquest

Dataquest estimates show rapid growth in shipments of Intel 80386-based machines. But the installed base of 80286-based PCs will far outnumber them until well into the 1990s.

Viruses and Trojans Strike—But Very Rarely

Lowering Risks of Downloaded Danger

PHILIP ANDERSON

Whether you think that computer viruses are urban myths or a real and growing threat, taking a few security precautions makes sense, according to the experts.

A *virus* is the software equivalent of an infectious intruder—a program that secretly attaches itself to program or system files, then reproduces on other systems through file exchange. The purpose may be as benign as flashing a holiday greeting or as malevolent as reformatting hard disks. A *Trojan horse*—a much more common hazard—differs from a virus in that it is unable to replicate itself.

Much of the concern about viruses has been exaggerated. "Whenever anyone runs into a Trojan, they call it a virus," says Robert Mahoney, operator of the Exec-PC bulletin board in Shorewood, Wisconsin. "Whenever someone runs into a poorly written program that happens to have an unintentional bug that deletes some files, they call it a virus."

Richard tenEyck, telecommunications director for the Boston Computer Society, published an article on viruses and received more than two dozen calls from people who claimed they were victims. But he found every one of them was suffering mundane glitches—such as data being mangled by power outages, telephone line noise, or operator error.

Much of the ballyhoo over viruses has been whipped up by purveyors of "vaccines." Loren Jones, Law and Computer Fellow at Chicago's Illinois Institute of Technology, Kent College of Law, published a letter decrying the fuss over viruses and received a call from a company claiming to have over 30 viral strains in captivity. He was told that these were, in fact, so dangerous that the firm could not show him any. Unsurprisingly, the company sells vaccine programs.

None of the bulletin board operators we polled had ever encountered a bona fide virus, but the PC kingdom has been hit by a few verifiable attacks. "PCs are enjoying a little bit of false bravado," says tenEyck. "It's only a matter of time before some smarter virus brings a couple of systems to their knees."

Users divide into high- and low-risk groups, says Steve Gibson, president of Gibson Research in Laguna Hills, California. Low-risk users, who stick strictly with commercial

(continues)

Presentation Manager

(continued)

place," says Jeff Raikes, Microsoft's director of applications marketing. *1-2-3*'s current look is fundamentally incompatible with the Presentation Manager's, and Gilmour acknowledges that the conflicts present difficult design choices.

That's just the beginning. Clipboards may not always work between various vendors' products—a problem that plagues *Windows*. Additionally, mechanisms to build hot links for shooting data between applications are still in flux, and none will provide a generic, automatic connection between offerings from different suppliers.

"Developers have to work together," Grayson says. "It's not just an issue of guidelines or specifications, it's an issue of cooperation." This cooperation will grow over time if the Presentation Manager follows the Mac model, suggests Raikes: "The more applications that come out, the more consistency."

Gilmour expects "a layered story" on integration—starting with packages that look like each other and progressing through increasingly tailored data-exchange facilities, with the tightest fits among each supplier's product families.

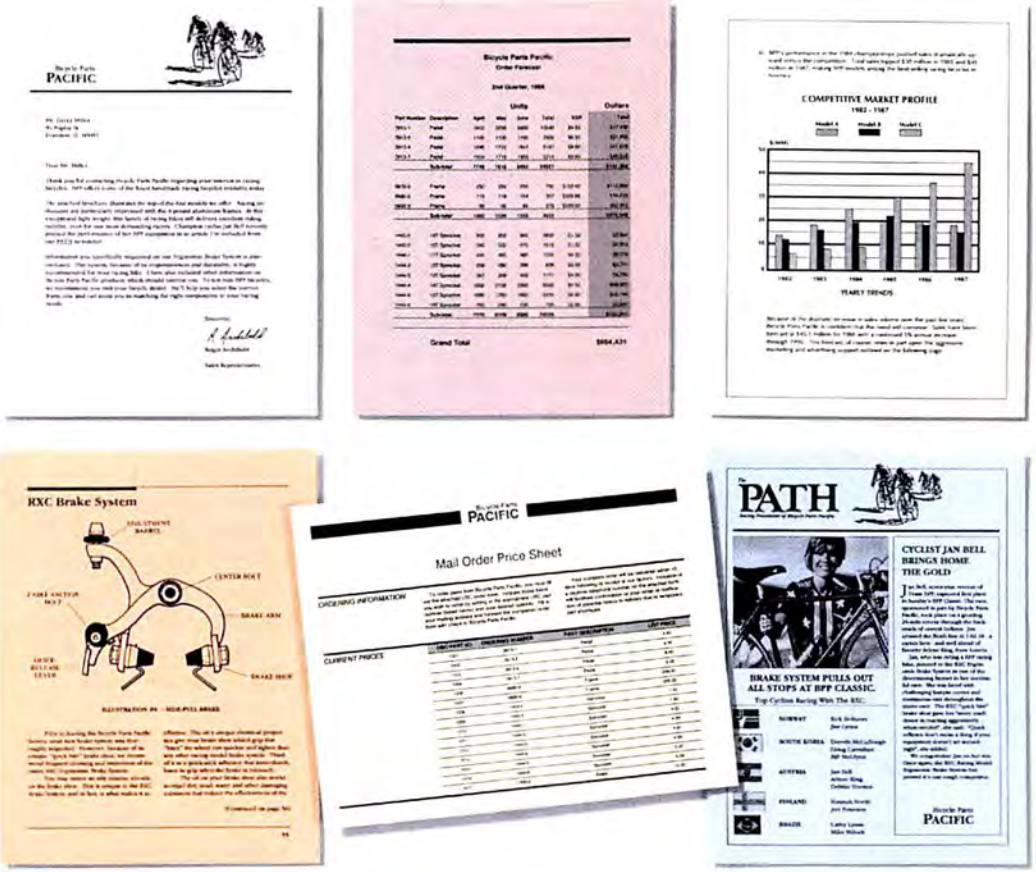
Overall, the Presentation Manager's development "may be a bit more difficult than some people think; it may be a slower burn," Grayson says. "But it's very seductive to a developer to have this kind of an environment with this kind of push from the industry."

While a few applications (quite possibly including *Excel*) are expected to ship in the fourth quarter, the bandwagon won't pick up much speed until 1989. In the meantime, all agree, users should start acquiring the requisite high-power hardware but should wait for compelling applications before making the switch. "The transition is going to be slow and messy," Gilmour advises. —*Eric Bender*

we never stop asking

What if...

How to look good from start...



to finish.

The HP LaserJet Series II Printer.

Nothing brings your ideas to life like the HP LaserJet Series II Printer—from office memos to forms to newsletters. As the leading laser printer, it works with all popular PCs and PC software packages. And, with a wide range of fonts, you get more options to create superior looking documents.

With additional memory you can even print sophisticated 300 DPI full-page graphics. And with HP's ScanJet scanner, you can also easily add photographs, illustrations and text.

No wonder more people choose the original over all other laser printers combined.

So call 1 800 752-0900, Ext. 900D for your nearest HP dealer.

HEWLETT PACKARD

© Hewlett-Packard 1988

Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker

Circle 26 on reader service card

IBM Finds a Metaphor for Analysis

A Model for a Future Presentation Manager?

Yet another breakthrough at Xerox's fabled Palo Alto Research Center is making its way into the personal computer world. This time, IBM rather than Apple will cash in.

Earlier this year, IBM inked a joint development agreement with Metaphor Computer Systems that should create an OS/2 version of the company's Metaphor Data Interpretation System (MDIS). Combining Structured Query Language (SQL) queries with spreadsheets, graphics, text, and other tools, MDIS analyzes data from large, distributed data bases. Based loosely on the Xerox Star, the object-oriented iconic environment currently runs on proprietary network workstations, but the IBM product will use 80386-based PS/2s.

Data bases don't have to be ugly, says Metaphor chairman David Liddle.

The Metaphor alliance calls for a $10 million investment (about 10 percent of the Mountain View, California, firm's value) and extensive sharing of technology. IBM will own exclusive rights to future Metaphor technology, but Metaphor will continue to sell its workstation-based system.

Founded in 1982, the private 380-employee company realized $40 million in sales last year. It primarily targets marketing departments in Fortune 500 companies—including Procter & Gamble, which bought its own $10 million stake in Metaphor.

While an IBM version of MDIS should offer formidable competition for decision analysis tools expected from Lotus and others, the agreement may have more far-reaching consequences. Should Apple win its look-and-feel lawsuit against Microsoft, Metaphor could provide a litigation-proof alternative to Microsoft's Presentation Manager. But it's doubtful the move was made to skin Apple—negotiations preceded the lawsuit.

Rather than replace the Presentation Manager, it's more likely that IBM will include some aspects of Metaphor's icon-based interface in future versions. The interface may also show up on larger systems in IBM's Systems Application Architecture.

"A future version of the Presentation Manager might incorporate some of the Metaphor technology,"

(continues)

Viruses

(continued)

software, shouldn't give the problem a second thought. But high-risk users, who frequently download from bulletin boards or exchange software via floppy disk, are taking small but real gambles. Gibson recommends employing a vaccine program that will monitor software and warn you if a program takes a suspicious action like altering COMMAND.COM.

However, truly sophisticated virus authors can circumvent vaccines, and tenEyck and Jones advise users not to bother installing the vaccines. Instead, they recommend prudence in the acquisition of public-domain software. "Don't hang around unpedigreed bulletin boards," says Jones. "It's the same rule of thumb for not getting social diseases." Does the operator check out users? Are uploads restricted to registered users? Does the operator keep tabs on the file collection? Also, boards with paid subscribers are far less likely targets than free ones, and game software harbors Trojans more often than do utility or application packages.

Mahoney recommends letting a file "age" for at least two weeks on the board before downloading it. Other veterans say to be wary of any downloaded program that doesn't come with a documentation file or tell you how to contact the author. Also steer clear of any file that contains COMMAND.COM. If you're unsure of a program, list out the code. "Some fool will write 'Ha-ha! I gotcha!' in the statement line," says Robert Connolly, operator of The Unicorn's Inn bulletin board in Salem, Massachusetts.

If you can, test out any downloaded program on a machine without a hard disk, and start it from a write-protected floppy. Also, whenever you format floppies, do so with your original DOS diskette—also write-protected. In an office, make sure that any "foreign" disks are labeled as such and handled with care.

What should you do if you're convinced your system has come down with a virus? Don't reboot—it will give viruses a chance to reinstall. Don't run CHKDSK, for some viruses glom onto that file to access every sector on your disk. Do stop what you're doing, make backups, and get professional help. The Boston Computer Society recommends that you enlist the aid of a good PC consultant—and avoid security consultants who specialize in viruses.

—Judy Getts

we never stop asking "What if..."

Small cash input for laser-quality output.

HEWLETT PACKARD

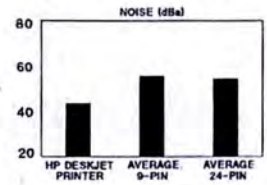
Dear Reader:

This letter was printed on one of the finest printers available today.

The HP DeskJet Printer.

It prints text and graphics more crisp and clear than 24-pin printers. And as you can see from the chart, it's a lot quieter than 24-pin printers, too.

PRINTER NOISE LEVELS



It's also easy to use. It does your important office tasks, but it's small enough to fit on your desk. Everything considered, it's the perfect personal printer.

And one of the most amazing features of all is its price. **It's under $1,000.**

Call us for the name of your local HP Dealer at 1 800 752-0900 Ext. 908B. Then go see for yourself why we call it laser-quality printing.

Sincerely,

Richard Snyder

The HP DeskJet Printer. Laser-Quality Output for Under $1000.

Circle 39 on reader service card

© Hewlett-Packard 1988 PE12611

HEWLETT PACKARD

Metaphor

(continued)

says David Liddle, chairman of Metaphor and a codeveloper of the Xerox Star with Metaphor president Donald Massaro. However, Liddle points out that the design philosophies of the two products are far apart. "People look at the Metaphor system and say, 'Well I guess we'll be seeing this on the Mac or the Presentation Manager pretty soon.' Not soon. They would have to start over again to do this."

Analysts agree that merging the products may be more trouble than it's worth. "IBM wants to stuff Metaphor's object-oriented skills into a future version of the Presentation Manager, but that's not a trivial task," says Molly Upton, a senior analyst at International Data Corporation in Framingham, Massachusetts.

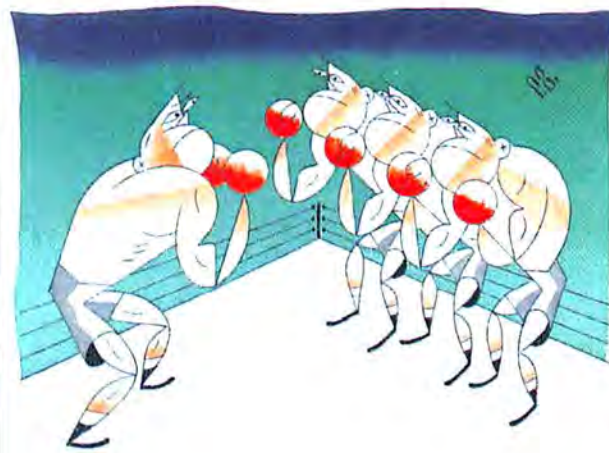
The chief distinction between Metaphor and other icon-based interfaces is Metaphor's graphics programming environment. Metaphor's approach eases the creation of complex applications by stringing together icon-based "application capsules," which can incorporate several other files and tools, each in its own icon-tagged capsule. You click on any tool you need. Among other strategems, you can mask intricate SQL queries by building them graphically with arrow icons. "In other interfaces, icons just open files, but Metaphor icons really jump through hoops for you," says Upton. "There's a lot of action behind each icon."

Adds Liddle, "Companies are doing fine with *dBASE*-size data bases, but they're not very good at analyzing large ones. Metaphor can help by shielding the statistical ugliness of data bases."

One of the first accomplishments of IBM's Applications Systems Division, the Metaphor alliance could serve as a model for many such deals as Big Blue tries to muscle further into the software business. The giant is reaching out for expert help—and it won't stop with Microsoft. *—Eric Brown*

Ashton-Tate Defends Title Again

dBASE IV—Late, but Great?



PHILIP ANDERSON

After almost three years in the ring, Ashton-Tate's *dBASE III Plus* still rules among data base packages, but contenders are landing heavier blows. After many delays, *dBASE IV* is scheduled to finish training by late September, so this month should tell if Ashton-Tate still packs a knockout punch.

With more than 2 million copies sold, *dBASE* easily dominates the personal computer data base market. Ashton-Tate accounted for half of all PC data base sales last year, and "*dBASE IV* will keep them from slipping, if they were in danger," predicts Randy Sutherland, an analyst with Dataquest in San Jose, California.

"Customers who like *dBASE* products continue to use them almost regardless of what other people do," comments Larry Foster, senior vice president for purchasing at Egghead Software in Bellevue, Washington. In Foster's view, this cult is unlikely to abandon Ashton-Tate. *dBASE IV* boasts a glossier front end, an upgraded application generator, query by example, a built-in compiler, and at least preliminary steps towards serious SQL capabilities. "It's an incredible product," says Foster. "*III Plus* users will undoubtedly switch right over."

Others disagree, noting the inroads of fast and powerful *dBASE* clones that already incorporate *dBASE IV* features. *Softletter* publisher Jeffrey Tarter sees the market splintering into factions pitting products compatible with *dBASE III* against those compatible with *IV*. Corporations have very little incentive to upgrade, he maintains, unless they really need those new features. "The *III* market is bound to stay large for a very long time, and the aftermarket has lots of opportunities.

"Ashton-Tate doesn't control the market just by coming out with a new version," Tarter explains. "*dBASE* is now a commodity product." He also points to threats like the joint development arrangement that will combine WordTech's *dBASE*-compatible front end with Oracle's SQL back ends, offering big-machine support that Ashton-Tate is many months away from matching. "That deal is the first in a landslide," he says. *—Eric Bender*

ANNOUNCING THE FIRST TIMED-RELEASE SOFTWARE.

"Hot product pick of 1988."
- PC Resource

"Product of the Week."
- Computer Reseller News

1988 CES Software Innovation Award

***Forget-Me-Not*, the first timed-release software,** directs your PC to perform all kinds of tasks...minutes, hours, days, weeks or months into the future.

With this breakthrough program, you predetermine what you want to happen and when. Then, at a precise point in time, *Forget-Me-Not* releases your commands and launches your computer into action.

Just exactly what will *Forget-Me-Not* do? First, it lets you automate all kinds of work (with your computer completely unattended) just by writing timed-release batch files.

Imagine: now you can have your PC print lengthy reports while you're enjoying dinner! You can back up file after file while you're away for the weekend. Download data...and have it printed and waiting for you when you arrive at work in the morning!

With *Forget-Me-Not*, you can also send reminder messages to yourself. It can read your daily appointment calendar from *SideKick*.™ Or you can create reminders from scratch, using your favorite word processor.

This unique product will help you meet deadlines. Divide your time over key projects. Improve your time management skills. Keep others on schedule. Plus, you'll never miss a meeting, birthday or anniversary again!

Forget-Me-Not also adds a new dimension to your electronic mail system. You'll no longer have just two choices: sending mail "now" or "not now." You'll be able to write mail today for delivery while you're out of town next week. Send reminders to everyone working on a project.

Whatever you predetermine, it delivers.

Put *Forget-Me-Not's* power to work for yourself...or for your LAN. The possibilities are as unlimited as your creativity!

System requirements: 100 percent IBM PC compatibility, 128K RAM and DOS 2.0 or greater. IBM is a trademark of International Business Machines. SideKick, Borland International.

Circle 203 on reader service card

It automates: now you can keep your PC working, even when you're not.

It reminds: timed messages keep you on schedule, on deadline, on top of your work.

It networks: your electronic mail is delivered at the precise moment you choose, while you're away for days or weeks.

90-day unconditional money-back guarantee.

CALL NOW: 800/722-7853 (800/323-6406 in CA).

FORGET-ME-NOT™

Order by phone or mail. Only $79.95.

Name _____ Phone _____
Address _____
City, State, Zip _____
Add $2 for US shipping ($15 for foreign). In CA: 6.5% tax.
❒ My check (US) or money order is enclosed.
❒ Please bill my: ❒ MasterCard ❒ Visa ❒ Am. Ex.
Card No. _____ Expires _____
Signature _____

Sterling Castle™
702 Washington St., Suite 174
Marina del Rey, Ca 90292

Distributed by Kenfil
800-662-0505.

Erasable Opticals

Maxtor's 1-Gigabyte Tahiti

Soon after Tandy surprised the industry by unveiling THOR last spring, an erasable CD ROM due in 1991, Maxtor Corporation of San Jose, California, raised the stakes in the optical contest with a faster, higher capacity erasable-optical drive due late this year.

Maxtor's $5995 5¼-inch Tahiti will read and write both 650MB and 1-gigabyte removable media at an average seek time of 30ms. The company also announced the $1995 Fiji, a 160MB 3½-inch erasable drive running at 100ms. Both drives are based on magneto-optical technology, which mixes laser optics with traditional magnetic techniques.

Previous announcements of erasable-optical drives by Olympus, Sony, and Verbatim have indicated slower speeds than the Tahiti's, suggesting competition with tape backup. But Maxtor's model may be able to compete in the larger Winchester market. The Tahiti will be marketed through PC manufacturers and system integrators, possibly Advanced Graphic Applications, a New York City–based controller board maker, which has pledged to deliver a complete retail subsystem with its DOS drivers before year-end.

CAP International of Norwell, Massachusetts, predicts rapid growth in 5¼-inch erasable-optical drives, with 3000 units sold this year, jumping to 50,000 units in 1990 and 176,000 in 1992. Whether optical drives can catch up with Winchesters depends largely on pricing.

"The gap between optical and magnetic drives has narrowed dramatically," says Scott McCready, associate director at CAP. However, he notes that the Fujitsu 778MB 16ms Winchester sells for $3170, little more than half the Tahiti's price, although the Tahiti's cost is likely to fall early next year.

Despite higher prices, the advantages of media removability, higher capacity, and data reliability should entice many users. So far, removability has been limited to small-capacity magnetic drives, and Winchester reliability tends to decrease at higher capacities and speeds. Due to their better reliability, erasable-optical drives may initially find a home on factory floors.

One question nagging the write-once, read-many (WORM) drive vendors that are expected to ease into the erasable product market is how the new products will affect sales of write-once drives. Sony has yet to begin full-scale production on its 750MB erasable drive, and Panasonic and Sharp are watching from the sidelines.

Analysts remain undecided about the potential impact on WORM sales. "Erasable drives will be the preponderance of optical drives shipped by 1991, but they won't kill off write-once," predicts Bob Katzive, vice president of Disk/Trend in Mountain View, California.

Effects on the tape-backup market are also uncertain. "People have been looking at erasable-optical as a replacement for tape backup, but that's not going to happen," says Abigail Shaw, a senior analyst for Rothchild Consultants in San Francisco. However, Shaw predicts that reliable optical drives may pose a more indirect threat to tape. "If optical drives replace Winchesters, users won't need tape backup."

Additionally, upcoming standards are delaying moves. The International Standards Organization is expected to establish optical guidelines within a year. Many vendors hope for standards that would allow full media interchangeability between write-once and erasable drives, thus lowering the cost of media.

Meanwhile, more drives will debut by year-end, and Olympus and other vendors may actually beat Maxtor out the door.

"We'll be seeing products that will be competitive with midrange Winchesters," says Shaw. If true, while small magnetic drives should remain competitive for a long time, the high-end business may soon belong to erasable-optical. *—Eric Brown*

386

(continued)

party offerings that do just that.

"We're pleasantly surprised," reports Richard Smith, president of Phar Lap Software in Cambridge, Massachusetts, which sells DOS extension tools. "We see the market splitting into OS/2 and DOS, with DOS dominating the market for at least five years." Smith expects to see around 200 DOS applications by year-end.

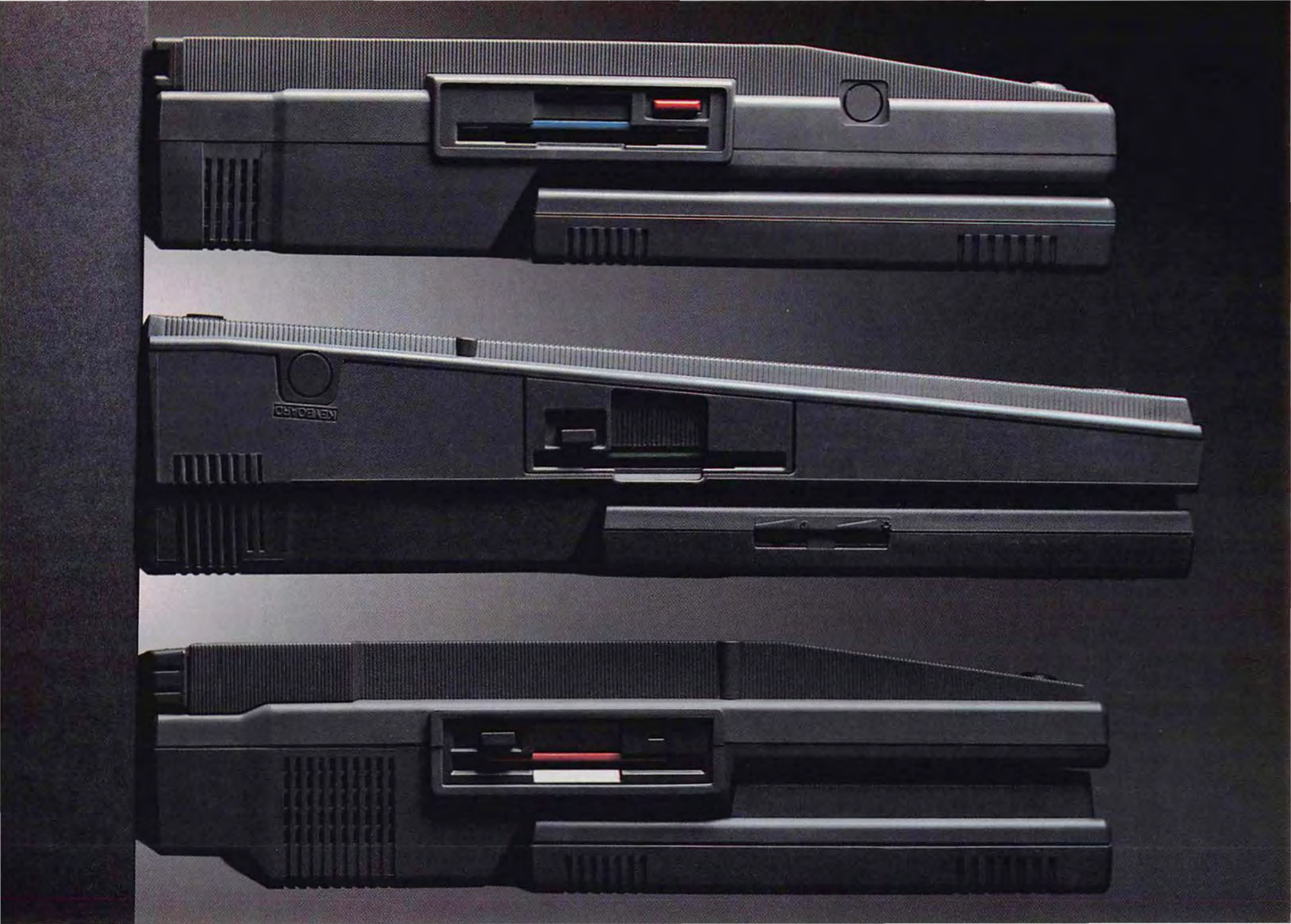
Terry Myers, president of Quarterdeck Software in Santa Monica, California, says that 80386-specific packages really began to take off last spring. "A year ago we would be talking only about FORTRAN; now it's data base, computer-aided design, typesetting, and others."

Fox Software, in Perrysburg, Ohio, began shipping its *Foxbase+/386* in July 1987. "Obviously the main advantage is speed; you get about a fourfold increase," says marketing director Richard Ney. "The major use is for incredibly large data base applications—500,000 records or more." Borland and Symantec also offer versions of their data base managers, and other major competitors will follow suit.

Many users want to run multiple DOS packages rather than OS/2 applications. Myers won't give numbers for *Quarterdeck Expanded Memory Manager 386*, the *Desqview* complement, but says it's selling very well. And Microsoft shipped more than 250,000 copies of *Windows/386* in the first nine months. *—Eric Bender*

Eric Brown and Judy Getts are both PC World *contributing editors.* ●

TWO-FISTED MANAGEMENT
NEXT TIME I WON'T BE SO DIPLOMATIC
1988
Mark Marek
Hello, John, how's the business?
Fine, Arnold, fine. And you?
FIRM, FORCEFUL HAND-SHAKE
Have a seat
no, I insist, you first.
No, no, no
Please, after you
SQUINT
GLANCE
GENTLEMEN?
Yes, I'll be having the "coq au vin" with the "vinaigrette new potatoes."
HEH HEH HEH
Yes, er, make mine a 14oz. t-bone and a baked potato, Russian dressing
SNICKER!
WAIT, WAIT. Let me change that to "Steak Tartare" with a half pint of horseradish and a tall mug of beer.
TWO steaks and a pitcher of manly, warm stout!!
Chef Salad, the works
Scungilli casserole
Pizza
Lasagna
SCARF
SMAK
CHOMP
GULP
SLURP
DESSERT?
OW!
OMIGOD
Well, yeh (urp) a thick slice of your chocolate mud pie, hot coffee
(gag) (urp) triple layer cheese cake, espresso
Milk shake, 3 scoops
strudel
donuts
Baklava
plate of whipped cream
Shot of whiskey
GASP
FEW CAN MATCH ARNOLD HARRIS IN A ONE-ON-ONE POWER LUNCH.
GURGLE



You Can Never Be Too Powerful Or Too Thin.

As portable PCs go, ours may look a bit on the skinny side. But they're by no means undernourished.

After all, each 286 and 386 microprocessor-powered Toshiba portable has an easy-to-read gas plasma screen. Each is IBM-compatible. And each gives you a wide range of features you'd expect only from a desktop PC.

The T3100/20, for example, weighs a scant 15 pounds, yet has an abundance of power. It comes with a 286 microprocessor and 640KB of RAM that's extendable to 2.6MB. Plus, there's a built-in 20MB hard disk.

Our T3200 has the advantages of a 12MHz 286 microprocessor, an EGA display system, a 40MB hard disk and 1MB of RAM expandable to 4MB. Also, its two IBM-compatible internal expansion slots let you connect your PC to mainframes, LANs and more. But what's even more impressive is how we managed to fit all this into a slim, 19-pound package.

Then there's our T5100. As amazing as it seems, we managed to squeeze a 16MHz Intel® 386 microprocessor into a slim package that weighs less than 15 pounds. To that we added an EGA display system and a 29 msec 40MB hard disk. As your thirst for power grows, its 2MB RAM can be upgraded to 4MB. Plus, you'll receive Microsoft's® Windows/386 at no charge with your T5100 purchase.

For more information on Toshiba computers and printers, call 1-800-457-7777. And rest assured that whichever Toshiba PC you choose, you'll be getting the kind of power once reserved for cumbersome desktop computers.

All of which proves you can maintain a position of great power without having to throw a lot of weight around.

Toshiba PCs are backed by the Exceptional Care program (no-cost enrollment required). See your dealer for details. IBM is a registered trademark of International Business Machines Corp. Intel is a registered trademark of Intel Corp. Microsoft is a registered trademark of Microsoft Corp.

In Touch with Tomorrow

TOSHIBA

Toshiba America Inc., Information Systems Division

Ventura Turns Pro

By releasing two versions of Xerox Ventura Publisher 2.0, Xerox will simultaneously court the "make it easier" bunch and the "give me more" crowd.

Ted Nace

If the strategists behind *Xerox Ventura Publisher 2.0* are right, the world of desktop publishing has split into two camps. One is made up of hard-core advanced users—those who spend day in, day out, dragging mouse to menu bar, craving ever more features and speed. This bunch doesn't much care if the learning curve is slippery and steep, so long as the view is great once they've clawed their way to the top. The other group consists of beginners and casual users who prefer a gentler slope and wouldn't mind parting with a few typographic niceties in return for ease of use.

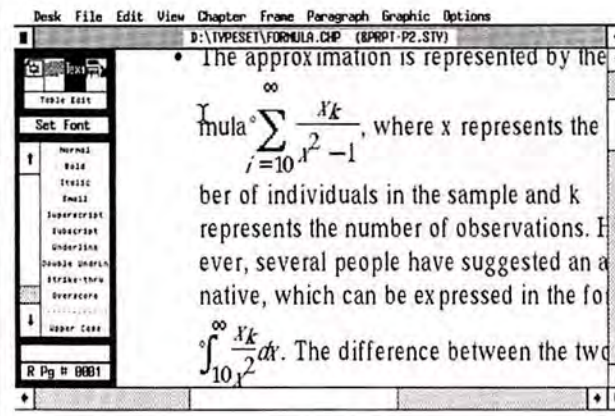
To satisfy both groups Ventura software has created *Xerox Ventura Publisher 2.0* and *Xerox Ventura Publisher 2.0: Professional Extension*. With over 70 enhancements, the $895 version 2.0 improves substantially over *Ventura 1.1*. The *Professional Extension* (an add-on expected to cost another $595) offers just 4 new features—table generation, equation formatting, vertical justification, and cross-referencing—but they dramatically extend the program's power. *Professional Extension* also supports expanded memory and has a hyphenation dictionary.

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.

Beginner's Delight

If nothing else, *Ventura 2.0* will appeal to new users. You're no longer forced to switch to the proper mode before taking an action. You can perform many common operations without leaving the current mode, such as selecting and moving a graphic in graphics mode without first switching to frame mode.

Also welcome are the 250 context-sensitive help screens, accessed by clicking a small question mark in the corner of every dialog box. Although the screens are limited to a maximum of 40 words each, they eliminate a lot of flipping through the manual.



After you create an equation using Ventura's equation generating function, the results are inserted directly into text. Ventura automatically adjusts the line spacing of the paragraph to make room for the equation.

Finally, *Ventura*'s haphazardly organized menus are now put in order, with functions grouped in more logical locations. Keyboard shortcuts have also been increased.

A Myriad of Small Touches

Beyond ease of learning, *2.0* will satisfy the appetites of veteran users. Nothing earth-shattering here—the big stuff was saved for the *Professional Extension*—but like Swift's Lilliputians, the enhancements do add up. *Ventura* will now:

- Align text vertically at the top, bottom, or middle of a page, a frame, or box text.
- Anchor a frame within a line of text, enabling you to embed an

image in the middle of a paragraph.

- Print out style-sheet and tag listings—a boon for business publishers who format numerous documents.
- Import scanned images and graphics in the TIF format.
- Allow you to enter true fractions, using either the diagonal or the horizontal style.
- Create custom colors and print color separations.

Other changes make *Ventura* easier and faster to use. For example, *Ventura* remembers where the cursor was the last time a list was opened.

In short, *Ventura*'s rough edges have been smoothed out. However, Ventura president John Meyer admits that version 2.0 will be 10 to 15 percent slower than its predecessor, due to its additional formatting features.

Going Pro

The *Professional Extension*'s features do more than break new ground for desktop publishing—they plow up a whole new field. Question is, will you need them? If you're producing newsletters or short manuals, probably not. But if your work involves publishing financial reports, books, forms, mathematical publications, or very long manuals, the answer is yes.

The most notable new feature is automatic table generation. Although you were always able to create tables in *Ventura* using tabs or the Box Text command, the job required patience. With *Professional Extension*, selecting a few commands pops a matrix onto the screen. To customize the grid, you highlight one or more cells, then select table-editing options that combine, split, stretch, or shrink cells; alter the grid lines; and add text. One drawback: At press time, the program did not provide a way to load data from a spreadsheet or data base into a table.

If you're publishing technical papers or a math textbook, take a look at the *Professional Extension*'s equation formatting feature. To insert an equation, you select an option that splits the screen in half and type the equation into the top half using an equation-generating language called EQN. *Ventura* displays the result at the bottom of the screen. Press a key, and the equation pops into the text.

Those producing books and other documents where text must fill a certain vertical space will appreciate *Ventura*'s new vertical justification feature. The program incrementally analyzes the situation, adding space first between frames and text, next between paragraphs, and finally between lines.

The last feature—cross-referencing—is key to true Just-In-Time publishing. Not only can you cross-reference a chapter, page number, figure number, or table number anywhere in a document, but you also can define and reference a number of different variables. For example, you can create a conference agenda and represent the unknown speakers with variables; supply the names at the last minute, and *Ventura* reformats the entire document and plugs in the names.

Divide and Conquer

PC World will put both of these feature-rich versions of *Ventura* through their paces after they debut in September; for now they promise to increase the product's considerable market lead over *PageMaker*. *Ventura* also plans to butt heads with *Interleaf Publisher* and other network-oriented publishing systems by introducing *Xerox Ventura Publisher 2.0: Network Server*. The company claims the package will run on 3Com, Novell, and PC Net networks and will permit users to share style sheets, mark style sheets as read-only, and use different printers within the network. ●

Contributing Editor Ted Nace is the coauthor of LaserJet Unlimited, Edition II, *and the author of* Ventura Tips and Tricks, Edition 2 *(both by Peachpit Press, 1988).*

SNAPSHOT

Xerox Ventura Publisher 2.0

Ventura is now three products—2.0, the "base" version, which includes over 70 minor enhancements; the *Professional Extension*, an add-on for creating complex tables and very long documents; and the *Network Server*, which offers some work-group publishing features.

KEY FEATURES

- **On-line help and reorganized menus**
- **Style-sheet listings, frames anchored in text, and color separations**
- **Automatic table generation**
- **Vertical justification**
- **Cross-referencing using variables**
- **Equation formatting**

AVAILABILITY

Ventura 2.0 and the *Professional Extension* should be released by September 1988; the *Network Server* should appear sometime before the end of the year.

PRICING

Xerox Ventura Publisher 2.0 $895; *Xerox Ventura Publisher 2.0: Professional Extension* $595; *Xerox Ventura Publisher 2.0: Network Server* $1295; upgrade from 1.1 to 2.0 $85

Xerox Corp.
Xerox Desktop Software
9745 Business Park Ave.
San Diego, CA 92131
800/822-8221

For more information, see Products Featured in This Issue.

Bulldog's Computers are #1 on the Best Seller's List!

IBM

PERSONAL SYSTEM/2

Model 30 w/2 floppy	$1310
Model 30 w/1 floppy & 20 mg.	1870
Model 50 - 20/30	2695/2975
Model 60 - 40/70	3295/3650
Model 70 - 60	4425
Model 80 - 40	4375
Model 80 - 70	4875
Model 80 - 115	7195

90 day warranty through Bulldog

COMPAQ

386 Desk Pro 40/60/130	$4495/5450/6950
286 Desk Pro 12 mhz	1695
Compaq II Model IV	2879
Compaq Port. 386 Model 40/100	5699/7199
Compaq III 20mb/40mb	3595/4195
Compaq 386-S model 1/20/40	2925/3465/3999
Compaq 386-25 110/300	7415/9575

90 day warranty through Bulldog

MATH COPROCESSORS

803-87-20	$689
803-87-16	449
802-87-8	239
80287-10	275
8087-3	119
8087-2	149
256K Chips	Call
64K Chips	Call

COMPATIBLE

8 MHZ TURBO

1 floppy, 640K, AT style keyboard, game port, clock calendar, monographics card, mono monitor $750
Color System add **$150** w/20mb add **$269**, w/30 mb add **$289**
90 day warranty through Bulldog

286 BULLDOG 10 MHZ

1 mb Ram, 1.2 floppy $1150
Bulldog 386 16 mhz, 1 mb Ram, 1.2 floppy $1850

AST

AST Premium 286 Model 80, 10 mhz, 0 wait state, 512K, DOS, keyboard, 1.2 floppy $1495

AST Premium 386 Model 300 20mhz, 1.2 floppy, 1 mg., DOS, keyboard $2875

All AST computers carry a 1 year warranty

LAPTOPS

NEC Multispeed EL	1549
NEC Multispeed HD	2299
Toshiba 1000	780
Toshiba 1200	2349
Toshiba 1200F	1595
Toshiba 3100	3095
T3200	3795
T5100	4895
Zenith Super Sport 20 mb	2325
Zenith Super Sport 286 20 mb	3449

GRAPHICS CARDS

ATI VGA	$269
EVEREX MICRO ENHANCER	135
GENOA SUPER HI RES	199
GENOA VGA 5100/5200	309/429
HERCULES GRAPHICS	181
HERCULES IN COLOR	289
ORCHID DESIGNER VGA	329
PARADISE Auto Switch 480	159
PARADISE VGA Plus	265
QUADRAM EGA PLUS	169
QUAD PRO SYNC	209
NEC GB-1	209
NEC MVA	909
STB CHAUFFEUR HT	135
STB Multi Res. II	169
VEGA DELUXE	189
VEGA VGA	265

MULTI FUNCTION BOARDS

AST Advantage w/128K	$229
AST Advantage Premium w/512K	319
AST 6 PACK PLUS w/384K	235
AST 6 PACK PREMIUM w/256K	199
AST 5251-11 PLUS Enhanced	589
AST RAMPAGE 286	385
AST RAMPAGE 286-2 for MODEL 50/60	459
AST RAMPAGE 286-2 for model 50/60	459
AST HOTSHOT	355
EVEREX MINI MAGIC w/o K	59
FAST 88/V20 w/Switch	89
INTEL Above 286 w/512K	369
INTEL Above PS286 w/512K	399
INTEL Inboard 386 w/Adapter	1040
INTEL Inboard 386 for PC w/1 mb	925
INTEL Above Board II for PS/2 w/o K	259
IRMA BOARD II	699
ORCHID JET 386 w/adapter	975
ORCHID PC Net Starter Kit	735
ORCHID Tiny Turbo 286	299
ORCHID Ramquest 50/60 w/1 mb	525
ORCHID Twin Turbo	389

MICE &MISC

GENIUS MOUSE GM6+	$59
MICROSOFT MOUSE w/windows	135
MICROSOFT MOUSE w/PC paint brush	119
MOUSESYSTEMS MOUSE	89
LOGITECH MOUSE C7 Plus	74
LOGITECH HI RES	99
KODAK DATA SHOW	750
MICROFAZER II w/64K	229

Sales Hot Line 1-800-438-6039

BULLDOG

COMPUTER PRODUCTS

We accept VISA MasterCard American Express

3241-E Washington Road • Martinez, Georgia 30907

For returns call (404) 860-6899 *In Georgia call* (404) 860-7364

PRINTERS

EPSON

LX 800 180 CPS, 30 NLQ	$189
FX 286E 240 CPS, 40 NLQ	419
FX 850 ***New!***	339
FX 1050 ***New!***	479
LQ 500 180 CPS, 60 NLQ	339
LQ 850 330 CPS, 88 NLQ	519
LQ950	589
LQ 1050 330 CPS, 88 NLQ	719
LQ 2550 400 CPS, 108 NLQ	929
DFX5000 533 CPS, ***New!***	1359
EX 800 300 CPS, 60 NLQ	439
Special Tractor for LQ1000	20

OKIDATA

320 300CPS, 62 NLQ	339
321 300 CPS, 62 NLQ	465
390 24 pin 270 CPS, 90 LQ	465
391 24 pin 270 CPS, 90 LQ	639
182 Plus 180 CPS, 30 NLQ	229
292 Plus 240 CPS, 100 NLQ	439
293 Plus 240 CPS, 100 NLQ	575
294 Plus 400 CPS, 100 NLQ	809
393 450 CPS, 120 LQ	925

TOSHIBA

321 SL 216 CPS, 72 NLQ	469
351 SX 350 CPS, 100 NLQ	950
341SL 216 CPS, 72 NLQ	599

NEC

2200	339
5200 **New!**	519
5300 **New!**	729
P5XL/P9XL	850/1030
3550/8850	825/1020

PANASONIC

1080i Model II	199
1091 Model II	209
1092	339
1524	565
1592	415
1595	479
3131/3151	285/439

HEWLETT-PACKARD

Laser Series II	1695
Desk Jet	749
DICONIX 150	325
OTC 850 CPS	1725

DRIVES

Seagate 20mb w/contr. ST225	$269
Seagate 30mb w/contr. ST238	289
Seagate 30 mb for AT ST4038	465
Seagate 40 mb for AT ST251	369
Seagate 80 mb ST4096	575
CMS 5¼" ext. 360K for PS/2	225
CMS 5¼" ext. 1.2 mb for PS/2	259
Toshiba 3½" 720K int.	89
Toshiba 3½" 1.44 mb int.	105
Toshiba 5¼" 360K int.	85
Toshiba 5¼" 1.2 mb int.	99
Micropolis 70 mb	695
BERNOULLI PLUS	3450
BERNOULI BOX II 5¼"	
20 mb internal	955
20 mb external w/card	1195
dual 20 mb external w/card	1795
SYSGEN Durapack single	925
dual external/internal	1695/1395
Plus Hard Card 40	669
Plus Hard Card 20	525
Priam 60 mb AT	769
Priam 43 mb AT	649

MODEMS

Everex 1200 int./ext.	79/115
Everex 2400 int./ext.	139/249
Hayes 1200/2400	279/419
Migent Pocket Modem	125
Practical Peripherals half card	
2400 w/Procomm	159
US Robotics 2400 direct internal	169
Supra Modem 2400 ext.	169
Ventel Half Card 2400 w/Crosstalk	359
Ventel 1200/2400 Plus	239/359

MONITORS

AMDEK

410	$145

PRINCETON

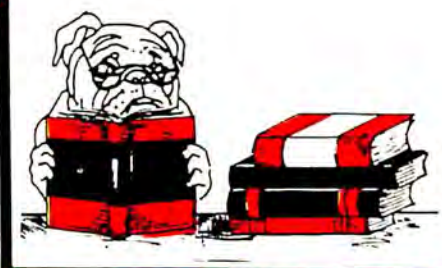
MAX12	149
HX12	419
HX12E	449
Ultrasync	529

IBM

Mono 8503	$199
Color Display 8512	449
Color Display 8513	515
Color 8514	1150
Magnavox RGB80	259

NEC

NEC Multisync II	589
NEC Multisync Plus	879
NEC Multisync GS	199
NEC Multisync XL 19"	2075



SOFTWARE

Aldus Pagemaker 3.0	$529
Chartmaster	205
Clipper	379
Corefast	99
Crosstalk XVI	99
D Base III	379
DBXL	125
Enable 2.0 w/Perspective	379
Fastback Plus	105
Foxbase +	199
Freelance Plus	329
Framework II	379
Harvard Graphics	279
IBM Display Write IV	289
Lotus	299
Lotus Hal	109
Managing Your Money 4.0	125
Microsoft Word 4.0	209
Microsoft Excel	329
Microsoft Windows 386	135
Microsoft Works	129
Multimate Advantage II	269
Multiplan	135
Office Writer 6.0	239
Peachtree II Complete	149
PFS Prof Write	119
PFS Prof File	145
Paradox	399
Quantro	149
R Base for DOS	439
Revelation	469
Super Calc IV 1.0	285
Symphony 1.2	439
Ventura Desktop Publishing	499
Word Perfect 5.0	219
Wordstar 2000 + 3.0	239
Wordstar Pro 4.0	239

TAPE DRIVES

Everex 60 m.b. int.teac	$550
external teac	645
Genoa Galaxy 60 mb internal	725
external	799
Achives 40 mb internal	299
Sysgen Quic 60 internal	705
external	755
Maynstream 60 PS/2 w/card	
for model 50 60 & 80	869
Everex 60 mb Wangtec int.	699
Everex 60 mg Wangtec ext.	799

For Orders Call **1-800-438-6039**

BULLDOG

COMPUTER PRODUCTS

For shipping & technical call **(404) 860-6905** or **(404) 860-7364**

Circle 24 on reader service card

PRODUCT OUTLOOK

87 **PRODUCT OUTLOOK**

STEP 386/25
Power users: The STEP 386/25 boasts a state-of-the-art processor and proprietary memory-caching scheme, and you can tailor the system to fit.

ErgoPrint 610
The ErgoPrint 610 delivers laser output with the fully automated paper/envelope-handling finesse of a photocopier.

D the Data Language
A fully relational data base manager insulates non-experts from many of the perils of data base programming and commands.

PicturePower
Add employees' pictures to personnel rolls or import images into your desktop publishing program.

Music/386
A cheap and easy, if slow, way to share processing time, this DOS-compatible multiuser environment best suits data base or accounting applications.

Screen Extender
Break *WordStar*'s 25-line-by-80-column viewing limit by squeezing on-screen type with this memory-resident program.

Back to Basics: Professional
Easy, basic accounting software that lets home-based small businesses track cash in and cash out.

94 **BRIEFLY NOTED**

V-RAM VGA
Color graphics performance rockets ahead on the first VRAM-based graphics board.

Smartmodem 9600
Hayes tackles big-time communications with a full-duplex modem that links LANs and mainframes.

R:base for DOS Runtime
Microrim's compiled *R:base* gives developers a new bag of tricks for creating cheaper and faster apps.

AMI 386 AT Mark 2 Motherboard
Beef up your AT with a 386 motherboard that includes memory caching.

Hummingbird Browser
Cut and paste from *dBASE* into word processing or spreadsheet files with a RAM-resident utility.

ScanMan
Scan graphics, photos, and text with a hand-held scanner, then enhance the images with its graphics editor.

Forget-Me-Not
Run programs unattended or send a preset message to yourself or other members of your work group with this TSR.

98 **UPDATE**

PFS: First Publisher 2.0
The new version blends basic capabilities with greater control of text and images.

Norton Commander 2.0
View *1-2-3*, *Symphony*, and *dBASE* files from within a DOS shell.

DacEasy Accounting 3.0, Payroll 3.0, Graph+Mate 3.0
DacEasy enriches its data base, *Payroll* acquires new skills for employee-file management, and *Graph+Mate* beautifies reports—plus pulldown menus for all.

Turbo Prolog 2.0
Prolog gets an interpreter and builds large data bases with a fraction of the code that 1.0 requires.

Tree86 2.0
A utility that performs speedy backups and supplies a helpful directory tree with pulldown menus.

10Net Plus
Menu-driven installation, E-mail, and resource sharing among nodes are a few benefits of this distributed LAN.

XtreeNet
Executive Systems' disk management utility gears up for networking with password protection and file housekeeping.

News you can use about
PC product announcements
and upcoming releases

Mike Hogan

STEP 386/25

Quick Step

If you're the average computer user—doing a little word processing here, running an occasional spreadsheet there—you may not feel the need for more than the standard AT-style system. On the other hand, your spreadsheets may be so large that during recalcs you can watch the cell changes ripple across the screen. Or you may manage a data base that the U.S. Census Bureau would envy. If so, you want every extra megahertz you can get. You'll find top speed and more in Everex's STEP 386/25.

Besides using a state-of-the-art 25-MHz Intel 80386 processor, the system exploits a proprietary memory access scheme that boosts throughput by providing both read and write caching. Depending on the application, your most frequently used data will be waiting for you in cache between 93 and 99 percent of the time. Furthermore, the cache uses a "128-bit" data path (actually 4 consecutive 32-bit accesses) and is directly mapped (as opposed to indexed), thereby providing the quickest possible access. Everex's cache can be enlarged from a standard 64K cache for the base configuration's 1MB of memory to 256K when you push out to the STEP 386/25's upper limit of 16MB of main memory.

If you want top speed, Everex's STEP 386/25 gives you a 25-MHz 80386 processor and a proprietary memory access scheme that boosts throughput to a blazing 6.13 MIPS.

The net result is a scorching 6.13-MIPS (million instructions per second) throughput rate.

The STEP 386/25 cache-memory system enables zero-wait-state access of 8MB of memory on the motherboard and an additional 8MB on an add-in board in its proprietary 32-bit memory slot. For I/O, the STEP 386/25 uses a standard AT-compatible bus with six 8/16-bit slots and a single 8-bit slot.

A $5999 base system comes with a 16-bit hard/floppy disk controller (supporting 1:1 interleave), serial port, parallel port, and 101-key keyboard. You also get a 1.2MB floppy drive, front-panel space for up to five half-height mass-storage devices, and DOS 3.30. An 8-character LED display on the front panel gives you power-up and disk-performance diagnostics. Also included are sockets for a 25-MHz Intel 80387 math coprocessor and a 25-MHz Weitek 3167 coprocessor.

The STEP 386/25 comes without a hard disk, graphics adapter, or monitor, since Everex expects its customers to be power users who will want to configure their systems in unique ways. You can choose from among three 28ms hard drives—a 40MB unit ($600), an 80MB unit ($900), and a 160MB unit ($2500). Your dealer will provide display adapters and monochrome and color monitors from which to choose.

You don't have to be an expert user to configure the STEP 386/25. Everex lets you configure your system for add-on cards and hard drives without setting jumpers or DIP switches on the motherboard. Everex Systems, 48431 Milmont Dr., Fremont, CA 94538; 800/356-4283.

ErgoPrint 610

The Paper-Full Office

What ever happened to the paperless office? Its imminence was hailed by soothsayers of the electronic age, but it never dematerialized, so to speak. While many of us exchange messages by electronic mail and share files via electronic data-transfer schemes, there comes a time in the life of every important report, memo, or spreadsheet when it has to be reduced to black and white.

The American office still travels on hard copy—and one copy is never enough. Add the need to alternate letterhead with second sheets and collate reports, and that trusty office-automation relic, the photocopier, seems as secure as the watercooler.

But now BDT Products has introduced an office tool that combines the paper-handling capabilities of a collating copy machine with the speed, resolution, and electronic transfer capabilities of a laser printer. No more standing in line at the

The ErgoPrint 610 will let you load and sort different-size paper and envelopes like a copy machine and adds the speed, resolution, and electronic transfer capabilities of a laser printer.

copy machine—the ErgoPrint 610 laser printer can queue the output of 10 to 15 users, thanks to its seven input and ten output trays. Handling and collating paper and envelopes are fully automated.

Ideal for a network environment, the ErgoPrint 610 lets you direct printer output to the desired bins via embedded print commands. You can have a marketing proposal printed and sent to one set of collating bins, while related memos, correspondence, and envelopes go to another set. The 610 operates unattended for more than 5 hours and produces up to 25,000 sheets and envelopes a month. Of course, you also can treat it as a standard copier, although it copies only 1 sheet at a time.

Equipped with a 10-page-per-minute Xerox 4046 print engine, the ErgoPrint 610 can access 7 types of paper automatically during printing and recognizes up to 32 types of paper and envelopes stored in its input trays. The 610 has five 250-sheet paper trays, one 1000-sheet tray, and another that holds 200 envelopes, including Monarch sizes. Ten standard output bins each hold 180 sheets of facedown output. An additional offset stacker holds up to 750 sheets while the printer sorts individual print runs, and doubles as an overflow bin when a selected output bin is full.

The ErgoPrint 610 ships with 1MB of memory, Xerox 2700 and Diablo emulations, and RS-232C serial and Centronics parallel interfaces. It's compatible with Novell's *Netware*, ethernet, and most other popular networks.

Resident fonts include Titan 10 in portrait mode and XCP-14 in landscape mode. HP LaserJet and Epson emulations are optional. A day of training is included in the ErgoPrint 610's $16,900 price. BDT Products Inc., 17152 Armstrong Ave., Irvine, CA 92714; 714/660-1386.

D the Data Language

A Thin Skin

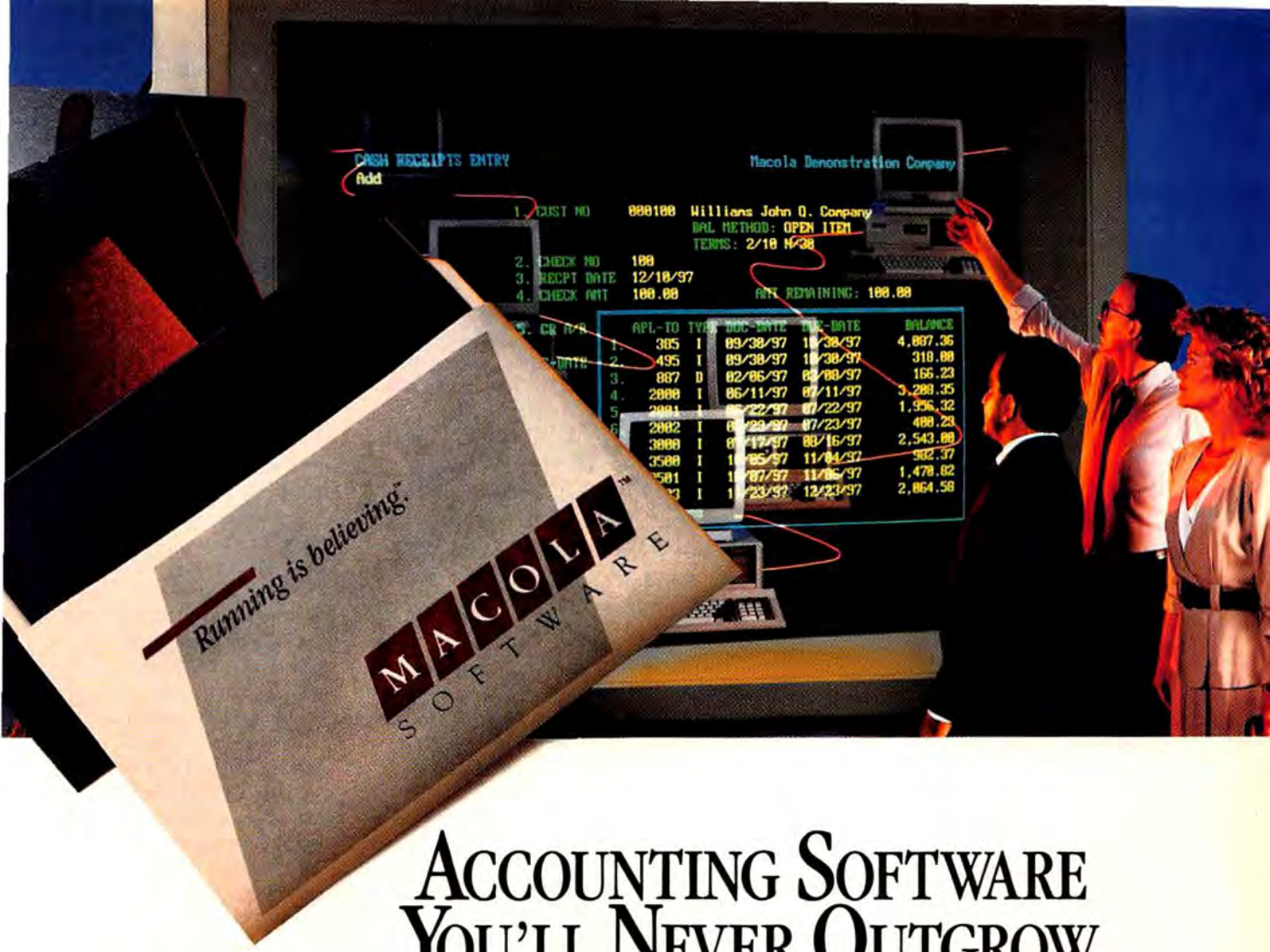
Data base managers are supposed to make molehills out of mountains of information. But how many data management programs gather dust because they require you to climb a steep learning curve? Even many of the best-selling data base programs seem determined to drag you up into programming heights where the oxygen is mighty thin.

But now Caltex Software puts the power of a fully relational data base at your fingertips, even if you don't have a degree in computer science. Like all truly rich fourth-generation data base management systems, *D the Data Language* incorporates its own programming language. But you'll maneuver through it in comfort, insulated from the rocky twists and turns of data base syntax by its limited command set and menu system.

Even though *D* offers the full range of data base capabilities, it puts the thinnest possible layer of commands between you and your data. The company claims a single command can perform up to ten times the functions of most data base languages. *D* also reduces programming by letting you isolate the subset of data you need to use in your present operation so that you don't have to apply data base filters to the entire data base. Regardless of how many records the data base holds, you'll focus only on those of interest.

You can set up as many records with as many fields as you like, limited to 4088 characters per record. You can store as many files as your hard disk holds and keep any

D the Data Language offers the full range of data base powers but puts the thinnest possible layer of commands between you and your data—a single command can perform ten times the functions of most data base languages.



ACCOUNTING SOFTWARE YOU'LL NEVER OUTGROW.

Business managers now are projecting their accounting software needs well into the future. That's smart. The software you choose must meet the demands of your evolving business and provide management information to help fuel growth.

In the words of PC Magazine, Macola Accounting Software "is at the top of its class... a flexible, powerful system that is well suited to many different businesses."

13 Integrated Modules

Accounting General Ledger—Accounts Receivable—Accounts Payable—Payroll—Assets/Depreciation

Distribution Inventory Management—Customer Order Processing—Purchase Order and Receiving

Manufacturing Bill of Material Processor—Material Requirements Planning—Master Scheduling—Shop Floor Control*—Job Costing*

Plus there's a Report Writer that allows customized reporting and can easily transport data files to popular spread sheet, word processing and data base programs.

Proven Network Compatibility. Macola Software reflects 15 years of maturity in mini and micro LAN environments. No other software can say the same. So when your business is ready to add more workstations, your software is ready as well. With no limitations.

Speed and Data Integrity. Macola Software is written in Micro Focus COBOL for maximum speed and data integrity (source code available.) IBM has licensed Micro Focus COBOL as its SAA standard for the new PS/2 and OS/2.

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

Running Is Believing. Your choice of Macola Software is a one-time solution for the life of your business. For detailed information, "live" demonstration modules and an authorized reseller in your area, call today:

1-800-468-0834 (USA)
1-800-336-8337 (Canada)

MACOLA™
SOFTWARE

P.O. Box 485
Marion, OH 43302
(614) 382-5999

Powerful accounting for successful companies.

*Call for availability. IBM, PS/2, OS/2 are registered trademarks of IBM. Micro Focus is a registered trademark of Micro Focus Corp. PC Magazine is a publication of Ziff Davis Communications Co. Macola is a registered trademark of Macola, Inc.

Circle 252 on reader service card

number of them open at once. *D* sorts across all data base files with a single command because it exploits an unusual indexing scheme that loads all of the data into a single open file.

You can build menus containing flashing light bars, pop-up windows, and help screens to guide you or your co-workers through an application. Multiple users can select these aids with point-and-shoot commands. Existing data files can be imported or exported in most formats, including *dBASE* (import only), DIF, and ASCII delimited.

D the Data Language requires DOS 2.00 or a later version, 512K of memory, and a hard disk. The retail price is $395. Caltex Software, 3131 Turtle Creek Blvd. #1101, Dallas, TX 75219; 214/522-9840.

PicturePower

Words and Pictures

Words and pictures go together like soup and sandwich—everywhere but on the computer. There, incompatible file formats have proven an expensive impediment to the marriage of the two information forms. But no more. Now, PictureWare has used the IBM PS/2's graphics capabilities to develop a relatively cheap way of putting faces next to names in your employee data base, or product images on your parts list.

PicturePower takes advantage of the PS/2's advanced graphics capabilities, letting you store and retrieve pictures in an internal file manager that uses the dBASE file format.

PicturePower is a picture data base system that allows you to capture color or black-and-white images from any video source—a VCR or a video camera, even a TV—using a cable and an image-capture board, then lets you store them in a data base.

Picture-file management works just like data base management—you store and retrieve pictures (along with numeric and/or text descriptions) in an internal file manager that uses the *dBASE* file format. You can add pictures to an existing *dBASE* or ASCII-compatible data base, such as an employee roster or parts list, or you can create your own library of images for use in a desktop publishing program. *PicturePower* images are stored in *dBASE* as .DBP character fields. Once the images are linked to *dBASE* fields, you can access them transparently from your *dBASE* applications without using *PicturePower*.

Mouse-driven pop-up menus make it easy to move between *PicturePower*'s modes for capturing images, editing them, and creating image data bases. In image-edit mode, you manipulate an image using the mouse; flip it, crop it, zoom and "airbrush" it down to the individual pixel level; even reverse it from color to a black-and-white "negative" with up to 16 shades of gray.

Like any data base, each *PicturePower* data base has an accompanying form file that explains where to display fields on your screen and includes your annotations. *PicturePower* even has a communications module that lets you exchange *PicturePower* files with remote devices via a Hayes-compatible modem. Also included is an add-on utility for converting *PicturePower* files to TIFF, the standard desktop publishing format. Thus, any desktop publishing package that supports TIFF can import images from *PicturePower*.

Before the advent of the PS/2, you would have had to spend thousands of dollars for such a system since, in addition to the $995 software, you also would have had to purchase an analog monitor, a video display board, and an image-capture board. But the PS/2 features an analog monitor and VGA graphics with enhanced display capabilities built in, eliminating the need for a display board. Even hardware prices have dropped, so now you need only buy a copy of *PicturePower* and a $250-to-$1000 image-capture board from ATD/Zucker, Digital Vision, Jovian Logic, or Sigma Designs.

PicturePower will also run on a classic PC, but you must add the cost of an analog monitor and a capture/display board such as one of TrueVision's Targa boards or Everex's Vision 16. Even with the PS/2, you may want to add a video camera, which ranges in price from $1000 to $12,000. PictureWare, 111 N. Presidential Blvd., Bala-Cynwyd, PA 19004; 215/667-0880.

Music/386

Orchestrating Processor Sharing

The virtual operating mode of the 80386 chip lets multiple users share the multifaceted processing not possible with its predecessor, the 80286. However, exploiting that capability while ensuring full DOS compatibility is a

TI's OmniLaser 2106. The laser printer for today, tomorrow, and when there is no tomorrow.

When your success depends on making great-looking documents, you need a laser printer that's versatile enough to handle just about anything that comes up. That printer is Texas Instruments OmniLaser™ 2106.

This quiet, six-page-per-minute laser printer comes with all the capabilities you need to produce word processing, spreadsheets and other PC applications. It also comes standard with Adobe™ PostScript®, the magic behind desktop publishing. So you get unsurpassed control over type, graphics and page composition. All from the top of your desk.

Beyond word processing.

Today, people in every pursuit are changing to desktop publishing to give their documents an edge. With over 600 software packages supporting PostScript, TI's OmniLaser 2106 gives you the power to print today's documents and then go far beyond. Because not only does the OmniLaser emulate the HP LaserJet Plus™, it also features Adobe PostScript. So your documents look better, communicate faster and sell harder.

TI's OmniLaser 2106 with PostScript gives you excellent control over type, graphics and page composition.

Improve your standard of printing.

TI's OmniLaser 2106 gives you great graphics, text that looks typeset and paper handling features that allow you to print on envelopes, legal size and more. It also features multiple industry-standard emulations and interfaces. All easily selectable at the touch of a button.

TI's OmniLaser 2106. It's the laser printer of your future, as well as the one you need right away. The OmniLaser family also includes the 2108 small-cluster printer and the 2115 shared-resource printer. **For a free brochure on how to choose a laser printer and information about TI's on-site warranty, call 1-800-527-3500.**

TEXAS INSTRUMENTS

© 1988 TI 442 55
OmniLaser is a trademark of Texas Instruments Incorporated. PostScript is a registered trademark and Adobe is a trademark of Adobe Systems Incorporated. LaserJet Plus is a trademark of Hewlett Packard, Inc.

challenge most multiuser system makers have dodged.

But not Bristol Systems. Rather than use a UNIX shell or its own superset of DOS, Bristol has introduced *Music/386*, a multiuser software environment that boasts perfect coexistence with the often finicky operating system. *Music/386* takes advantage of the 386's virtual mode to create as many as five 640K memory partitions for a like number of users, employing DOS BIOS for complete compatibility with the large library of DOS-based software.

Music/386's downside is common to all multiuser environments: sluggish processing speed when multiple users attempt simultaneous processing. Those who think that AT-level performance is slow should consider installing a network. But if you're satisfied with the response time of a fast XT, you'll be happy with *Music/386*.

The optimal operating environment for *Music/386* is one where processing is heavy and screen display requirements are minimal, virtually ruling out offices dedicated to word processing. Prime candidates are offices oriented toward data base applications—inventory and point of sale, for example—as well as accounting. In both cases, instantaneous display response is not a priority.

Unlike a network, the *Music/386* system is easy to learn and install. In most instances, the company claims, you can install it in less than 10 minutes. Just copy the program into a subdirectory of the main system and step through the set-up program to partition your memory.

Bristol markets *Music/386* as a simple, relatively fast, and—at $386 for 3 users or $586 for 11 users—very inexpensive solution to processor time-sharing. The program requires 640K of memory for each partition and DOS 3.00 or a later version. The company also offers a bundle: *Music/386*, a Link PC dumb terminal, a cable, and a three-user license for $996. Bristol Information Systems, 84 N. Main St., Fall River, MA 92720; 617/679-1051.

Screen Extender

See More of What You Get

It seems hard to believe in this era of bit-mapped graphics, but *WordStar* was perhaps the first WYSIWYG program. Unlike so many of its early competitors, *WordStar* let you see on screen where pages would break, where margins would fall, and how lines would be spaced when you printed your document. *WordStar* hasn't changed; trouble is, you can never see as much of your document on screen as you would like without shelling out for expensive add-on boards or massive monitors. Even EGA and VGA boards buy you only 43 and 50 lines of text, respectively.

But Staircase Software offers a much cheaper way to break the standard 25-line-by-80-column limit and view a full page of text on screen. *Screen Extender* for *WordStar Professional 4.0* is a memory-resident program that compresses on-screen type so you can see up to 58 rows and 180 columns simultaneously, depending on your graphics adapter.

Screen Extender uses compressed sans serif type to fit more text on screen, with your graphics adapter determining the actual number of rows and columns. CGA and MCGA adapters provide 25 or 33 rows, with 80, 91, 106, 128, or 160 columns; EGA and VGA cards offer 35, 43, 50, or 58 rows, with the same column combinations; Hercules-mode options include 34, 43, 49, or 58 rows, with 80, 90, 102, 120, 144, or 180 columns.

Column and row combinations can be mixed at will. In addition to accommodating longer documents, the extra columns may come in handy for creating and viewing tables or programming longer lines of code without horizontal scrolling.

All *WordStar* features remain fully functional when *Screen Extender* is running, regardless of the number of columns and rows selected. Screen color remains unchanged, but paging or scrolling up or down takes two to three times as long. You can speed updates on EGA or VGA monitors by switching off full color and using only foreground and background colors.

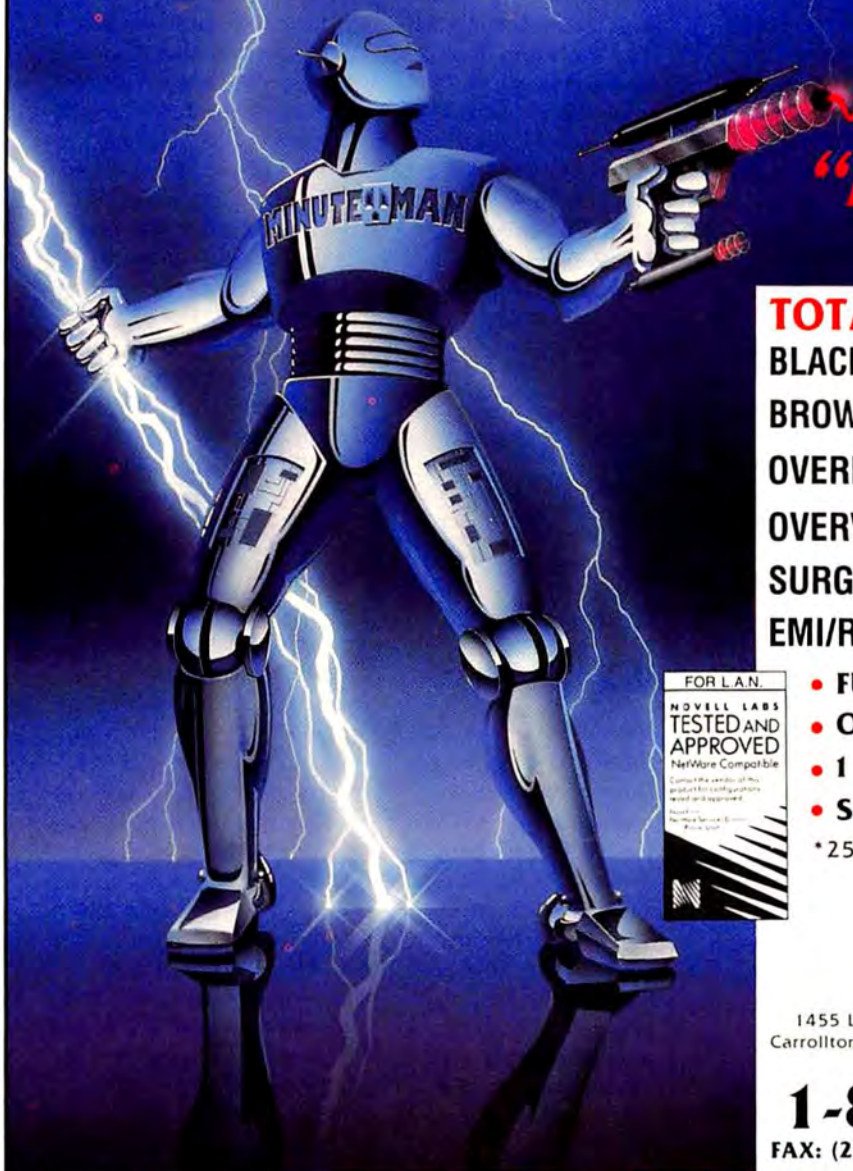
The swap hot key lets you toggle between colors and between extended and normal modes. You can change row and column defaults at any time during editing by hitting the menu hot key for a pop-up menu and even redefine the hot keys so they don't clash with other memory-resident programs.

You can remove *Screen Extender* from memory after exiting *WordStar*. But once you've patched *WordStar* (by running WSCHANGE), you must activate *Screen Extender*

You can see more of your WordStar Professional 4.0 text with Screen Extender, a memory-resident program that can compress on-screen type into 58 rows and 180 columns.

MINUTE MAN®

UNINTERRUPTIBLE POWER SUPPLIES



"More Powerful Than Ever!"

TOTAL POWER PROTECTION

BLACKOUTS Enables user to operate during complete loss of power.

BROWNOUTS User is protected from low AC voltage below 102 volts.

OVERLOADS Automatic shutdown in overload situation to protect UPS from inverter burnout.

OVERVOLTAGE UPS runs on inverter (117 volts) when AC voltage exceeds 132 volts.

SURGES/SPIKES Clamps transients above 200 volts with an energy rating of 100 joules or less.

EMI/RFI Three stage filtering for clean AC power.

- **FULL ONE YEAR WARRANTY**
- **ORDER-SHIP SAME DAY**
- **1 MILLISECOND TRANSFER TIME***
- **SYNCHRONIZED SINEWAVE***

*250 watt and 500 watt units offer 4 msec transfer time, PWM waveform

PARA SYSTEMS, INC.

1455 LeMay Dr.
Carrollton, TX 75007

Telephone:
(214) 446-7363

1-800-238-7272

FAX: (214) 446-9011 TELEX: 140275 OMEGA

Power Output	120 Volt Models	230 Volt Models
250 WATT	$ 379.00	$ 429.00
300 WATT	$ 549.00	N/A
500 WATT	$ 699.00	$ 799.00
600 WATT	$ 899.00	$1049.00
1200 WATT	$1499.00	$1749.00
1600 WATT	$1999.00	$2299.00

Suggested Retail

Optional Battery Packs Not Shown

See us at
COMDEX/Fall '88
November 14–18, 1988
Las Vegas Convention Center
Booth #163

UL 250, 300 and 500 Watt Models

Circle 268 on reader service card

before running the word processor. Both operations are easily accomplished with the simple batch file provided.

The $59.95 add-on uses 48K of memory for CGA or MCGA, 68K for EGA or VGA, and 64K for Hercules adapters. *Screen Extender* requires DOS 2.00 or a later version, a graphics adapter, and *WordStar Professional 4.0*. It does not support earlier versions. Stairway Software Inc., 700 Harris St. #204, Charlottesville, VA 22901; 800/782-4792 for orders, 804/977-7770.

Back to Basics: Professional

Accounting Homework

While home-based businesses are often referred to as cottage industries, there's nothing quaint about what goes on there. In this country, the ranks of work-at-home entrepreneurs are growing by about 400,000 a year.

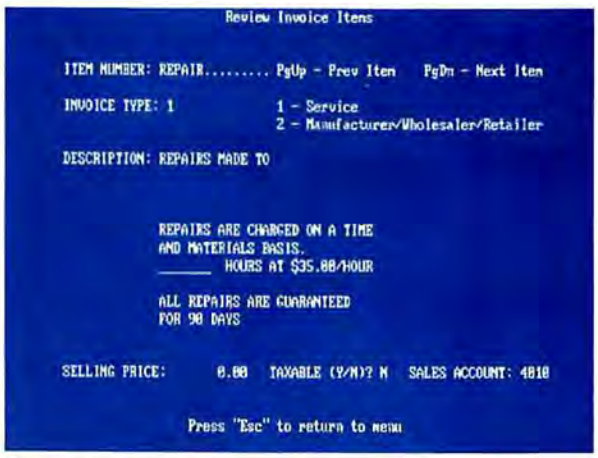
If your office is also your home, you need a strong but straightforward way to track what's coming in and going out. Peachtree's *Back to Basics: Professional* takes your accounting system out of the shoe box and puts it on the computer.

Aimed at those whose number-crunching prowess tops out with their monthly bank statements, *Back to Basics: Professional* takes the double-talk and double jeopardy out of double-entry accounting. The $199 program protects you from error by requiring that all entries balance before they're recorded. The accounts payable module provides an uncomplicated way to track your debts. Even better, the accounts receivable module streamlines tracking what you're owed.

Transactions from both modules automatically post to the program's general ledger, which computes balances from all transactions and prints useful financial reports such as your income statement and balance sheet.

Finally, the invoicing module lets you choose between free-form and predefined descriptions of services rendered or goods sold and will compare customer purchases with their credit limits. This module includes formats for service companies, manufacturers/wholesalers, and retailers.

Back to Basics: Professional requires DOS 2.00 or a later version and 128K of memory. Peachtree Software, 4355 Shackleford Rd., Norcross, GA 30093; 404/564-5700.



Back to Basics: Professional gives small businesses a variety of invoicing options.

BRIEFLY NOTED

V-RAM VGA

Video-7 has introduced the first graphics board based on video random access memory (VRAM), the speedier substitute for dynamic RAM (DRAM). Video-7 claims that its V-RAM Video Graphics Array (VGA), which is based on the company's proprietary VGA chip, processes graphics ten times faster than IBM's Graphics Display Adapter.

VRAM chips achieve this speed increase by having two "doors" through which information can pass, as opposed to the single door of conventional DRAM. V-RAM VGA reduces bottlenecks sometimes caused by standard DRAM chips running graphics-based software, bringing the fast response of text-based applications to such graphics-oriented jobs as desktop publishing and computer-aided design (CAD).

The board generally supports higher resolutions with more simultaneous colors than standard VGA cards. With 256K worth of video RAM memory, the V-RAM VGA board offers 4 colors at 1024 by 768 pixels, 16 colors at 800 by 600, and 256 colors at 640 by 400. Add another 256K of VRAM, and the number of colors rises to 16 at 1024 by 768, 256 colors at 720 by 540, and 256 colors at 640 by 480. V-RAM VGA comes bundled with software drivers supporting Microsoft's *Windows* and *Windows/386* and Autodesk's *AutoCAD* and *AutoShade* applications at resolutions up to and including 1024 by 768.

The $799 board will fit a PC XT-compatible 8-bit or an AT-compatible 8/16-bit slot, though its performance is superior when installed in the latter. For those willing to sacrifice a little speed for dollar savings, Video-7 offers Fast-Write VGA, a DRAM-equipped version that includes the custom VGA chip and the software drivers but is priced at $549. Video-7, 46335 Landing Pkwy., Fremont CA 94538; 415/656-7800.

Smartmodem 9600

Hayes Microcomputer Products has made its first foray into the mainframe communications market with the Smartmodem 9600, a full-duplex

END FINANCIAL HASSLES. $49.95

IBM APPLE II
NEW FOR MAC!

If you pay bills, you need Quicken software financial package. It's the absolute fastest, easiest way to do your personal finances or small business bookkeeping.

Finish Financial Chores in Seconds
Quicken slashes the time to finish financial work because it *automatically* does the clerical work for you. Quicken actually learns your regular monthly bills. Each month, just confirm the payment amount on your auto loan or indicate the new balance due on your utility bill. Quicken does 14 automatic bookkeeping steps and hands you the printed checks already addressed for mailing. All you do is sign on the appropriate line.

Eliminate Bookkeeping Chores Forever.
Instead of dreading tax time, use Quicken to give you itemized reports supporting each tax deduction. Quicken delivers complete reports on screen or on paper almost instantaneously. Income and expenses by category. Rental property. P & Ls. Detailed budget vs. actual comparisons.

All your financial data is ready at your fingertips because Quicken keeps complete records to the last penny. Need to find a check you wrote months ago? Quicken finds it in three seconds flat.

Unbelievably Easy to Use.
Quicken is as easy as working with pen and paper. With Quicken, you get a checkbook and register right on your screen, just like what you've always used. Fill in the screen exactly as you would write a check, or record a transaction in your register. It's that easy.

No "debits." No "credits." No accounting mumbo jumbo. Just pop in the disk and you'll be rolling in five minutes, without even opening the manual. And for any questions you might have, we offer unlimited technical support at no charge.

Here's What the Critics Say:

"I've never seen such an easy-to-use manual or software that's so simple to use."
Martin Blumenthal, inCider Magazine

"Extremely simple and fast."
Esther Dyson, Industry Analyst

"Absolutely the best small accounting program made." *Bob Schwabach, Universal Press Syndicate*

For Business *and* Personal Use.
Quicken works for individuals. For service and manufacturing businesses. For doctors, consultants, and property managers. Quicken is ideal for anyone tired of bookkeeping hassles.

Quicken tracks business payables, receivables and payroll. It does cash flow forecasting, petty cash control, as well as job, client and property bookkeeping.

Free 30-Day Trial.
Try Quicken by ordering below. If you're not 100% satisfied, return it in 30 days and pay absolutely nothing.

Specifications:
General: Number of bank accounts unlimited. Number of categories unlimited. Number of transactions unlimited. Works with all monitors and all printers including lasers. Includes complete on-screen help and users manual.
IBM: PC, XT, AT, PS/2 and compatibles with 256K RAM and DOS 2.0 or higher. Exports data in ASCII format. Exports to Lotus format with optional Transfer Utility.
Macintosh: All with 512K RAM. Exports in SYLK and HyperCard for custom and multi-column reports.
Apple II: IIGS, IIc, IIe with 128K RAM. Exports to AppleWorks and AppleWorks GS for budget, custom, and multi-column reports.
Other: Not copy-protected. Checks approved by all financial institutions in U.S. and Canada. Order form included in Quicken program package.

Quicken $49.95

NOT COPY PROTECTED

Try Quicken for 30 Days Free!
If not completely satisfied, return Quicken within 30 days for a full, no hassle refund.

1-800-624-8742
(in California call 800-468-8481)
Or send coupon with payment to:
Intuit, 540 University Ave., Palo Alto, CA 94301

☐ Check enclosed (no purchase orders, please). ☐ VISA ☐ MasterCard ☐ American Express

Card No._____ Exp._____

Name_____

Address_____

City_____ State_____

Zip_____ Phone_____

Quicken, $49.95 plus $3.00 shipping & handling. CA residents add sales tax.

☐ IBM version ☐ Apple II version
☐ DeskMate version ☐ Macintosh version
☐ 5¼" disk ☐ 3½" disk
☐ Optional Transfer Utility to Lotus, $19.95

Intuit
520 University Avenue
Palo Alto, California 94301

PW 1088

device built around the CCITT V.32 protocol. Designed for data transfer between local area networks and mainframes, the synchronous/asynchronous modem permits the high-speed data blasts required for communications with large computer systems.

While it is designed for high-integrity leased-line data transfer, the Smartmodem 9600 will automatically access a dial-up line should the leased line fail, falling back to the leased line when it becomes available again. This eliminates the expense of maintaining an extra dedicated leased line. The modem relies on mainframe protocols such as HDLC for its error correction. Version 2.0, due out later this year, will also support the range of lower speeds used more in the international market.

An industrial strength data gateway, the Smartmodem 9600 should not be confused with Hayes's V-series Smartmodem 9600, which is intended strictly as a PC modem. A half-duplex, asynchronous modem, the V-series isn't built to handle the large bursts of data required by the mainframe world. Version 1.0 of the Smartmodem 9600 is priced at $1999. Hayes Microcomputer Products, Inc., 705 Westech Dr., Norcross, GA 30092; 404/449-8791.

R:base for DOS Runtime

Microrim has introduced a full-fledged compiler for its relational data base management program, enabling developers to distribute cheaper, faster, and unalterable applications in the *R:base* procedural language. A single *R:base for DOS Runtime* license lets five users run any application written in the current or previous versions of *R:base for DOS* without needing individual copies of the data base program. The *R:base for DOS* procedural language itself ships with a pseudocompiler that still requires each user to have the program.

R:base for DOS Runtime is the first true compiler for Microrim's popular data base language. Such third-party compilers have vastly expanded the market for Ashton-Tate's *dBASE* language. Users of *R:base for DOS Runtime* have access to other *R:base* programs, custom mathematical expressions and routines, and SQL commands, but not to commands that create or modify the application's data base structure. *R:base for DOS Runtime*, which requires DOS version 2.00 or later, retails for $250. Microrim, 3925 159th Ave. NE, Redmond, WA 98052; 206/885-2000.

The Smartmodem 9600 is your communications gateway to distant LANs, mainframes, and cluster controllers. The synchronous/asynchronous modem is capable of the high-speed data blasts required for mainframe communications.

AMI 386 AT Mark 2 Motherboard

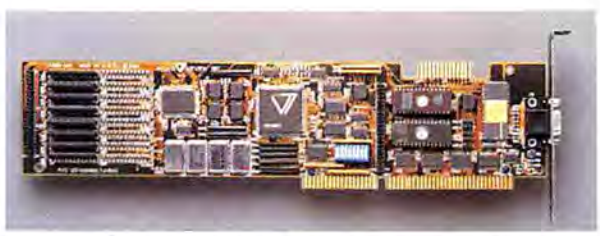
American Megatrends has introduced a motherboard upgrade for ATs that could easily be considered the Cadillac of replacement boards. Equipped with a 25-MHz 80386 processor, the 386 AT Mark 2 Motherboard is rigged out with all the options.

In addition to its top-of-the-line processor, the AT Mark 2 achieves near-zero-wait-state performance through the use of a 64K memory cache operating at a 75 to 85 percent hit rate, claims the company. A 32-bit ROM BIOS also boosts speed. Graphics processing gets its own turbocharge through "video BIOS shadow RAM"—which exploits motherboard memory speed by using video routines stored in 32-bit memory rather than retrieving them from ROM in 8-bit chunks.

The motherboard also accommodates both the Intel 80387 and Weitek 3167 coprocessors, making a Mark 2–equipped AT ideal for CAD, desktop publishing, and other calculation-intensive applications such as sorting large data bases and recalculating large spreadsheets.

And the AT Mark 2 is as flexible as it is fast. You can add up to 4MB of DRAM chips and up to 4MB of SIMMs (single in-line memory modules) directly to the motherboard. DRAM is added in 256K increments; SIMMs, in 1MB increments. And if that's still not enough, the board's proprietary 32-bit memory slot will accept another 16MB.

The AMI BIOS, for which the company is best



Video-7 claims that its V-RAM VGA board can process graphics ten times faster than IBM's Graphics Display Adapter by using video RAM.

Case History #60302

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

No programming changes required from system to system.

"DataFlex delivers, by far, more combinations of hardware and operating systems than any of the competition, and DataFlex source code is transportable, without change, to every supported system. That's very important to Drake International because it gives each office the flexibility to acquire the computer hardware that is best suited to a situation without worrying about re-inventing the wheel and spending a fortune on program development. All we need to do is install the run-time module for the desired system and we're up and running immediately with proven, standardized programming."

Easy to use for even the least technical operators.

"A major component of our recruitment and placement operations involves mailing lists. DataFlex's capability to quickly generate reports utilizing a wide range of variables is extremely important," explains Nohra. "DataFlex's intuitive 'Point and Shoot' Query technique makes it easy for non-technical operators, even those lacking previous knowledge of programming or query language syntax, to be productive after only minimal training. There are a lot of products which promise the world, but for Drake, DataFlex has really delivered."

"Lots of DBMS/4GL products promise the world... DataFlex delivered it for Drake International."

Eva Nohra, Drake International, Toronto, Ontario

Take the first step to more efficient program development today. Return the coupon below for your free DataFlex Demonstration Diskette.

Toll Free Sales Lines:
Nationwide 1-800-451-FLEX
In Florida 1-800-331-3960

DATAFLEX®

Data Access Corporation
14000 S.W. 119th Avenue
Miami, Florida 33186
(305) 238-0012
TELEX: 469021 Data Access CI
FAX: (305) 238-0017

For more information, call from your modem 1-800-444-8080 (300-1200 baud, 8 bit, no parity 1 stop bit) and enter the access code **FLEX23** when prompted.

FREE SELF-RUNNING DATAFLEX DEMO (PC-DOS/MS-DOS ONLY)

PCWL 10/1/88

Find out more about DataFlex's ease of use and programming power. Mail this coupon today for your free self-running demonstration diskettes.

Name_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone ( )_____

How many computer systems are in use at your company? ____
Do you use a Local Area Network or Multi-User computer? ____

Data Access Corporation, 14000 S.W. 119 Avenue, Miami, Florida 33186

Circle 55 on reader service card

known, handles all system setup and advanced diagnostics. The AMI 386 AT Mark 2 comes with a 25-MHz processor and 1MB of memory for $2800. A 20-MHz version is also available for $2100. For XT owners there's a 20-MHz 386 XT Mark 2 replacement motherboard for $2000. American Megatrends, Inc., 4025 Pleasantdale Rd. #350, Atlanta, GA 30340; 404/263-8181.

Hummingbird Browser

Cauldron, headed by Charles Chou, the author of Ashton-Tate's *dBASE* compiler, has unveiled the first in a series of products aimed at making that popular but cumbersome data base easier to use. *Hummingbird Browser*, a RAM-resident program, has a cut-and-paste feature that lets you drop into a *dBASE III Plus* file, pluck out data, and deposit it directly into word processing documents or spreadsheets. This eliminates the time-consuming step of moving *dBASE* data to a newly created file before transferring it to another program.

To make cutting and pasting even easier, Cauldron has included macros that identify frequently addressed *dBASE* records and mark them for quick access and transfer. Users can cut and paste a single record or an entire window in one move. *Hummingbird Browser* also overrides regular *dBASE* commands to make adding and editing files simpler.

The $99 software comes packaged with two versions on the program disk. The first requires 180K of memory and takes advantage of all the software's functions. The second uses only 150K—enough to cut and paste, but not enough to edit *dBASE* files. Both versions require DOS 2.00 or a later version and at least 256K of memory. Cauldron, 3204 Adeline St., Berkeley, CA 94703; 415/654-3361.

ScanMan

Logitech has introduced a hand-held scanner for reading continuous-tone graphics, photographs, and text for desktop publishing and other applications. The company claims that ScanMan offers a 4-inch scanning window, compared to the 2½-inch window common among other hand-held devices. The device scans images up to 4 inches wide and 11 inches long at a resolution of 200 dpi.

Two scanning options are offered. Using WinScan, one of Logitech's bundled ScanWare utilities, you can scan a document or image directly into the *Microsoft Windows* clipboard. Non-*Windows* users can scan into a file with the Graphics Editor utility. Graphics Editor lets you size, cut and paste, color, reverse, rotate, flip, or magnify an image. ScanMan, which includes the scanner, interface card, and Logitech software, retails for $299. Logitech, 6505 Kaiser Dr., Fremont, CA 94555; 415/795-8500.

Forget-Me-Not

Sterling Castle calls it time-release software. *Forget-Me-Not* is a terminate-and-stay-resident program that operates on the computer's clock, rather than on a keyboard interrupt, to activate pop-up reminders or execute computer programs unattended. In a network environment, *Forget-Me-Not* can send messages of varying lengths to either the originator or another user. Multiple messages can be stored and then delivered at a specific time, at regular intervals, or randomly. If you insist, a "snooze alarm" feature repeats messages a few minutes after the first transmission.

Forget-Me-Not messages can be created with the DOS text editor EDLIN, *WordPerfect*, or any ASCII text editor. Additionally, the package will deliver pop-up messages from the appointment calendar in Borland's *SideKick*. Messages longer than one line in the window automatically wrap to the next line, and the pop-up window is adjustable. You can program *Forget-Me-Not* to execute batch files unattended; for example, it can sort large data bases and print lengthy reports after hours or dial up other computers when telephone charges are low. On a network, it can handle periodic work-group bulletins, reminders of project milestones, and backup tasks.

Forget-Me-Not, which uses standard DOS calls for file access and batch processing, requires 64K of memory and DOS 2.00 or a later version. It retails for $79.95. Sterling Castle, 702 Washington St. #174, Marina del Rey, CA 90292; 800/722-7853, 800/323-6406 California, 213/306-3020.

UPDATE

PFS: First Publisher 2.0

PFS: First Publisher 2.0 provides enhanced file import from popular word processing packages, as well as the ability to import scanned images. In addition to ASCII files and files from Software Publishing word processors, version 2.0 lets you select *Microsoft Word*, *WordPerfect*, *DisplayWrite 3*, *MultiMate*, and *WordStar* documents from a menu. It also accepts graphics files from *PC Paintbrush* and Microsoft's *Windows Paint*.

Though intended as an entry-level publishing tool, the program incorporates many features of more sophisticated and expensive products. But *PFS: First Publisher 2.0* is best at producing docu-

No matter which of these modes you use,

40-column CGA Text
40-column EGA Text
40-column VGA Text
80-column CGA Text
80-column EGA Text
80-column VGA Text
Lo-res CGA Graphics
Hi-res CGA Graphics
MDA Monochrome Text
80-column VGA Monochrome Text
Lo-res MCGA Graphics
Lo-res VGA Graphics
Med-res VGA Graphics
EGA Monochrome Graphics
Hi-res EGA Graphics
Hi-res MCGA Graphics
Hi-res VGA Graphics

we have the VGA display for it.

Magnavox introduces two new Professional Series displays that are fully compatible with all 17 VGA modes—both designed with the intelligence you've come to expect from Magnavox.

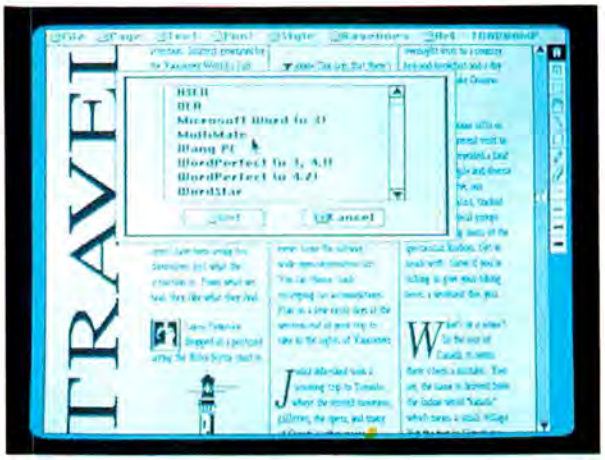
With a VGA display system, you'll get the most out of your present software and prepare yourself for graphics environments like Windows 386, OS/2,™ and Presentation Manager.™ Resolutions include 720 x 400 for text, and 640 x 480 in 256 colors for graphics.

Both displays have a 14" CRT, versus the 12" industry standard. And both come with a built-in tilt/swivel base and are backed by a 2-year limited warranty—twice as long as most other brands.

At $229 for the 7BM749 paper-white monochrome and $649 for the 9CM082 color display, Magnavox makes VGA displays affordable.

MAGNAVOX
Smart. Very smart.

© 1988 Philips Consumer Electronics Company
A division of North American Philips Corporation.
IBM OS/2 and Presentation Manager are trademarks of IBM Corp.



The entry-level PFS: First Publisher 2.0 imports scanned images and files from popular word processing packages.

ments like newsletters, flyers, attention-getting memos, announcements, and invitations.

This latest edition of *First Publisher* imports text, manipulates images, and prints twice as fast as version 1.0; it provides online help and will resize, invert, or flip images, or rotate them 90 degrees. With its new speed keys, users familiar with the program can bypass menus. The package also comes with 14 templates offering preconfigured page layouts. Documents can be formatted in one-to-four-column layouts of equal or varying lengths, but graphics and text are not restricted to those column borders. In the magnify mode, you can more easily edit the details of graphic images.

PFS: First Publisher 2.0 outputs to more than 70 dot matrix, laser, and ink jet printers, and it supports all Hewlett-Packard LaserJet and Bitstream soft fonts. The latest version ships with 150 clip-art images and a selection of 60 fonts; more are available in two font and seven clip-art portfolios for $39 each. The $129 program requires 512K of memory and DOS 2.00 or a later version. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94039; 415/962-8910.

Norton Commander 2.0

The new version of the *Norton Commander* DOS shell and file management program features the ability to open and browse all versions of *1-2-3*, *Symphony*, and *dBASE* files. These files can be viewed from the directory with a single keystroke, while word processing files can be seen with *Commander*'s scrollable text viewer.

Commander's pull-down menu interface responds to mouse or keyboard commands and organizes program functions into logical groups. Using the menu bar, you can select one or two directory panels and sort them alphabetically by name, size, date, or extension, or show the unsorted DOS order. You also can select multifile operations from directory panels. *Norton Commander* will show you a tree directory of the entire hard disk in one or both directory panels or pop it up in a window. Also available is a pop-up listing of the last 15 DOS commands you've executed.

The File Find feature lets you search an entire hard disk across all directories for a specific file or set of files (such as all files with a certain extension) in a full-screen, scrollable window. These functions also are accessible via the DOS command line.

Norton Commander, which requires DOS 2.00 or a later version and only 13K of memory, retails for $89. Upgrades are available for $33 for version 1.0 users. Peter Norton Computing, 2210 Wilshire Blvd. #186, Santa Monica, CA 90403-5784; 213/453-2361.

DacEasy Accounting 3.0, Payroll 3.0, Graph + Mate 3.0

Dac Software has upgraded its accounting suite. *DacEasy Accounting 3.0* has easier-to-use pulldown menus designed to handle accounting in the way you work—following a transactional flow rather than tying you to a module orientation. The new version also gives users the ability to add customers, vendors, accounts, products, or services while invoicing, entering purchase orders, and performing transactional entry routines. Also included are enhanced export facilities, new password protection, flat-rate billing, and more financial form options.

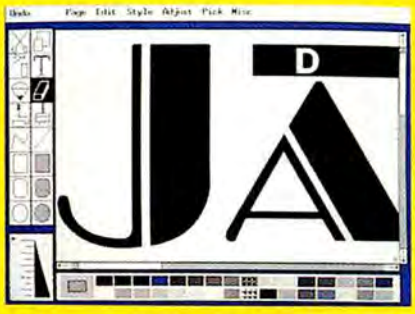
Dac Software has also added the new interface to the packages that complement its accounting flagship. *DacEasy Payroll 3.0* offers a revamped employee-file design that accommodates new fields, a new report format, and improved procedures for dealing with temporary employees.

Dac also has introduced *DacEasy Graph + Mate 3.0*, a RAM-resident utility for the accounting and payroll modules. It provides graphing and custom report generation and lets you select ways to view files. Moreover, this module incorporates a notepad, a calculator with a pasting capability, the ability to print to screen, and automatic backup and restore without the need to exit *DacEasy Accounting* or *Payroll*.

All three Dac packages require DOS 2.00 or a later version. *DacEasy Graph + Mate 3.0* requires 512K of memory. Each program retails for $99.95, or $35 for current users. Dac Software, 17950 Preston Rd. #800, Dallas, TX 75244; 214/248-0205.

Publisher's Paintbrush™

The *art* of desktop publishing



This masthead was created using the fonts and typographic features of Publisher's Paintbrush.

Gray scale technology gives your images amazing clarity – with up to 256 shades of gray.

Desktop publishing's favorite graphic tool now brings you new levels of creativity and page perfection. Publisher's Paintbrush™ now has two exciting enhancements – *gray scale* and *Compugraphic Intellifont®* technologies. Suddenly, you're in the same league with professional printers and typesetters!

Gray scale publishing: For the ultimate image.

Gray scale technology is a major advance over the conventional "dithering" technique, which simulates shades of gray by varying the density of black dots.

Gray scale images, composed of dots in up to 256 intensity levels, have distinct shades of gray much cleaner than "dithered" images.

Now you can edit a gray scale image with all the features that made Publisher's Paintbrush the premier package of its class. Then export your masterpieces to Ventura Publisher™, PC PageMaker® or business presentation software.

Fonts galore!

Publisher's Paintbrush offers 25 popular fonts – including a selection in Compugraphic outline format. Hundreds of other perfectly formed outline fonts are available from ZSoft. So your desktop publishing documents gain impact with razor-sharp type.

You have complete flexibility with your type. Adjust leading (line spacing) and kerning (character spacing). Adjust type size – from 1 to 200 point. Adjust italic slope or line slope in 1-degree increments.

Many other popular features.

Publisher's Paintbrush provides the most extensive hardware support in the industry and your images can be used in all major desktop publishing packages.

With *zoom out editing*, all your editing is done at the resolution of the print device – *not* the screen. Result: Incredibly smooth edges.

And, our new import utility converts Hewlett-Packard printer files to PCX for post-process editing.

Join the graphic era of desktop publishing.

Give your documents and presentations the classy look they deserve. With Publisher's Paintbrush. Clearly, it's the *art* of desktop publishing.

© 1988 ZSoft Corporation

Z·SOFT
450 Franklin Road / Suite 100
Marietta, Georgia 30067
(404) 428-0008
FAX: (404) 427-1150
Telex: 6502859318

1988 PC WORLD WORLD CLASS AWARD

Voted "Best Desktop Publishing Utility."

Publisher's Paintbrush is a trademark of ZSoft Corporation. Ventura is a trademark of Ventura Software, Inc. PC PageMaker is a registered trademark of Aldus Corporation. Type Director and CG are trademarks and Intellifont is a registered trademark of Compugraphic Corporation.

Circle 206 on reader service card

Turbo Prolog 2.0

Borland International has bolstered its fifth-generation language with external data base support and an interpreter. Turbo Prolog 2.0 carries a complete set of tools for developing and maintaining large data bases and adds extensive graphics support. Turbo Prolog's ability to perform data base functions using one-tenth the amount of procedural-language code makes it ideal for designing customized knowledge bases, expert systems, and natural language interfaces.

The program's interpreter comes with source code and can be built into applications that require user programming capabilities. Program output can be directed to user-created windows on the screen. A Turbo Prolog Toolbox with 80 tools and more than 8000 lines of source code is available separately for $99.95. Turbo Prolog 2.0 requires DOS 2.00 or a later version and 384K of memory. It sells for $149.95, and registered users can upgrade from previous versions for free. Borland Int'l, 1800 Green Hills Rd., Scotts Valley, CA 95066; 408/438-8400.

Tree86 2.0

Version 2.0 of *Tree86* speeds backup operations by letting you copy a drive's directory structures onto a second drive, quickly identify unbacked-up files, and copy entire directories between drives without changing the logged drive or delving into DOS commands. A DOS shell and file management utility, *Tree86* provides a tree-like directory view with pulldown menus and dialog boxes. Together with its built-in mouse support, these provide point-and-shoot capability. *Tree86 2.0* also supports both 43-column EGA and 50-column VGA modes; a single keystroke lets you toggle between those and a 25-line mode.

Version 2.0 of Tree86 enables you to create subdirectories on and back up files to a drive other than the one you are logged onto.

Other enhancements include a menu-driven configuration program, the ability to use up to four specifications for global file searches, a variety of file-sorting criteria, and enhanced mouse support. *Tree86* reports on disk and system memory, lets you hide subdirectories, and runs programs from its environment. The $89 program requires DOS 2.00 or a later version and 128K of memory, but it automatically pares itself down to a 70K kernel when inactive. The Aldridge Co., 2500 City West Blvd. #575, Houston, TX 77042; 713/953-1940.

10Net Plus

10Net Communications has introduced a new version of its distributed local area network. The NETBIOS-compatible *10Net Plus* features *The Network Courier* electronic mail package, a windowed Chat feature for user-to-user communications and network management, and a menu-driven installation routine. *10Net Plus* supports the Server Message Block (SMB) protocols used in IBM's PC Network Program and OS/2 LAN Server, Microsoft's OS/2 LAN Manager, and Microsoft Networks. Its distributed architecture lets you share resources with and retrieve files from any node on the network, while disk caching minimizes I/O and reduces network traffic.

10Net Plus ships with a 10Net interface card tap box, cabling, software, and documentation. It requires DOS 3.00 or a later version and 192K of memory per node. The twisted-pair AT bus/starlan version and the Micro Channel Architecture version for IBM PS/2s each sells for $695 per node. The fiber optic version retails for $895. 10Net Communications, 7016 Corporate Way, Dayton, OH 45459; 513/433-2238.

XtreeNet

Executive Systems has released a network version of its *XtreePro* disk management utility. *XtreeNet* includes all of the file-locate, copy, move, and delete features of the single-user utility as well as several features tailored to the needs of network users. Under Novell's password scheme, *XtreeNet*, which supports Novell *Advanced Netware* versions 2.0 and higher and *286 ELS*, will display only those files and directories to which the user has access. Able to log on to multiple drives and handle up to 16,000 files, the package helps organize the network to avoid duplicate files and speeds installation of directories and copying of files to the server. With *XtreeNet*, network supervisors can configure and customize each user's file access as well as all files and directories on the system. Its retail price of $295 covers access by six users on a single file server. Executive Systems, 4330 Santa Fe Rd., San Luis Obispo, CA 93401; 805/541-0604. ●

Limited Time Offer

Save a Bundle On Our New Bundle.

A lot of accounting software companies will try to tell you their product does more than just accounting. So even though you can get Peachtree Complete™ II — the most complete accounting software — for a lightweight $199, we won't tell you that it's more than an accounting package. Just that it's the most accounting power you can get for your software dollar.

Now we've bundled Peachtree Complete II and Peachtree Data Query™ II together, and cut the price $100. So you're not only getting full-featured accounting, you're also getting custom reporting and analysis. Peachtree's "Double Bonus Bundle" gives you two first-rate software packages for one low price — Peachtree Complete II, The Business Accounting System and Peachtree Data Query II, the Custom Reporting Tool for Peachtree Complete II, both for only $298. And that's the best deal around.

Still Just $199 Complete. We will continue to tell you that Peachtree Complete II offers the most powerful accounting software you can buy at virtually any price. Designed and sold as a $5,000 accounting system, the latest version of Complete II represents a vastly expanded and improved product, yet sells for an incredibly reduced price of just $199. With that kind of value, and more than 250,000 satisfied users, our record speaks for itself.

Peachtree Complete II is a comprehensive accounting system developed to meet the needs of small- to medium-size businesses. It comes with eight high-power modules that may be used individually, or fully integrated for absolute maximum accounting efficiency:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Invoicing
- Inventory
- Payroll
- Fixed Assets
- Job Cost

And Peachtree Complete II is designed using the latest software innovations, like full-color scrolling reference tables, pop-up windows, and short-cut keyed menus. We've increased numeric capacities as high as $999,999,999.99 in key areas, added Service Invoicing, included Range Printing, and expanded to allow an unlimited number of companies.

Error handling is quick and easy, with plain English messages and suggestions. Context-sensitive Smart HELP is on-line, all the time. And as always, Peachtree Complete II comes with the most thorough documentation — a separate quick-start Installation Guide, Accounting Primer, seven-volume Reference Library, and extensive on-line tutorials on each module — all at no extra charge.

Save Even More on Peachtree Data Query II. So while you're getting the best deal on the best accounting software, why not get an even better bargain? Extend the power of your Peachtree accounting to include the most advanced custom reporting and analysis with PDQ II, and when you buy both, save $100!

PDQ II lets you turn raw figures into highly sophisticated reports, allowing you full access to the important accounting data in your Peachtree Complete II files. From the simplest mailing labels to the most detailed budget analyses, Peachtree Data Query II opens up the potential of your computerized accounting, with no risk to your files, and no re-keying of accounting data.

And now, PDQ is easier than ever to use, with all new user instructions and on-line practice sessions that lead you through the system and build confidence as you go.

Choose from PDQ's own pre-defined reports, design your own (and store the formats for future use), even export data to popular applications like dBASE III® and Lotus 1-2-3®. PDQ's simple, clear approach to report writing allows maximum control and flexibility. You can begin creating reports with PDQ in just minutes. And as you continue using it, PDQ can perform highly complex, intricate analyses.

Save a Bundle When You Buy Both. We think using PDQ to make Peachtree Complete II more than an accounting system makes good business sense. So we bundled them together and made it well worth your while. For a limited time, Peachtree's "Double Bonus Bundle" is available for just $298. That's two regularly-priced $199 packages for one low price, and that's a savings of $100. The "Double Bonus Bundle" is a limited-time offer, so call today!

And of course, if all you need is the best accounting package your money can buy, Peachtree Complete II by itself is still only $199.

Compare Feature for Feature

General Ledger
- Chart of Accounts includes 76 suggested and 26,000 user-defined accounts.
- Financial statement comparisons may include current period and year-to-date with budget and/or prior period comparison.

Accounts Receivable/Invoicing
- Maintains open item or balance forward customers.
- Up to 14,400 customers.

Accounts Payable
- Partial payments of invoices.
- Up to 14,400 vendors.
- Checks printed with unlimited invoice listing on stub.

Inventory
- Supports average, last purchased and standard costing methods.
- Up to 19,500 inventory items (SKUs).

Fixed Assets
- Handles 15,000 assets and 13 methods of depreciation.

Job Cost
- Tracks costs and profitability on a job-by-job basis.

Payroll
- Built-in current year federal, state, city and county tax tables for all 50 states with automatic calculation capabilities.
- Automatic payroll processing supporting hourly, salaried, commission or draw-against-commission pay types.
- Printed and magnetic media W-2s generated automatically.
- Processes up to 3,900 employees.

And Many More!

Money Back Guarantee. As with all our products, we stand behind Peachtree Complete II and PDQ II with a toll-free hotline for technical support ($1 per minute, $20 minimum on your credit card). And both are covered with a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, you can return the product within 30 days for a prompt refund. That's the Peachtree Software promise. (A $25 restocking fee applies to all returns.)

Hardware Specifications: Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory (512K required with DOS 3.3) 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.

Call Now to Order

1-800-247-3224

(or call 1-404-564-5800)

To Order by Mail Add $12.50 Shipping and Handling*

(In Georgia add applicable sales tax.)

*Call for international rates.

Peachtree Software

A Member of the Inielligent Systems Family

4355 Shackleford Road, Dept. PCW, Norcross, Georgia 30093

Circle 144 on reader service card

The Dell System 220. Once again the critics stole the words right out of our mouth.

"The Dell System 220 runs most PC Labs system benchmark tests at speeds that would make you think you're running a 386."
—PC MAGAZINE

"...the Dell machine is renewed evidence that the price of 286-based desktop equipment continues to drop rapidly, making such machines very attractive for daily work under MS-DOS even as they hold out the promise of running OS/2 in the future."
—WILL FASTIE, PC WEEK

"...includes a year's on-site support...in the price of the computer. This is the sweetest support deal offered by any computer vendor in the industry."
—ERIC KNORR, PC WORLD

"The hot item from a technical point of view is the System 220. This machine runs a 286 processor at 20 MHz, which is its major claim to fame."
—WILL FASTIE, PC WEEK

"...the System 220 has more going for it than just speed."
—PC WORLD

The reviews are beginning to pour in.

And they read like a wish list for every power user looking to exceed the ordinary limitations of a 286 computer.

The computer everyone is praising in such glowing terms is the Dell System 220.

The first 286 computer with a clock speed of 20 MHz.

It's totally MS-DOS® and MS® OS/2 compatible. Yet it sells for much less than you may pay for a 386† computer.

Because you buy it direct from us.

Eliminating the mark-ups and margins of computer stores.

We design and build every Dell computer right here in Austin, Texas.

We put each and every one through a comprehensive burn-in and a battery of diagnostic tests before we ship it.

And after we ship, we give you the best technical support you'll find anywhere in the computer industry.

Our technicians are on the phone from 7AM to 7PM every business day.

Almost any question you may have about a Dell system can be answered over the phone.

And, in the rare case, that your question can't be answered by an on-line technician, we'll send a Honeywell Bull technician by the next business day.

A full year of on-site Honeywell Bull service is included within the purchase price of your Dell system.

Your Dell computer also comes with a thirty-day money back guarantee.

And we back every one of our computers with a one year limited warranty on materials or workmanship.

For more information about Dell computers, read the reviews in the trade press, turn the page, review our product offerings, and call us at (800) 426-5150.

You'll like what we have to say.

DELL COMPUTER CORPORATION

TO ORDER, CALL
800·426·5150
IN THE U.S. AND CANADA

Circle 74 on reader service card

The Dell Computer Store.

Welcome to our store.

We believe you'll find this an extremely pleasant shopping experience.

Our sales staff is on hand to serve you from 7AM to 7PM (CST) from Monday thru Friday.

Just call (800) 426-5150 and we'll give you the technical assistance and information you need to make sure you're buying the system that's right for your needs.

Then you have the option of either a direct purchase or your company can take advantage of our Leasing Plan.

Once you've made your choice, our Total Satisfaction Guarantee gives you thirty days from the day you receive your system, to decide if you are absolutely, totally satisfied with the product.

If you're not, simply return the system and you'll receive a full refund. No questions asked.

Your Dell computer is supported by a team of technical experts that can be reached every business day, from 7AM to 7PM (CST), simply by calling (800) 624-9896.

In most cases, any question you may have about your Dell system can be answered by one of our technicians on the telephone.

Our technicians are also supported by Honeywell Bull service engineers who can be sent to your office by the next business day, should on-site service be required.

This optional service contract is available in over 95% of the United States, with over 1,000 engineers in 198 service locations.

We also offer a One Year Limited Warranty,** which warrants each system we manufacture to be free of defects in materials and workmanship for one full year.

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

THE NEW 20 MHz 386† SYSTEM 310.

The top of the line. It's our highest performance computer available, faster than the IBM† PS/2† Model 80 and the Compaq† 386/20. It runs at 20 MHz with the latest 32-bit architecture. Since it also has Intel's Advanced 82385 Cache Memory Controller, and high performance disk drives, the System 310 is ideal for intensive database management, complex spreadsheet development, CAD/CAM, desktop publishing or performance as a network file server.

Standard Features:

- Intel† 80386 microprocessor running at 20 MHz.
- 1 MB of RAM (640K usable) expandable to 16 MB without using an expansion slot.
- Advanced Intel 82385 Memory Controller with 32 KB of high speed static RAM.
- Socket for 20 MHz 80387 or Weitek 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 expansion slots (6 available).

Performance Enhancements (Systems 310 and 220):

- 384 KB of dedicated RAM is used by portions of the system software for increased performance.

***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

THE NEW 20 MHz 286 SYSTEM 220.

As fast as most 386 computers, at less than half the price—more power for the money than any other system. An 80286 system that runs at 20 MHz, with less than one wait state. Completely compatible for both MS-DOS® and MS® OS/2 applications (it runs faster than IBM PS/2 Model 80), and with a remarkably small footprint, the System 220 is the ideal executive workstation.

Standard Features:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM (640K usable) expandable to 16 MB (8 MB* on system board).
- Page mode interleaved memory.
- Integrated diskette and VGA video controller on system board.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- LIM 4.0 support for memory over 1 MB.
- Three full-sized AT† compatible expansion slots available.
- Socket for 80287 coprocessor.

Options:

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

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

System 220	With Monitor		
	VGA Mono	VGA Color	VGA Color Plus
One Diskette Drive	$2,299	$2,499	$2,599
40 MB – 29 ms Hard Disk	$2,999	$3,199	$3,299
100 MB – 29 ms Hard Disk	$3,799	$3,999	$4,099

THE 12.5 MHz SYSTEM 200.

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

Standard Features:
- Intel 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB (4.6 MB* on system board).
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200 watt power supply.
- Real-time clock.
- 6 expansion slots. (4 available with hard disk drive controller and video adaptor installed).
- Socket for 8 MHz 80287 coprocessor.

Options:
- 512 KB RAM upgrade kit.
- 8 MHz Intel 80287 coprocessor.

***Lease for as low as $78/Month.*

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

A Full Line Of Computers With A Full Line Of Configurations.

At Dell, we understand that different users have different needs. So we tailor each system to the user's individual requirements.

We offer monitors, graphics boards, tape backups, dot matrix and laser printers, hard disk and diskette drives, expanded memory boards, serial mice and more.

We also offer third party software applications for virtually every business application including: accounting, communications, desktop publishing, graphics, word processing, integrated applications and user training.

So when your Dell System arrives, you can do productive work the minute you unpack the box.

We can build you the system you've been looking for.

COMMON TO THE SYSTEM 310, SYSTEM 220 AND SYSTEM 200:
The Dell System Analyzer. Guaranteed hardware and software compatibility. Security lock with locking chassis. 12 month on-site service contract (Available on complete systems).

PRINTERS/SOFTWARE. *We offer a full line of printers and popular software. All printers come with our 30-day money-back guarantee.*

LASER PRINTERS.

LASER SYSTEM 150; $5,995.
15 pages per minute, text and full-page graphics.
Dual 250 sheet-input trays.

LASER SYSTEM 80; $3,295.
8 pages per minute, text and full-page graphics.

LASER SYSTEM 60; $2,195.
6 pages per minute, text and full-page graphics.

DOT MATRIX PRINTERS.

PRINTER SYSTEM 800; $699.95.
Highest resolution text and graphics from a 24-wire dot matrix printer.
Draft quality at 200 cps.
Correspondence quality at 132 cps.
Letter quality at 66 cps.
Standard parallel and serial interfaces.
Wide carriage.

PRINTER SYSTEM 600; $499.95.
9-wire dot matrix.
Draft quality at 240 cps.
Near-letter quality at 60 cps.
Standard parallel interface.
Wide carriage.

PRINTER SYSTEM 300; $199.95.
9-wire dot matrix.
Draft quality at 144 cps.
Near-letter quality at 36 cps.
Four standard fonts.
Paper parking.
Standard parallel interface.

OPERATING SYSTEMS.
Dell Enhanced MS-DOS 3.3 with disk cache and other utilities; $119.95.
Dell Enhanced MS OS/2 Standard Edition 1.0 $324.95.

DELL COMPUTER CORPORATION

TO ORDER, CALL 800·426·5150 IN THE U.S. AND CANADA

All prices and specifications are subject to change without notice. Please inquire for current details. Dell cannot be responsible for errors in typography or photography. In Canada, leasing is not currently available and configurations and prices may vary. Microsoft,® MS® and MS-DOS® are owned by Microsoft Corp. †Signifies registered or unregistered trademarks owned by entities other than Dell Computer Corporation. *Available January 1, 1989. **Payments based on a 36-month open-end lease. Please inquire for further details.
© 1988 DELL COMPUTER CORPORATION.
AD CODE NO. 11DJ8

Circle 74 on reader service card

Compaq and IBM: Faster, Top to Bottom

PC World reviews four hot new PCs—two from Compaq and two from IBM.

Compaq gets the plaudits for new technology, while IBM adroitly fills the gaps in its PS/2 line.

Eric Knorr

The past few months have been a heady time for PC shoppers. IBM finally decided there's no reason why all 80386 machines should sit under the desk, and introduced its first desktop 80386 machine, the PS/2 Model 70. The company also began shipping the PS/2 Model 50 Z, a zero-wait-state version of the original and still available Model 50 that offers hard disks larger than 20MB—a long-overdue improvement. Around the same time, Compaq launched the Deskpro 386/25, the first 25-MHz 80386 PC from a major vendor. Then Compaq threw a curve and inaugurated an entirely new class of machine with the Deskpro 386S.

Neither fish nor fowl, the small-footprint Deskpro 386S is the most intriguing of the four computers, because it's the first PC built around the new 16-MHz Intel 80386SX chip. One of the industry's worst-kept secrets, the 80386SX (also known as the P9) is a modified 80386 microprocessor designed to work in a low-cost, AT-like architecture instead of the standard 80386's architecture, which is still comparatively expensive to implement.

With a base price of $10,000—$6000 more than the Deskpro 386S—the fleet new Deskpro 386/25 seems designed to demonstrate how pricey an 80386 PC can get. Like the Deskpro 386/20, the 386/25 uses an Intel 82385 controller to manage a cache of very fast static RAM, enabling the CPU to run at zero wait states. At this writing, the Deskpro 386/25 is one of the fastest PCs around and is surely the first in its class to be available in large quantities.

At the high end of IBM's new 80386 desktop line is the 25-MHz PS/2 Model 70-A21, whose architecture closely resembles the Deskpro 386/25's; unfortunately, we were unable to procure a production unit in time for

IBM PS/2 Model 50 Z

Compaq Deskpro 386S

Compaq Deskpro 386/25

IBM PS/2 Model 70-121

PHOTOS BY JOHN GREENLEIGH

FEATURES EVALUATION

IBM and Compaq Systems Compared

The new boys on the block: Both the high and low ends get a boost from new IBM and Compaq contenders.

● Yes
○ No

	Deskpro 386/25	PS/2 Model 70-121	Deskpro 386S	PS/2 Model 50 Z
Standard features				
CPU	80386	80386	80386SX	80286
Clock speed	25 MHz	20 MHz	16 MHz	10 MHz
Built into motherboard				
Parallel port	0	1	1	1
Serial port	0	2	2	2
Floppy disk controller	○	●	●	●
Hard disk controller	○	●	●	●
Video adapter	○	●	●	●
Mouse port	○	●	●	●
Coprocessor support	80387, Weitek	80387	80387SX	80287
Memory capacity				
Amount shipped with unit	1MB	2MB	1MB	1MB
Maximum installable on motherboard	16MB	6MB	13MB	1MB
Expandability				
8/16-bit expansion slots/number free	5/3	1/1	4/4	3/3
8-bit expansion slots/number free	2/2	0	0	0
32-bit expansion slots/number free	1[1]/0	2/2	0	0
Half-/full-height storage device bays [2]	1/2	3/0	4[3]/0	3/0
120MB or larger hard disk available from maker	●	●	○	○
Ergonomic design				
Front-panel reset button	○	○	○	○
Front-panel on/off switch	○	●	●	●
Front-panel keyboard socket	●	○	○	○
ROM-based setup software	○	○	○	○
Tilt-and-swivel monitor	●	●	●	●
Compact footprint	○	●	●	●
Complete documentation	●	●	●	●

[1] Dedicated for memory.
[2] The Deskpros can use either 5¼-inch or 3½-inch devices; the PS/2s, 3½-inch only.
[3] Two bays handle only third-height devices.

review. What we did get from IBM was a customer-ready Model 70-121, a 20-MHz entry that uses a memory-paging scheme similar to that in the 20-MHz Model 80 (see *The Hardware Shelf*, *PCW*, August 1988). Interestingly, benchmarks conducted by National Software Testing Laboratories (NSTL) revealed that the Deskpro 386/25 offers a greater speed advantage over the Model 70-121 than the 25 percent higher clock rate would suggest.

Amid all this thundering new technology, the Model 50 Z upgrade seems but a whisper. Nonetheless, many users who fell for the original Model 50's cute footprint, snazzy graphics, and Micro Channel mystique—but balked at the sole 20MB hard disk option—will welcome the new 30MB and 60MB flavors. In addition, the machine's zero-wait-state operation boosts the speed of memory-intensive tasks by as much as 25 percent.

Four machines from the industry's two biggest PC manufacturers seemed a perfect challenge for our new compatibility benchmark, the NSTL Crash Test (see last month's *Hardware Shelf* for a full description). Of the four PCs, two exhibited compatibility problems. On the Deskpro 386/25, *SideKick* wouldn't unload, and timing problems prevented *Crosstalk XVI* from completing its setup routine or dialing out; all these difficulties can be overcome by switching the clock rate to a slower speed. With the Model 50 Z, *Smartcom II* could not initialize or reset the modem, and the COM1 port did not respond to *Smartcom II* commands.

In addition to the compatibility tests, NSTL ran its usual five-part set of DOS speed benchmarks, along with a brand-new seven-part OS/2 performance suite (see "Is Your PC Ready for OS/2?" in this issue for the results of NSTL's OS/2 opus). Three of the OS/2 benchmarks were multitasking tests built on a best guess of how tomorrow's user will handle multiple applications. We think you'll find the results instructive, provocative, and particularly useful for making long-term PC buying decisions.

The Compaq 386S Versus the 80286 Hordes

In terms of price and functionality, the 16-MHz Deskpro 386S falls squarely between the 12-MHz Deskpro 286 and the 16-MHz Deskpro 386. Like an 80386, the Deskpro 386S's 80386SX CPU can run 80386-specific software such as *Windows/386* or *Paradox/386*. But like any AT compatible, the Deskpro 386S moves data along a 16-bit path rather than a 32-bit path and uses a 24-bit address path, limiting memory to 16MB.

CPU aside, the diminutive Deskpro 386S is unlike any other PC that Compaq has produced. Know thy enemy, the saying goes; Micro Channel excepted, the Deskpro 386S's design is very similar to that of the PS/2 Model 50. The machines' footprints are nearly identical. And although you can't pull the *whole* 386S apart without tools like you can a Model 50, the cover is held on by thumbscrews, just as on a PS/2 unit.

More important, as with the Model 50, the hard/floppy disk controller is built into the motherboard. A VGA, a mouse port, and one parallel and one serial port are also integrated, with corresponding connectors in exactly the same locations on the Model 50. Even the front-mounted power switch is in the same place. Now *that's* learning from the competition.

EXECUTIVE SUMMARY

PS/2 Model 70-121

20-MHz 80386 computer

Essentially a Model 80-111 in a Model 50 chassis, the Model 70's performance is not outstanding for its class. A fairly low ceiling on memory and mass storage expansion makes the unit a workstation rather than a server-class machine.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity			●	
Expandability			●	
Ergonomic design				●
Performance				●
Overall value				●

Compaq claims that unless you run one of the handful of programs that use 32-bit instructions, the Deskpro 386S—with its half-width data path—should match the performance of comparable 80386 machines. NSTL's speed tests reveal that when compared with the original 16-MHz Deskpro 386, the Deskpro 386S actually runs about 91 percent as fast as its ancestor in both the DOS and OS/2 benchmarks.

EXECUTIVE SUMMARY

PS/2 Model 50 Z

10-MHz 80286 computer

At last, IBM expands the Model 50's mass storage beyond 20MB! In addition to offering new 30MB (Model 50-031) and 60MB (Model 50-061) drive options, the 50 Z pushes memory access to 10 MHz, zero wait states—a 25 percent increase in memory access speed.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity			●	
Expandability			●	
Ergonomic design				●
Performance			●	
Overall value			●	

Clearly, the main advantage of the Deskpro 386S (or any 80386SX machine) over an 80386 PC is lower price. In addition to meshing with a less costly architecture, the 80386SX chip is about 30 percent cheaper than an 80386 chip, and these savings are clearly reflected in Compaq's pricing structure. A Deskpro 386S with 1MB of RAM, a 1.2MB floppy drive, a 40MB hard disk, a VGA monitor, and a 101-key keyboard costs $5898; an identically configured 16-MHz Deskpro 386 goes for $1500 more.

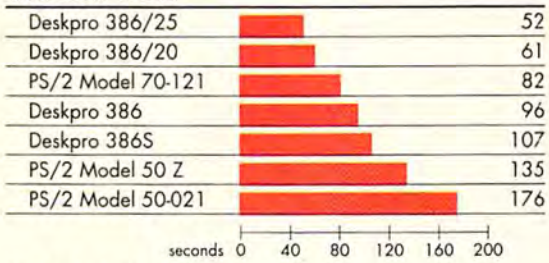
But what about comparable 80286 machines? Both types of computers offer a 16-bit data path, and Compaq's own 12-MHz Deskpro 286 is $1000 cheaper than the 386S. More to the point, Dell's System 220, which

NSTL TEST REPORT

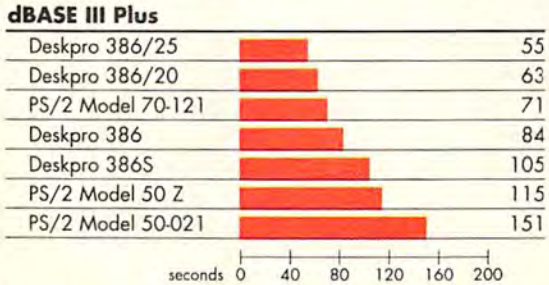
Compaq and IBM Systems

The four latest, greatest PCs tested—the Deskpro 386/25, the Deskpro 386S, the PS/2 Model 50 Z, and the PS/2 Model 70-121—represent four distinct classes of machines.

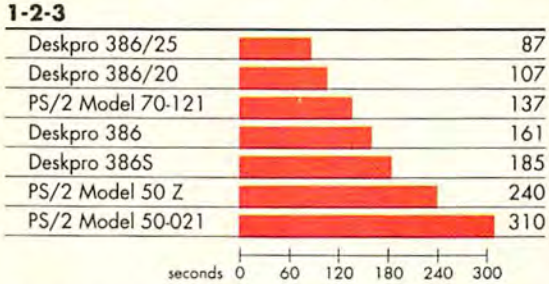
Microsoft Word



dBASE III Plus



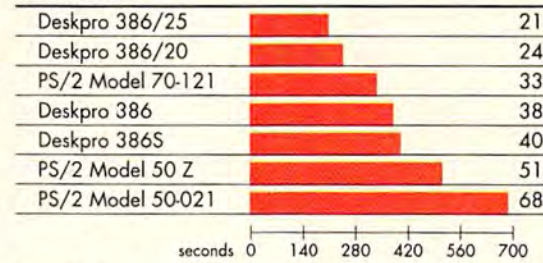
1-2-3



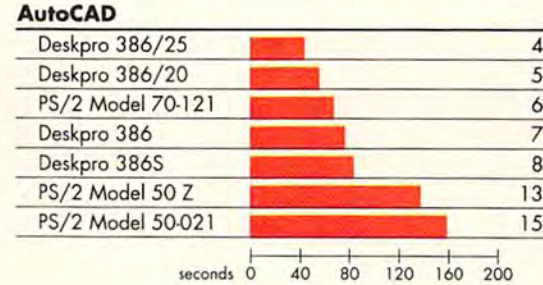
All machines were tested with a coprocessor and a disk cache consisting of 256K of extended memory, except for the *1-2-3* benchmark. The Compaq Deskpro 386/25 was tested with a 300MB hard disk and 3MB of RAM. The Deskpro 386/20 was tested with a 135MB hard disk and 5MB of RAM. The IBM PS/2 Model 70-121 was tested with a 120MB hard disk and 3MB of RAM. The Deskpro 386 was tested with a 43MB hard disk and 4MB of RAM. The Deskpro 386S was tested with a 40MB hard disk and 1MB of RAM. The PS/2 Model 50 Z was tested with a 30MB hard disk and 1MB of RAM. The PS/2 Model 50 was tested with a 20MB hard disk and 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.

Microsoft C



AutoCAD



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.

uses a 20-MHz 80286, outperforms even the 16-MHz Deskpro 386 and beats the 386S's price by a cool $2600 (see *The Hardware Shelf* in this issue for a review of the System 220). Aside from their ability to run 80386-specific software, will 80386SX machines offer any advantage over 80286 PCs with the same clock rate?

The answer is a heavily qualified yes. Many experts believe that 80386SX chips are more reliable than 80286s pushed to 16 MHz and over; others contend that, clock rates being equal, 80386SXs have a slight performance edge when running today's 16-bit OS/2. Unfortunately, not enough testing has been done to confirm either hypothesis decisively.

When you get down to it, the real benefit of the 80386SX is, yes, 80386-specific software. A 32-bit version of OS/2 will probably surface by 1990. Even if OS/2 leaves you cold, multitasking contenders like *Windows/386* and *Desqview/386* provide viable alternatives bound to grow more useful and popular.

In the unlikely event that you plan on running DOS through the end of the century, however, the PS/2 Model 50 Z might be a better bet. It's only 25 percent slower than the 386S but includes a video setup and, like the Deskpro 286, is about $1000 cheaper. And thanks to no-wait-state operation, the 10-MHz Model 50 Z enjoys about a 10 percent performance edge over the comparably priced 12-MHz Deskpro.

Deskpros 286 and 386S trounce all desktop PS/2s in one area, however: expandability. Like any AT clone, the Deskpro 286 offers two 8-bit and six 8/16-bit slots; with a floppy/hard drive controller and a video board, that leaves a capacious six slots open.

But the Deskpro 286 is a passé desk hog. The real marvel is the Model 50–size Deskpro 386S, which leaves four 8/16-bit AT-compatible slots free for the taking, as opposed to the Model 50 Z's three 16-bit Micro Channel slots. In addition to having space for one 3½-inch hard disk, the Deskpro 386S can accommodate one half-height and two third-height 5¼-inch devices, all of which are externally accessible. Contrast this with the Model 50 Z's support for three half-height 3½-inch devices total, only two of which you can get to from the outside.

If you're concerned about the future and don't want to shell out for a full-fledged 80386 PC, compatibility with upcoming 32-bit software provides a strong argument for buying a Deskpro 386S. The machine's paradoxical combination of expandability and small footprint is also a strong draw.

On the other hand, if you think an 80286 PC can fill your needs and you don't anticipate much expansion, the Model 50 Z is a good choice as a DOS machine. Its price is fairly competitive, its performance is first-rate for a 10-MHz unit, and IBM's ability to manufacture its own RAM chips should ensure that you won't be caught short. However, keep in mind that when the future

EXECUTIVE SUMMARY

Deskpro 386/25

25-MHz 80386 computer

One blazing PC, the Deskpro 386/25 uses the same high-performance caching architecture as the 386/20. An AT-class array of expansion slots, room for plenty of RAM, and high-capacity ESDI drive options make this machine an excellent choice as a server.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability				●
Ergonomic design			●	
Performance				●
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.

arrives, you may not be able to use your elegant little Model 50 Z for anything more than a network workstation.

The Clock Strikes Again

After introducing the Deskpro 386/25, Compaq loudly proclaimed that it was ahead in the performance race once again. That braggadocio may have been premature, because according to NSTL's preliminary benchmarks, IBM's 25-MHz Model 70-A21 appears to have a slight edge (see the preview of IBM's new systems in *PCW*'s August issue).

Whatever the ultimate outcome of the speed trials, one thing is certain: In the Model 70-A21, Compaq's choice of the 82385 cache controller has gotten an enthusiastic second from IBM. Ironically, the wisdom of this endorsement is illustrated by the 20-MHz Model 70-121.

At 25 MHz, some kind of cache memory scheme is a necessity, unless you want to spend an impractical amount of money for very fast system RAM. At 20 MHz, it's a judgment call. Rather than opt for an 82385-based memory-cache architecture as Compaq did with the Deskpro 386/20, IBM chose a page-memory scheme similar to that of the 20-MHz Model 80.

The upshot is that the Model 70-121 is up to 36 percent slower in the DOS tests and as much as 43 percent slower in the OS/2 tests than the Deskpro 386/20.

IBM may not have created a speed demon, but it has done an expert job of shoehorning an 80386 into a casing identical to that of the Model 50. Although the Model 70-121 offers only three expansion slots, it holds up to 6MB of RAM on the motherboard and, like the Model 50, integrates a hard/floppy disk controller, a VGA, a mouse port, and one parallel and one serial port into the motherboard.

Like all Micro Channel PS/2s, the Model 70 has a 16-bit slot with a special video extension for augmenting the built-in VGA with a higher resolution video board. The other two slots are 32 bit and can be used for either memory or yet-to-be-released 32-bit I/O boards. Storage device support is identical to that of the Model 50 Z.

Compared with the Model 70 or Compaq's own 386S, the Deskpro 386/25's classic Compaq cabinet is clunky and unattractive—but roomy. The motherboard offers five 8/16-bit AT-compatible and two 8-bit PC XT–compatible slots; with a VGA board and the floppy/hard disk controller, two of the 8/16-bit slots are unavailable. You can access both full-height device bays from the outside; either one can also accommodate two half-height drives.

In addition to a faster CPU and greater expandability than the Model 70, the 386/25 offers two more advantages: a larger capacity for 32-bit RAM and sockets for both the 25-MHz 80387 and the higher performance 25-MHz Weitek math coprocessors. In a special 32-bit slot, you can install a board that holds up to 16MB of 32-bit RAM. With the cache as an intermediary, this RAM can be accessed at the full speed of the CPU.

Beyond the Model 70-121's 6MB motherboard limit, you could conceivably add 20MB

EXECUTIVE SUMMARY

Deskpro 386S

16-MHz 80386SX computer

This machine represents a whole new class of PC. Using a scaled-down 80386 (called the 80386SX, or P9) in a 16-bit architecture, the 386S offers a PS/2-like shell and a price between that of the 12-MHz Deskpro 286 and the 16-MHz 386. The 386S's main advantage over 80286 PCs is its ability to run 80386-specific software.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity			●	
Expandability			●	
Ergonomic design				●
Performance			●	
Overall value			●	

of 32-bit RAM via expansion boards, but that memory would be accessed at the Micro Channel's 10-MHz expansion bus speed, not at the CPU's 20-MHz clip. Had the 70-121 used memory caching (which caches data from the expansion bus as well as the memory bus), RAM over 6MB would have also benefited from it.

The Model 70-121 and the 386/25 occupy different rungs on the price/performance ladder. With 2MB of RAM, a 1.2MB floppy drive, a 110MB hard disk, VGA graphics, and a 101-key keyboard, the 386/25 costs $11,952; the Model 70-121 (with a 120MB instead of a 110MB hard disk and a 1.44MB floppy drive) goes for $7995. The appropriate comparison is really with the Model 70-A21, which goes for $11,295 in the same configuration.

When the Model 70-A21 arrives, we'll see who's really the baddest on the block. (In the meantime, it's clear that Compaq's 82385-based 386/20 also bests the Model 70-121.) The Micro Channel may reveal hidden superiorities, but at this writing, it looks like memory-cached PCs with 20-MHz or faster 80386s are the preferred computing platforms for the future. ●

Eric Knorr is a senior editor for PC World.

WHERE TO BUY

Deskpro 386S
Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
800/231-0900,
713/370-0412 (customer support)
List price: Model 1 with 1MB RAM, 1.2MB floppy drive, built-in VGA, one parallel and two serial ports, 101-key keyboard $3799; Model 20 with 20MB hard disk $4499; Model 40 with 40MB hard disk $5199
Accessories: 1MB memory module $799, 4MB memory module $2999, 1MB memory expansion board $799, 4MB memory expansion board $2999; color VGA monitor $699, monochrome VGA monitor $255; 360K floppy drive $225, 1.2MB floppy drive $275, 1.44MB floppy drive $245; 20MB hard disk $999, 40MB hard disk $1549, 110MB hard disk $3499; 40MB tape backup $799, 135MB tape backup $1999; 16-MHz 80387SX math coprocessor $799; I/O board $149; MS-DOS 3.30 and BASIC 3.30 $120, MS-OS/2 1.00 $325
Warranty: one year
Extended warranty: available through dealers
Technical support: customer support line, no toll-free number, M–F 7–7
Other support services: none

Deskpro 386/25
Compaq Computer Corp.
List price: Model 110 with 1MB RAM, 1.2MB floppy drive, 110MB ESDI hard disk, one parallel and one serial port, 101-key keyboard $10,299; Model 300 with 300MB ESDI hard disk $13,299
Accessories: 1MB memory module $799, 4MB memory module $2999, 4MB system memory board $2999; color VGA monitor $699, monochrome VGA monitor $255; VGA board $599; 360K floppy drive $225, 1.2MB floppy drive $275, 1.44MB floppy drive $245; 110MB ESDI hard disk $3499, 300MB ESDI hard disk $6499; 40MB tape backup $799, 135MB tape backup $1999; 25-MHz 80387 math coprocessor $1899, 25-MHz Weitek 3167 math coprocessor $2599; I/O board $149; MS-DOS 3.30 and BASIC 3.30 $120, MS-OS/2 1.00 $325
Warranty: one year
Extended warranty: available through dealers
Technical support: customer support line, no toll-free number, M–F 7–7
Other support services: none

PS/2 Model 70-121
IBM
900 King St.
Rye Brook, NY 10573
800/447-4700
List price: with 2MB RAM, 1.44MB floppy drive, 120MB hard disk, built-in VGA, one parallel and two serial ports, 101-key keyboard $7995
Accessories: 2MB-to-8MB memory expansion option $1695; 1MB 85ns memory module kit $695, 2MB 85ns memory module kit $1395; IBM C/2 1.10 C compiler $560 (additional licenses $475 each)
Warranty: one year
Extended warranty: available through dealers

PS/2 Model 50 Z
IBM
List price: Model 50-031 with 1MB RAM, 1.44MB floppy drive, 30MB hard disk, built-in VGA, one parallel and two serial ports, 101-key keyboard $3995; Model 50-061 with 1MB RAM, 1.44MB floppy drive, 60MB hard disk, built-in VGA, one parallel and two serial ports, 101-key keyboard $4595
Accessories: unpopulated 8MB expanded memory adapter $600; 512K 120ns memory module kit $215, 2MB 120ns memory module kit $995, 2MB 85ns memory module kit $1395; IBM C/2 1.10 C compiler $560 (additional licenses $475 each)
Warranty: one year
Extended warranty: available through dealers
Technical support: available through dealers
Other support services: none

For more information, see Products Featured in This Issue.

Remote Assistance

Remote communications packages let you dial up a distant PC to access data, swap files, and run applications.

They're popular among MIS managers, tech support specialists, and anyone who needs to access the office PC from home or while on the road.

Judy Getts

Distance may lend enchantment, but it sure complicates computer projects. Consider these scenarios: An out-of-town client's software goes haywire the minute you get back to your office. The files in your company's Tampa branch need to be updated every night, but the information is generated in Dayton. Or maybe you'd just like to be able to call up your office PC on the weekend and fetch files or run a program from your home.

Thanks to a group of specialized communications packages, all these challenges can be met. Lumped under the *remote communications* rubric, *Carbon Copy Plus*, *Close-Up*, *Co/Session*, and *Co-Compute* share many features with general-purpose communications programs. But their special talent is accessing a remote PC's entire system, including DOS, and controlling it from a distance by modem. The host PC can run the remote PC's applications, fetch and send files, and even switch to DOS for housekeeping. If you've ever wanted to update information on a group of PCs in another city or troubleshoot a data base across the country, these long-distance assistants can be invaluable.

Remote Control

Most remote packages consist of two separate modules—a control program for the PC that runs the show, and a smaller, memory-resident complement that pops up over whatever application is running on the remote system. Video setups and processors needn't match, but the same brand of remote software must be running at each end.

Once connected by modem, the two PCs work in tandem: The screens at each end display the same images, the keyboards operate as one, and users at either end can work with the application at the same time. The main difference in running a program from afar is that applications feel molasses-slow. In some instances when you type a command, the remote package has to transmit a new screen image, and the delay can be quite noticeable.

Some of the programs use data compression to speed transmission of screen images, and some offer automatic error-correction of screen images and keystrokes. Some can take snapshots of the remote PC's screen, and log and replay a series of screens for later review. System security is usually limited to an access password or a requirement that

the remote PC call the host PC back before allowing access. You can't effectively cordon off selected subdirectories or files, much less maintain caller logs that track access.

Tested with *dBASE III Plus*, *Reflex*, *1-2-3*, *Microsoft Word*, *WordPerfect*, *VP-Planner*, *Xtree*, and *WordStar*, most of the packages ran well. Because the large amount of screen data involved in high-resolution graphics slows communications, three out of the four packages don't support EGA, so applications must be installed in CGA mode. (*Carbon Copy* is the sole EGA supporter.) Finally, the programs often clash with RAM-resident utilities; to be on the safe side, you should unload any TSRs before attempting a remote connection.

To be most useful for support or teaching, a good communications package puts the advisor in the driver's seat. If a remote user is rattling away at the keyboard and you need to take control, for example, you can usually blank the remote screen or freeze the remote keyboard. This may seem draconian, but anyone who regularly troubleshoots applications or trains less experienced users will find these measures necessary to prevent novices from jumping in at the wrong time. To help orchestrate the proceedings, users can exchange messages in a pop-up status screen/chat window (which freezes the application, except in *Co-Compute*) or switch their call from data to voice.

Close-Up 3.0A

Technical Support Favorite

Well-chosen features, a unique script language, and a polished interface have made *Close-Up* increasingly popular, especially among tech-support specialists. Norton-

TIM LEWIS

Lambert has signed long-term contracts for customer support with a number of major software vendors, including IBM, Borland, and Ashton-Tate.

In *Close-Up*, a 128K Support module runs on the advisor PC, while a 50K memory-resident Customer module runs on the remote PC. Either computer can call the other, and you can switch between voice and data with a single menu command. Optional password and auto-callback features control access to the remote PC, and the customer decides whether to allow the advisor to send files, fetch files, or do both. If detailed analysis is called for in troubleshooting a sputtering application, *Close-Up* can take screen snapshots or record the session for later playback.

Close-Up is the only package that includes a script language for automating remote sessions. The language is easy to learn, yet so-

FEATURES EVALUATION

Remote Communications Programs Compared

Carbon Copy Plus may have an edge in video support, but ease of use and a unique script language make Close-Up the top choice.

● Yes
○ No
◒ Deficient

	Carbon Copy Plus 5.0	Close-Up 3.0a	Co-Compute 2.1	Co/Session 3.0
Remote control features				
Accesses remote system's DOS	●	●	●	●
Disables remote PC's keyboard	●	●	●	●
Blanks remote PC's screen	●	●	○	○
Remote printing	●	●	○	●
Script language for automating remote sessions	○	●	○	○
Video modes supported				
HGC	●	○	○	○
CGA	●	●	●	●
EGA	●	○	◒[1]	○
MCGA	●	○	○	○
VGA	●	○	○	○
Terminal emulation	●	●	○	◒[2]
Data security/integrity				
Password protection	●	●	n/a	●
Automatic callback	●	●	n/a	●
Sets file-transfer access rights	○	●	○	●
Error-corrected keystrokes	●	●	●	○
Error-corrected screens	●	●	○	○
Error-corrected file transfers	●	●	●	●
Collaboration features				
Voice/data switching	●	●	●	●
Chat box	●	●	●	●
Real-time keystroke display	○	○	●	○
Captures remote screen	●	●	○	●
Records entire session	●	●	○	●
Logs time and activity	●	●	○	◒[3]

[1] In keystroke-sharing mode, not in terminal mode.
[2] TTY terminal only.
[3] Logs time only.

phisticated enough to rouse the program in the middle of the night to transfer and modify files on a whole series of different PCs. Finally, *Close-Up* emulates a host of terminals—including TTY, VT 100, and IBM 3227. You can access on-line services and other non-*Close-Up* systems, even dial up the office PC to access the company's minicomputer or mainframe. You can also transfer files in the background while running an application.

Close-Up worked seamlessly with all the test applications, including *Microsoft Word* in graphics mode. The package's screen painting and terminal features were none too speedy, but file transfers proved fast and reliable. Easy-to-use *Close-Up* is the top choice among the packages reviewed. Its unique script language makes it particularly useful for late-night, multiple remote sessions.

EXECUTIVE SUMMARY

Close-Up 3.0A

Remote communications program

Close-Up is a polished product with a capable user interface and a unique script language to automate remote sessions. The program is easy to learn and use and contains an abundance of useful features.

	POOR	FAIR	GOOD	EXCELLENT
Remote control features				●
Data security and integrity			●	
Collaboration features			●	
Overall value				●

Carbon Copy Plus 5.0

Fast Graphics

If it weren't for *Close-Up*, *Carbon Copy Plus* would dominate the remote market. One of the first remote package released, *Carbon Copy Plus* now boasts EGA support, fast screen updates, expanded terminal emulation, and background file transfers. At $195 per module, however, *Carbon Copy Plus* is the most expensive package reviewed. Moreover, its interface isn't well organized, and its file transfer utility and documentation could stand improvement.

Carbon Copy Plus's 176K advisor and 62K remote modules are included in a single pack-

age but are copy protected by serial number, so you must buy a separate copy for each PC. File transfers are performed with a module called CCDOS, which lets users shuttle files between PCs with a COPY command and DOS-like syntax. Unfortunately, CCDOS proved clumsy to use and a tad erratic. It sometimes appeared to transfer files between PCs when in fact nothing was deposited on the target PC. When this happened, the program locked up and both PCs had to reboot.

Carbon Copy Plus ran all the programs tested except *Microsoft Word* in graphics mode and handled *1-2-3* graphs and charts impressively fast in EGA mode. The package's screen updates are remarkably quick—some 30 percent faster than *Close-Up*'s. Its facility with graphics and unrivaled speed make *Carbon Copy Plus* a solid choice, especially for support of applications in EGA mode.

EXECUTIVE SUMMARY

Carbon Copy Plus 5.0

Remote communications program

A market leader among support packages, Carbon Copy Plus deserves plaudits for its EGA support and speedy screen updates. But the program proved unreliable in transferring files.

	POOR	FAIR	GOOD	EXCELLENT	
Remote control features				●	
Data security and integrity			●		
Collaboration features				●	
Overall value				●	

Co/Session 3.0

Awkward Design

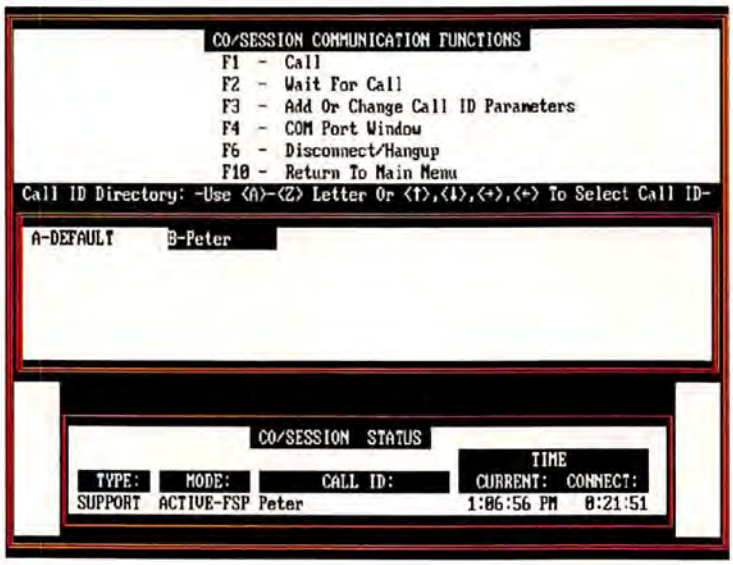
The newest entry in the remote computing field, *Co/Session* has most of the features found in *Carbon Copy Plus* and *Close-Up* but implements them poorly. The hardest thing about using *Co/Session* is dealing with its labyrinth of menus. You have to fight through a jungle of menus to make a connection, then hack through an even denser menu thicket to transfer files to and from the remote PC.

With Close-Up, the advisor can display either Support or Customer pulldown menus while on line with a customer's PC. Here, the Support menu is popped up over dBASE III Plus at the customer's end.

Like *Carbon Copy* and *Close-Up*, *Co/Session* offers a terminal mode, but it's a pale shadow of a TTY. When logging on to a remote system, *Co/Session* missed the first few lines of the connection screen. When capturing text, it omitted linefeeds unless instructed to include them, and it couldn't upload text in ASCII mode. And after you thrash through a series of menus to upload files using error checking, you return to find the terminal screen unexpectedly blank.

Some *Co/Session* features seem pointless. For example, when you switch from voice to data, the program demands a password. And a security feature designed to restrict file access by drive and directory works only while the remote user is manipulating files with *Co/Session*. Nothing prevents the user from skipping into DOS and accessing off-limits files.

Other design omissions are at least as annoying. It's too easy to accidentally hang up by pressing the wrong function key, and there is no prompt to confirm your intention to terminate. A billing log records the time, date, and elapsed time of a support call but not the operations performed. And when *Co/Session* was tested on a Tandy 1000, the keyboard's cursor pad wouldn't work.



Co/Session's Communications Function screen is hardly a model of clarity. Call profiles—containing settings, phone number, password, and so on—are listed in the center of the screen.

Co/Session worked well with most applications tested. Its screen painting was faster than average, though it took two slow sweeps of the screen to paint both a *1-2-3* bar graph and individual screens in *Reflex*. While in *Reflex*, *Co/Session* smeared part of a screen, then froze up both machines.

Co/Session has some good points. It's easy to skip between the remote PC and applications on your own PC, and using *Co/Session* can be fast once you get used to its quirks. But careless design makes the package an iffy choice.

Co-Compute 2.1

Collaborative Companion

If the other packages reviewed foster something of a master/slave arrangement, Harmony Software's *Co-Compute* is much more egalitarian. It's both a remote access program and a person-to-person conferencing tool. Unfortunately, a Spartan interface and lean features make using it relatively awkward.

Unlike the other packages, *Co-Compute* requires that two people establish a phone connection by voice and then switch over to data. In terminal/host mode, *Co-Compute* then runs much like its competitors. But in what Harmony calls Symmetric, or keystroke-sharing, mode, users run identical applications on each PC simultaneously. Harmony claims that running two applications on two PCs in parallel, rather than running a single application by remote control, means graphics-based programs like *Harvard Business Graphics* and *Ventura Publisher* can run at normal speed.

Co-Compute sessions all begin with a voice phone call, but conversation soon recedes to a tiny on-screen box that serves both as *Co-Compute*'s menu and chat box. You can expand the one-line box to the width of the screen, but sending notes still feels as cramped as peering through a keyhole. On the other hand, *Co-Compute*'s unique real-time keystroke display always lets you know exactly what your partner is doing. When the remote user presses <Cursor Up>, for example, an up arrow appears in the box on your screen. And unlike the other packages, *Co-Compute* lets you read and write notes on screen without suspending the application—a boon for backseat spreadsheet drivers.

Co-Compute could be an ingenious teaching device, but it's limited for remote communications. The program can't take screen snapshots, doesn't offer error correction for screen transmissions, and lacks even a simple hang-up command. At press time, Harmony was developing an unattended auto-answer feature, but the current version of *Co-Compute* doesn't let you call up your office PC from the road.

EXECUTIVE SUMMARY

Co/Session 3.0

Remote communications program

Co/Session suffers from flaky design and inadequate documentation. It's fast but weighted down by complex menus and features that never quite get off the ground.

	POOR	FAIR	GOOD	EXCELLENT
Remote control features			●	
Data security and integrity			●	
Collaboration features			●	
Overall value			●	

A Few Words of Advice

In the best of all worlds, a remote communications package would offer advisor/remote and collaborative modes, control over any program in any graphics mode, error-checked file transfers, and tamper-proof security features. While it isn't perfect, *Close-Up* comes closest to providing all these functions. *Carbon Copy* offers spiffy graphics support and exemplary speed, but it suffers from file transfer problems and quirky design. With its muddled menus and pointless features, *Co/Session* still has a ways to go. While *Co-Compute*'s collaborative orientation and keystroke viewing mode are appealing, the program's limitations make it a poor choice for general remote support.

Remote communications software is still evolving, and vendors seem to bring out new versions almost weekly. At press time, for example, *Crosstalk* had just released its $195 *Remote2* package—too late for review. And users will need patience and a willingness to fiddle to get a session running smoothly. If your frantic client (or collaborator) works just down the road, spend your money on gas. But if your long-distance phone bill is an inch thick or you constantly fly around the country putting out fires, these remote alternatives can pay off. ●

Judy Getts is a contributing editor for PC World.

EXECUTIVE SUMMARY

Co-Compute 2.1

Remote communications program

Co-Compute provides both terminal/host and synchronized modes, handy for on-line collaboration and teaching. However, the user interface and manual are confusing, and program features are limited.

	POOR	FAIR	GOOD	EXCELLENT
Remote control features		●		
Data security and integrity		●		
Collaboration features			●	
Overall value			●	

WHERE TO BUY

Carbon Copy Plus 5.0
Meridian Technology
7 Corporate Park #100
Irvine, CA 92714
714/261-1199
List price: $195 per module
Requirements: remote module 176K, host module 62K; DOS 2.00 or later version
Copy protected (by serial number)
Technical support: unlimited, no toll-free number, M–F 7–6
Other support services: none

Close-Up 3.0A
Norton-Lambert Corp.
P.O. Box 4085
Santa Barbara, CA 93140
805/964-6767
List price: Support module $245, Customer module $195
Requirements: Support module 128K, Customer module 50K; DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 7–5
Other support: user BBS, occasional newsletter

Co-Compute 2.1
Harmony Technology Associates
3700 S. Sepulveda Blvd. #332
West Los Angeles, CA 90034
800/622-7600, 213/398-0878
List price: $123.75 per module
Requirements: 55K, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–6
Other support services: money-back guarantee, free quarterly newsletter, free 30-minute on-line demo, on-line training for dealers and major customers

Co/Session 3.0
Triton Technologies
146 Maple Ave.
Red Bank, NJ 07701
201/741-3232
List price: support $175, application $125, twin pack with support and application $249
Requirements: support module 128K, application module 100K; DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–5
Other support services: money-back guarantee

For more information, see Products Featured in This Issue.

Fax Times Seven

Low-priced PC fax boards put fax convenience at your fingertips—with features you can't get on a stand-alone fax machine for love or money.

TJ Byers

If the line of people waiting to use your office fax machine looks like it belongs in Disneyland, it's time to consider installing a fax board in your PC. Fax boards are high-speed, data-compressing modems that support the internationally recognized Group III fax standard. This makes them compatible with the office fax machine (and they cost significantly less to buy). The main advantage with PC-based fax is that you can send disk-based files to fax machines. In addition, some fax boards offer a modest complement of standard modem features.

There are disadvantages, of course. A stand-alone fax machine lets you feed in hard copy, then converts it to fax format and sends it; the fax machine at the other end rolls out a hard copy. With PC-based fax, you'll need a printer to get hard copies of incoming faxes. Moreover, you'll need to spend $1000 and up for a scanner to *transmit* hard copy—and not every fax board works with a scanner.

Perhaps the biggest drawback with PC fax is that you can't convert incoming fax files to ASCII text—at least without optical character recognition (OCR) software, which seldom produces an error-free file. On the other hand, graphics users and desktop publishers will be happy to learn that many fax boards can convert fax files into graphics formats usable by such applications as *PC Paintbrush*, *Dr. Halo*, and *AutoCAD*.

Not all boards handle all files. Some convert only from ASCII files to outgoing fax; others convert formatted files produced by supported word processors and graphics packages. In all, there are 14 incoming and outgoing file conversions common to PC fax boards.

To help you choose the right PC fax board for your needs, *PC World* and National Software Testing Laboratories (NSTL) took a hard look at seven popular boards, ranging in price from $395 to $1195. The roundup includes Complete PC's The Complete Fax, Quadram's JT Fax, GammaLink's GammaFax, Panasonic's Fax Partner, Microtek's MFAX96, Ricoh's ImageCard, and E.I.T.'s pc-Fax.

All seven fax boards can schedule unattended fax sessions, broadcast identical fax messages to multiple addressees, and queue fax files until a remote station phones in (which is called *polling*). They also all maintain an on-line phone book and support a

zoom function. Five of the seven systems accept input from a scanner, and five provide on-screen help.

The software packages accompanying all seven boards support standard CGA and Hercules Graphics Card display modes, with varied support for EGA and VGA. Unfortunately, because the fax page must be reduced to fit the screen, most fax documents are hard to read on standard monitors unless you use the zoom mode. For this reason, some PC fax software supports high-resolution, full-page displays.

All seven boards deliver background operation, but each one does it slightly differently. Three of the boards take over the PC when an incoming fax is detected and leave you staring at a frozen screen or banging on a locked keyboard. The other four boards let you continue using your PC with only the minor annoyance of delayed keystrokes.

Worse yet, these boards all share a dreadful trait: If you happen to be saving a file when an incoming fax triggers the board to take over your PC, you will suffer data loss or file corruption and possibly both. This means that even when a board permits you to keep working while it receives in the background, you may not save a file without the risk of data loss. This problem has plagued PC fax from day one.

How do the boards compare in terms of performance? NSTL tests show no significant difference in the time they take to send or receive fax files, aside from the predictable speed difference between 9600- and 4800-bps boards. There is, however, a sizable difference in the times the boards take to convert ASCII files into fax files; the MFAX96 came in first, while the slowest board was The Complete Fax.

The Complete Fax

The Complete Fax is a 4800-bps card with a low $499 price tag, but it's not low on features. In addition to ASCII file conversion, The Complete Fax can convert Epson printer files; this ability allows you to use printer control characters in your word processing program to create bold, compressed, or underlined text in documents for fax trans-

ANTHONY RUSSO

FEATURES EVALUATION

Seven PC Fax Boards

Two clear winners—JT Fax and GammaFax—emerge from the pack, mainly on the basis of their broad file-conversion capabilities and scanner support.

Standard features	The Complete Fax	Quadram JT Fax	GammaFax	Panasonic Fax Partner	Microtek MFAX96	Ricoh ImageCard	E.I.T. PC-Fax
Price	$499	$395	$995	$999	$995	$1175	$1195
Bits per second	4800	4800	9600[1]	9600	9600	9600	9600
Slot size required	¼	½	½	¼	full	full	full
Requires TSR installation	●	●	○	●	○	○	●
RAM required as TSR	48K	200K	n/a	20K	n/a	n/a	200K
Installation and support							
Installation software	●	●	●	●	○	○	●
Complete documentation	●	●	●	●	●	●	●
Mouse support	●	●	○	●	○	○	●
Scanner support							
Canon IX-12	○	●	●	●	○	○	○
HP ScanJet	○	●	●	●	○	○	○
Princeton LS-300A	○	●	○	○	○	○	○
Microtek MS-300	○	○	○	●	●	○	○
Chinon N-205	○	●	○	○	○	○	○
E.I.T. PS-2000	○	○	○	○	○	○	●
The Complete Hand Scanner	●	○	○	○	○	○	○
Monitor support							
CGA	●	●	●	●	●	●	●
EGA	●	○	●	○	●	●	●
VGA	○	○	●	○	○	○	○
HGC	●	●	●	●	●	●	●
Tecmar	○	○	○	●	●	○	●
Genius VHR	○	○	●	○	○	●	●
Wyse-700	○	○	●	○	●	○	○

File conversion outgoing	The Complete Fax	Quadram JT Fax	GammaFax	Panasonic Fax Partner	Microtek MFAX96	Ricoh ImageCard	E.I.T. PC-Fax
ASCII	●	●	●	●	●	●	●
Epson	●	●	○	○	○	○	●
80-column	●	●	●	●	●	●	●
132-column	○	●	○	●	○	●	○
WordStar	○	●	●	○	●	●	●
Word	○	○	○	○	○	○	●
PC Paintbrush	●	●	●	●	●[2]	●	●
Dr. Halo	●	○	●	○	○	●	○
AutoCAD	○	○	●[2]	○	●[2]	○	○
Windows	●	○	●	○	○	○	○
File conversion incoming							
OCR	○	○	●[2]	○	○	○	●
PC Paintbrush	○	●	●	●	●[2]	○	●
Dr. Halo	○	○	●	○	○	○	○
AutoCAD	○	○	●[2]	○	○	○	○
File transfer							
On-screen help	●	●	●	●	○	○	●
Background mode							
Sends	●	○	●	●	○	●	○
Receives	●	●	●	●	●	●	●
Permits PC to be used	●	○	●	●	○	●	○
On-the-fly text-file conversion	○	●	○	●	○	○	●
Modem capability	●	○	●	○	○	○	●
Speaker	○	●	●	●	●	○	○

● Yes ○ No

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

mission. Unfortunately, The Complete Fax's text-file conversion process is painfully slow.

In the graphics department, The Complete Fax converts files made by *PC Paintbrush*, *Dr. Halo*, and virtually any graphics program that runs under *Microsoft Windows* into fax files. However, The Complete Fax is the only card reviewed that can't return an incoming fax file to one of the graphics formats supported for transmission.

The Complete Fax's software is RAM resident but requires only 48K of memory. Its background mode permits you to keep on working while it sends and receives.

EXECUTIVE SUMMARY

The Complete Fax

PC fax board

The Complete Fax is an inexpensive 4800-bps fax board that proves you sometimes get what you pay for, as evidenced by its primitive phone book and slow file conversion. But if you can accept its limitations, it is a decent, low-cost product.

	POOR	FAIR	GOOD	EXCELLENT
Standard features				●
Setup and installation			●	
File conversion			●	
File transfer				●
Performance		●		
Overall value			●	

A nice added touch is a software utility that turns The Complete Fax into a conventional 9600-bps modem—but only if there's another Complete FAX board at the other end.

The only scanner supported by The Complete Fax is The Complete Hand Scanner from, you guessed it, The Complete PC. However, as it scans only 3 inches per pass, it's limited to logos, memos, and signatures.

For an inexpensive fax board, The Complete Fax is certainly usable—especially given its unobtrusive background operation. Nonetheless, the inconvenience of 4800-bps operation, slow file conversion, and an inferior phone book make it one of the least attractive entries in the roundup.

JT Fax

Quadram's JT Fax is another 4800-bps board, and at $395 it's very reasonably priced. What's more, it comes packed with features that businesspeople need.

Its text-file conversion capabilities include ASCII, *WordStar*, and Epson printer files. Unlike most fax boards, which handle text conversions by translating the original file to another disk file in fax format, JT Fax converts text on the fly; it doesn't create a disk file, which is why this board has no NSTL file-conversion speed rating.

PC Paintbrush is the only graphics application JT Fax supports, but it works in both directions: Incoming faxes can be converted to *PC Paintbrush* format for viewing and editing. Quadram also provides a screen capture utility, which is one way to convert images from unsupported graphics applications to fax files. The JT Fax works with no fewer than four full-page scanners.

JT Fax's software is RAM resident and requires a hefty 200K of memory, but it can be called instantly—from any application—simply by pressing a hot key. It receives fax messages in the background but won't send them, and its background mode is far from friendly. As soon as it detects an incoming fax, it seizes control, halting the current application and locking the keyboard; only when the incoming fax file has been saved to disk do you get your machine back.

JT Fax is the only board in the roundup to provide automatic printing. As fax files come in, they can be sent directly to the printer,

EXECUTIVE SUMMARY

JT Fax

PC fax board

BEST BUY

Quadram's 4800-bps JT Fax is loaded with features that businesspeople will like, including hot key access, broad file-conversion capability, fast text-file conversion, the ability to work with four scanners, and a low $395 price tag.

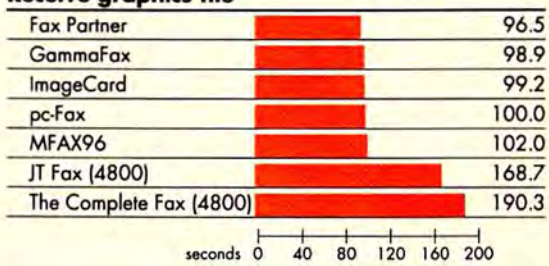
	POOR	FAIR	GOOD	EXCELLENT
Standard features			●	
Setup and installation				●
File conversion				●
File transfer				●
Performance			●	
Overall value				●

NSTL TEST REPORT

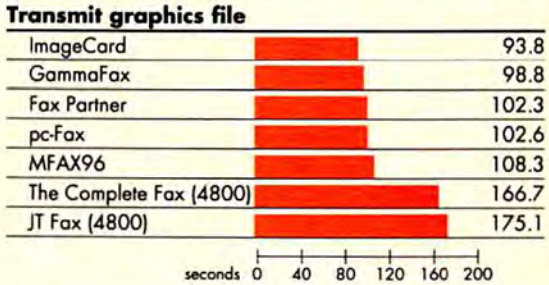
Fax Boards

Transmission and reception scores for the seven fax boards are fairly close, aside from predictable differences between 4800- and 9600-bps boards. Panasonic's Fax Partner edges out the 9600 competition, and Quadram's JT Fax leads at 4800. But remember: Speed is only one of the factors to consider when choosing a fax board.

Receive graphics file

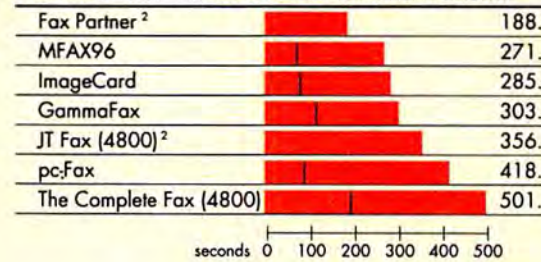


Transmit graphics file



Selected files were transmitted between an 8-MHz IBM AT Model 339 equipped with 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 3 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 both set to 20 in CONFIG.SYS. An ASCII file was then copied to the second system's hard disk.

Convert ASCII file to fax format and transmit [1]



[1] The time on the left of the bar is the time it took to convert the file.
[2] Conversion is performed automatically; no disk file is created.

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 performing subsequent tests.

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.

just as with stand-alone fax machines. This is fine for unattended operation, but if your printer is already occupied, you'll find a fax download stuck in the middle of your document.

On the whole, JT Fax is impressive, especially considering its bargain list price. It offers fast on-the-fly file conversion in 7 out of 14 modes, four-scanner support, hot-key pop-up access, and reliable screen capture.

GammaFax

GammaLink's $995 GammaFax is top gun in the 9600-bps class, thanks to its convenient user interface, broad file-conversion capability, and ability to drive two full-page monitors—all of which make it an ideal system for *AutoCAD* users and desktop publishers. Optional software even lets you convert *AutoCAD* files for fax transmission.

GammaFax transmits both ASCII and *WordStar* text files, although its ASCII file

EXECUTIVE SUMMARY

GammaFax

PC fax board

GammaFax is a 9600-bps fax board with a great user interface, unusually broad support for text and graphics files, and support for two scanners and two full-page monitors. Optional OCR and *AutoCAD* file conversion complete a very pretty picture.

	POOR	FAIR	GOOD	EXCELLENT
Standard features				●
Setup and installation				●
File conversion				●
File transfer				●
Performance			●	
Overall value				●

conversion is fairly slow. It converts outgoing graphics files from *PC Paintbrush*, *Dr. Halo*, and *Windows*, while incoming facsimiles can be converted to standard *PC Paintbrush* and *Dr. Halo* files. Optional *AutoCAD* conversion software costs $995.

GammaFax accepts input from two full-page scanners. OCR software is also available (for $595) to convert incoming faxes to ASCII text files.

Although GammaFax is rated at 9600 bps, that's true only on ATs; when installed in a PC or XT, its maximum speed is only 4800 bps. The GammaFax board can also be used as a standard modem to transfer DOS files between two GammaFax boards, with the same speed restrictions holding true.

GammaFax can be installed as a foreground or background application. When installed in the background, it allows you to keep working but seems to cause more keyboard delays than other time-sharing fax cards.

Broadcast sessions are controlled by menu-driven software that links an outgoing fax file with a name (or names) in the phone book. If the call doesn't go through, it is tagged for a retry; unfortunately there's no easy way to remove the tag. You may find your PC spending more and more time retrying failed calls.

Overall, GammaFax shapes up favorably. Its file conversion capabilities are the best in the roundup: 11 out of 14 modes are supported. It also provides an excellent user interface, good scanner and full-page monitor support, and optional *AutoCAD* translation. Add it up, and you've got an unusually useful system.

Fax Partner

Panasonic's Fax Partner is a decent, mid-priced ($999) fax board, but it doesn't offer enough value to compete in the crowded 9600-bps market.

Fax Partner's text-file conversion is limited to ASCII, but the board comes with a software utility that squeezes 132 columns of ASCII text onto a standard page—just the ticket for spreadsheet users. Text-file conversions are done on the fly. The only graphics-file format Fax Partner uses is *PC Paintbrush*'s, but fortunately that support works in both directions. What's more, a copy of

EXECUTIVE SUMMARY

Fax Partner

PC fax board

Fax Partner runs at 9600 bps and comes with a free copy of *PC Paintbrush*. A respectable performer with adequate scanner and monitor support and excellent file transfer features, Fax Partner's file conversion capability is its only serious drawback.

	POOR	FAIR	GOOD	EXCELLENT
Standard features			●	
Setup and installation			●	
File conversion	●			
File transfer				●
Performance				●
Overall value			●	

PC Paintbrush is included at no extra cost. Fax Partner works with three full-page scanners. It also bundles a screen capture utility called GRAB, but the program's too buggy to be worth much.

Fax Partner's software is memory resident but eats only 20K of RAM. The program sends and receives in the background and lets you keep working with only minimal keyboard slowdown.

Fax Partner has several nice features, including a small plastic box that blinks to let you know a fax has come in, the free copy of *PC Paintbrush*, and a decent background mode. However, it supports only 5 out of 14 file conversion modes. Apart from speed, this board has little to offer that isn't provided by The Complete Fax or JT Fax for considerably less.

MFAX96

Microtek's $995 MFAX96 has an extremely convenient user interface, but once you get past that surface, you'll find this board seriously lacking in features.

EXECUTIVE SUMMARY

MFAX96

PC fax board

The worst file-conversion support in the roundup (unless you're prepared to pay extra for optional software) is just one reason the MFAX96 fails to measure up. A brutal background mode is another. Its only redeeming feature is an excellent menu interface, but that's not enough to justify a $995 price tag.

	POOR	FAIR	GOOD	EXCELLENT	
Standard features				●	
Setup and installation			●		
File conversion		●			
File transfer		●			
Performance				●	
Overall value		●			

It converts ASCII, extended IBM ASCII, and *WordStar* text files and has the fastest file conversion rate in the roundup. Unfortunately, it has no built-in graphics capability; to convert *PC Paintbrush* or *AutoCAD* graphics, you must purchase optional software from Microtek for $49 and $995, respectively. A screen-capture utility is included, but it's full of irksome bugs.

You can install MFAX96's software as a RAM-resident or foreground application. The background mode is limited to receiving only—and as soon as a fax call comes in, you're frozen out until the session is finished.

MFAX96 provides full support for Microtek's MS-300 series of full-page scanners. It's also the only board with a built-in scanner port; the other PC fax systems use up a second expansion slot or a serial port to accommodate the scanner.

Although MFAX96 sports the nicest menu-driven interface of any board in our roundup, its file conversion is weak: Out of the box it supports only 3 out of 14 modes, the lowest score in the roundup. Furthermore, its background mode is brutal, its screen capture utility needs work, and you must pay for a *PC Paintbrush* conversion utility that comes free with many other boards. Not recommended.

ImageCard

Ricoh's ImageCard starts out with a big strike against it. At $1175, it's one of the most expensive boards in the roundup, and it fails to deliver value to match its price. The unit doesn't support a single scanner or mouse and handles only 6 out of 14 file conversion modes.

ImageCard converts outgoing ASCII and *WordStar* files, but it does so at a poky pace. Outgoing graphics support is provided for *PC Paintbrush* and *Dr. Halo.*

EXECUTIVE SUMMARY

ImageCard

PC fax board

Ricoh's 9600-bps ImageCard is a high-priced product with very little going for it. The file conversion capability is mediocre, no scanners or mice are supported, and the user interface is awkward. You'd expect more for the money.

	POOR	FAIR	GOOD	EXCELLENT	
Standard features				●	
Setup and installation	●				
File conversion			●		
File transfer			●		
Performance				●	
Overall value	●				

ImageCard software does not require installation as a TSR, unless you want to send and receive faxes in the background. Its background mode does not lock you out.

Considering ImageCard's high price, Ricoh has done some unconscionable corner cutting. There's no on-screen help. You can't print incoming messages until you display them on screen. The phone book does not permit hyphens or parentheses. And the user interface is unimpressive. Despite its manufacturer's estimable reputation, ImageCard is an unsatisfactory entry at a very stiff price.

pc-Fax

E.I.T.'s pc-Fax is another high-end 9600-bps entry. It boasts a proprietary interface that looks and works very much like *Windows*, complete with pulldown menus and dialog boxes—and a price tag of $1195. Like ImageCard, it's a disappointing package for the price.

ASCII, *WordStar*, *Word*, and Epson text files are supported. As for graphics, only *PC Paintbrush* is supported. pc-Fax provides a screen capture utility, but it's extremely difficult to use, and most captured screens look terrible. On the bright side, the package includes an OCR utility at no extra cost. Text-file conversion is handled on the fly.

pc-Fax's software is memory resident and requires a whopping 200K of RAM. An auto-answer option enables pc-Fax to receive (but not send) fax documents in the background—and freezes your application until the incoming fax files are saved to disk.

Utility software is provided to turn pc-FAX into a 9600-bps modem, but (as usual with these boards) a twin must be at the other end of the line. pc-Fax supports only one scanner: E.I.T.'s full-page PS-2000.

Unlike the other reviewed fax systems, which send data directly from a disk file, pc-Fax software uses a procrustean technique that loads fax transmissions into a RAM buffer prior to sending. If the file is too big for the buffer, overflow data is lost.

EXECUTIVE SUMMARY

pc-Fax

PC fax board

pc-Fax offers decent file support, plus a handy OCR utility at no extra cost. But it has a deadly flaw: When the data buffer overflows, information is lost or corrupted. If that's not enough to warn you off, consider its steep $1195 price.

	POOR	FAIR	GOOD	EXCELLENT	
Standard features			●		
Setup and installation					●
File conversion				●	
File transfer				●	
Performance			●		
Overall value			●		

pc-Fax supports 8 out of 14 file conversion modes. Its *Windows*-like interface and free OCR software are nice touches, but they don't make up for limited graphics support, the deadly overflowing data buffer, or the temperamental screen capture utility. This is one card to avoid.

Fax, Not Fiction

There are two clear winners in our PC fax roundup, one for each bps rate—and they are both Best Buys. The 4800-bps JT Fax comes out on top, thanks to its four-scanner support, fast text-file conversion, convenient pop-up operation, and low $395 list price.

For heavy fax use at higher speed (and a higher price—$995), GammaLink's GammaFax is clearly the board of choice. It converts a broad range of text and graphics files for fax transmission, supports two full-page monitors, accepts input from two scanners, and even handles *AutoCAD* files with optional software. Its convenient user interface adds to its attraction.

The Complete Fax, Fax Partner, and MFAX96 are adequate, but they simply don't provide the features or performance of the Best Buys. The losers are ImageCard and pc-Fax, whose high prices are not justified by their poor performance and missing features.

PC fax boards aren't about to replace stand-alone fax machines, but they offer real benefits. If a direct link between your PC and remote fax locations appeals to you, these products are undeniably convenient. And with the money and time you save, you can afford to stand in line at Disneyland instead of at your overcrowded office fax machine. ●

TJ Byers is a contributing editor for PC World.

WHERE TO BUY

The Complete Fax
The Complete PC
521 Cottonwood Dr.
Milpitas, CA 95035
408/434-0145
List price: $499
Requirements: 284K, hard disk, DOS 2.10 or later version
Accessories: none
Warranty: 90 days parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 8–5

Fax Partner
Panasonic Industrial Co.
Division of Matsushita Electric Corp. of America
Two Panasonic Way
Secaucus, NJ 07094
201/348-7000
List price: $999
Requirements: 512K, hard disk, DOS 3.10 or later version
Accessories: none
Warranty: one year parts and labor
Extended warranty: none
Technical support: toll-free number, M–F 8–5, 24-hour toll-free BBS

GammaFax
GammaLink
2452 Embarcadero Way
Palo Alto, CA 94303
415/856-7421
List price: $995
Requirements: 512K, hard disk, DOS 3.00 or later version
Accessories: OCR conversion software $595, AutoCAD conversion software $995
Warranty: one year parts and labor
Extended warranty: none
Technical support: no toll-free number, 24-hour fax number

ImageCard
Ricoh Corp.
Communications Products Group
5 Dedrick Pl.
West Caldwell, NJ 07006
201/882-2000
List price: $1175
Requirements: 640K, hard disk, DOS 2.10 or later version
Accessories: none
Warranty: one year parts and labor
Extended warranty: none
Technical support: toll-free number, M–F 9–5, 24-hour bulletin board

JT Fax
Quadram
One Quad Way
Norcross, GA 30093
404/923-6666
List price: $395
Requirements: 384K, one disk drive (hard disk recommended), DOS 2.00 or later version
Accessories: none
Warranty: one year parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 8–7

MFAX96
Microtek Lab
16901 S. Western Ave.
Gardena, CA 90247
213/321-2121
List price: $995
Requirements: 384K, one disk drive (hard disk recommended), DOS 2.00 or later version
Accessories: PC Paintbrush conversion software $49, AutoCAD conversion software $995
Warranty: one year parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 9–5

pc-Fax
E.I.T., Inc.
25 Just Rd.
Fairfield, NJ 07006
201/227-1447
List price: $1195
Requirements: 512K, hard disk, DOS 3.00 or later version
Accessories: PS-2000 scanner $1600 (when purchased with pc-Fax)
Warranty: one year parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 9–5

For more information, see Products Featured in This Issue.

Introducing ACCPAC, accounting software for those who plan to grow

A family of accounting solutions to meet your growing needs.

ACCPAC® Easy Simple, inexpensive accounting software designed for very small businesses that plan to grow. To get you started immediately, it's easy to install and has a friendly, colorful user interface. It also includes a chart of accounts, a broad range of pre-defined reports and very affordable price—just $89 per module.

Start with the General Accounting module; you get customer and vendor balances, after-the-fact payroll, and a complete general ledger. Add the full Payroll module to automate paydays and produce the required government reports.

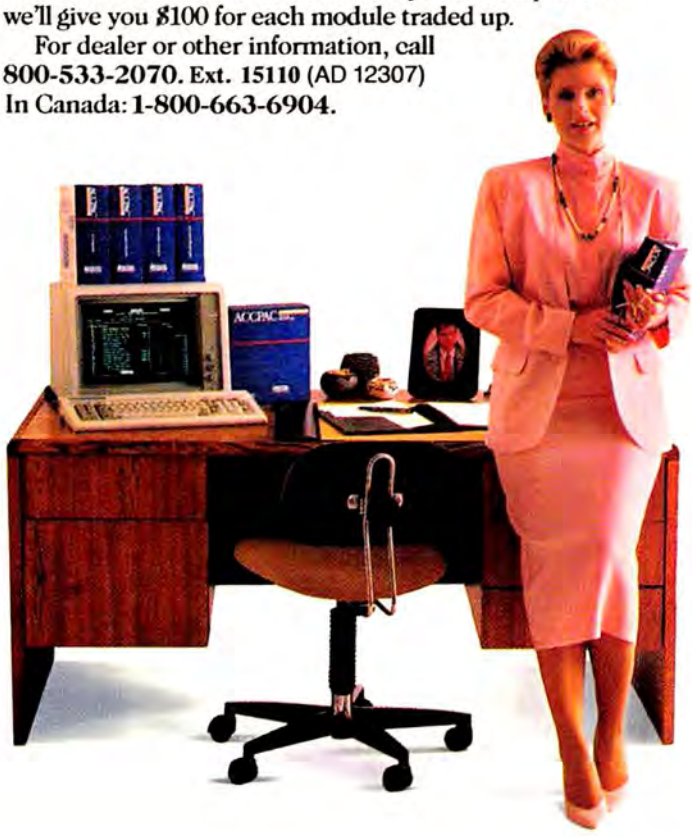
And when your business grows, transfer your data automatically to the more powerful ACCPAC BPI Accounting. What's more, we'll give you $50 cash for each ACCPAC Easy module you trade up. Never before could such a small sum make such a big difference in managing your growth.

ACCPAC BPI® Accounting Provides a powerful full-function accounting system at an amazingly low price—just $395 per module. ACCPAC BPI Accounting is designed for small and medium businesses that need sophisticated General Accounting, Accounts Receivable, Accounts Payable, Payroll, and Inventory software.

Tying these five modules together is an extremely friendly user interface in vivid screen colors of your choice. Additional features include: "Suspend"—stop work in one module, complete a task in another, and return to the point where you left off; "Selector"—search, for example, a chart of accounts or customer list for forgotten data and transfer directly to a data entry form; and one-time printer configuration. You can also key in and edit batches of information, then post them to both the subsidiary and general ledgers simultaneously.

When your business growth requires more industry-specific accounting modules, trade up to ACCPAC Plus. Your data can be transferred automatically and on top of that we'll give you $100 for each module traded up.

For dealer or other information, call **800-533-2070. Ext. 15110** (AD 12307)
In Canada: **1-800-663-6904.**



© 1987 Computer Associates International, Inc.

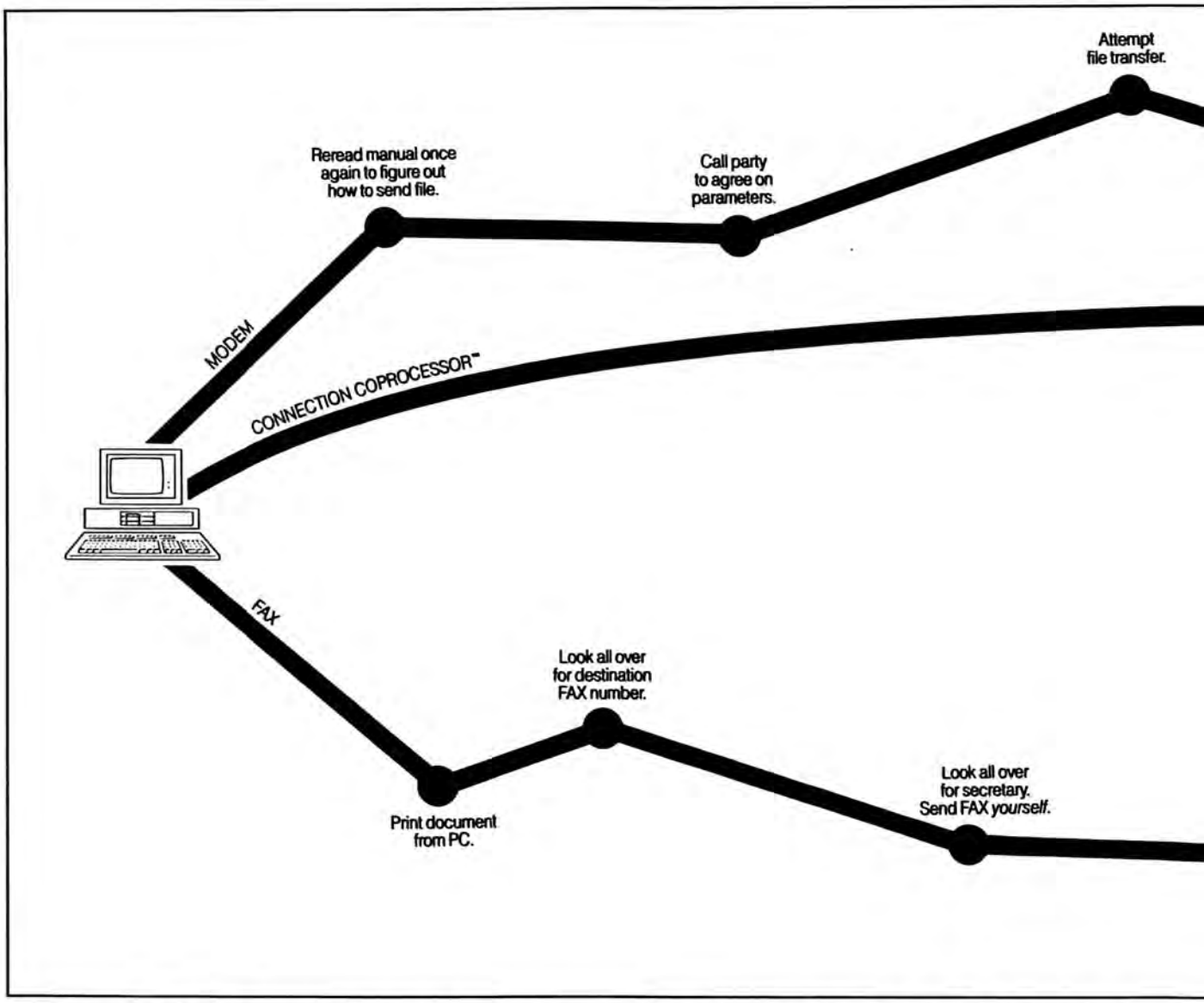
COMPUTER ASSOCIATES™
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 70 offices.

Accounting • Spreadsheets • RDBMS • Graphics • Project Management • Resource & Operations Management

Circle 42 on reader service card

Intel announces



Announcing the first non-stop communications route between businesses anywhere in the world.

Intel's Connection CoProcessor.™

It's a whole new way to send and receive programs, files, text, graphics and electronic messages. Not just between PCs, but with fax machines as well.

The Intel Connection is a new communications coprocessing board that frees your PC from the task of communicating.

Which means you can work on your computer non-stop—even while sending a document as big as the New York phone book.

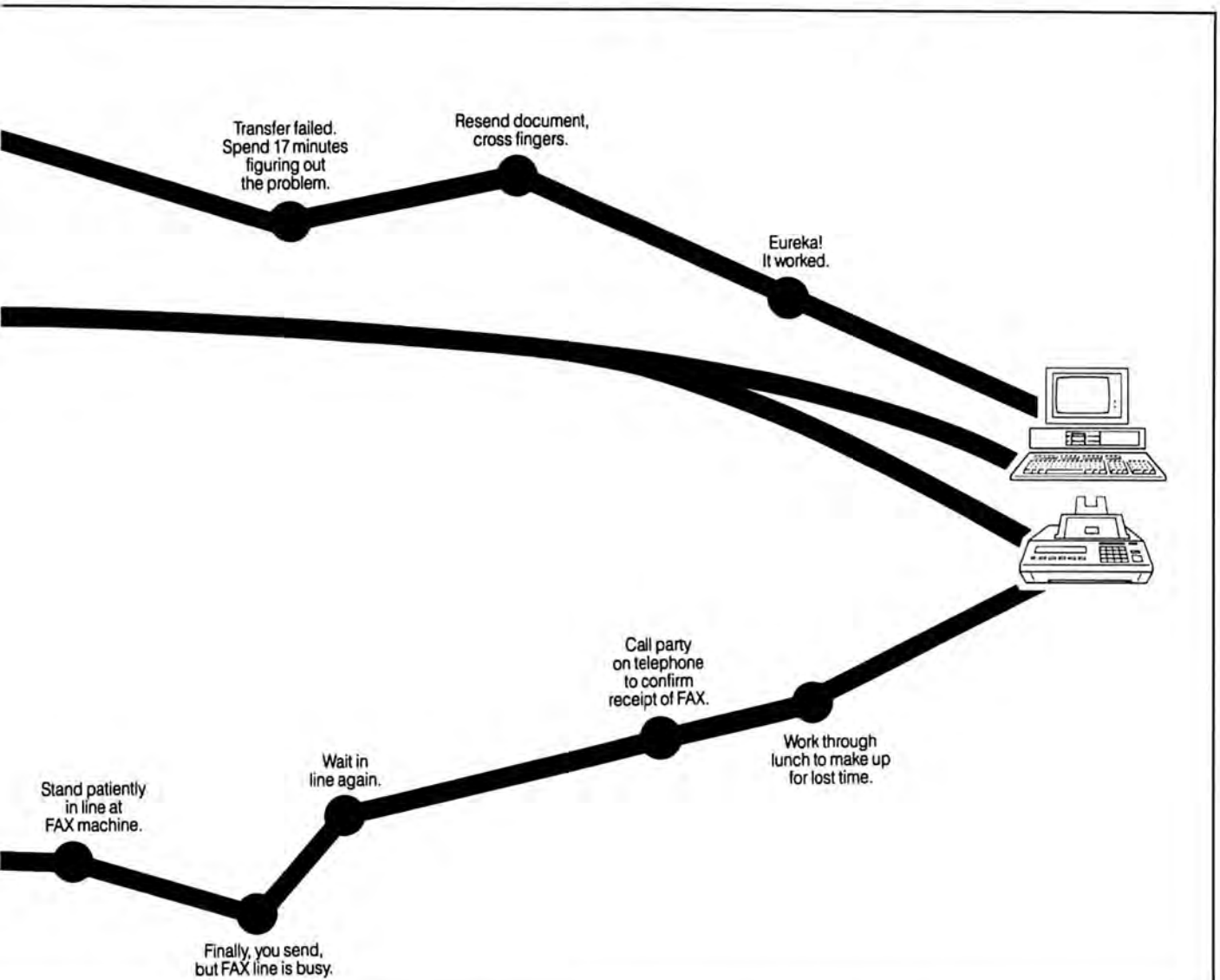
Now your faxes or files can fly cross country. And you can still be zooming around in your flight simulator. Or writing that letter to your biggest account. Or recalculating your spreadsheets for tomorrow's meeting. Without interruption or downtime.

And when you fax, there are no more stopovers at the printer, or cooling your heels in line at the fax machine. Because Connection lets you do everything without leaving your PC.

And when you send files directly to

©1988 Intel Corporation. Connection CoProcessor is a trademark of Intel Corporation. WordPerfect is a registered trademark of WordPerfect Corp. Ashton-Tate is a registered trademark of Ashton-Tate Corporation. Borland is a registered Microsoft is a registered trademark of Microsoft Corporation. *CAS (DCA/Intel Communicating Application Specification.)

non-stop flights.



another Connection-equipped PC, you won't have to fiddle around with modem parameters or protocols. Because the Connection CoProcessor sets them for you. At 9600 bps.

Best of all, Connection supports CAS,* a new communication standard that is supported by major software and hardware developers like Ashton-Tate,® Borland,® DCA,® Microsoft,® and WordPerfect.® Which means you can send, for example, a word processing file to your London office, without ever exiting your WordPerfect program.

You just send the document directly from your application. That's it. There isn't any complicated communications software to learn.

And everything is backed by toll-free technical support and a five-year warranty from Intel.

So what are you waiting for? Call 800-538-3373 now for a free demo disk.

Because with Intel's Connection CoProcessor, communication is really going to take off.

intel®

Circle 143 on reader service card

134 **Dell 220**
What's hot, compact, and tightly integrated? The Dell 220, a rip-roaring 20-MHz 286 system that performs like a 386.

136 **Mach20**
Microsoft's multifunction 286 accelerator board gives your XT some next-generation features like a built-in mouse port and support for 3½-inch drives and OS/2. But it won't give your system next-generation speed.

144 **Xerox 4020**
If your business reports demand gorgeous color but you can't manage $8000 for a thermal wax printer, Xerox's $1495 color ink jet printer can probably do the job.

148 **NEC MonoGraph**
High-speed screen updates, kerned fonts in ROM, and crisp images earn this full-page paper-white monitor top marks for desktop publishing.

Dell 220

AT-compatible system

PROS: High-speed CPU, small footprint, VGA and hard disk controller on motherboard

CONS: Limited expandability

Depending on how you look at it, Dell's 20-MHz 220 represents either the dying gasp or the brilliant culmination of a long string of 80286-based PCs. With 80386-based systems becoming increasingly common (and increasingly affordable), who needs another 286 machine, no matter *how* fast or *how* low priced?

Dell, the Austin, Texas–based company known in a former incarnation as PC's Limited, clearly feels the answer is "everyone" and is backing up its claim by introducing one of the hottest, smallest, most tightly integrated 80286 systems ever offered. With a blazing 20-MHz CPU, less-than-one-wait-state memory access, and disk caching, this machine challenges the performance of low-end 80386 systems. In fact, National Software Testing Laboratories (NSTL) tests show the 220 beating two 16-MHz 80386 systems on every test except *AutoCAD*. The Dell zipped through the NSTL Crash Test with no problems worth mentioning.

The Dell 220 comes in two basic configurations. $3299 buys you a system with 1MB of RAM, a fast 40MB hard drive, a 1.44MB 3½-inch floppy drive, a 101-key keyboard, a VGA, and a color monitor; $2299 buys a similar system with a monochrome monitor and no hard disk. Both versions provide a generous 8MB of motherboard memory expansion, OS/2 capability, and a socket for a 10-MHz 80287 math coprocessor.

The 220's amazing speed is due largely to its hot new 20-MHz chip, custom manufactured by Harris Corporation. To keep memory from falling behind the CPU speed, Dell provides *less-than-one-wait-state* memory access—standard terminology for its combination of memory paging and interleaving.

But the compact 220 is far more than a fast AT clone; it combines speed, integrated hardware, and one of the smallest footprints ever offered in a desktop system. The VGA, serial ports, parallel port, and even the hard disk interface are built into the motherboard, leaving the three 8/16-bit expansion slots open for more exotic expansion boards.

On the other hand, its snug system unit and integrated hardware have drawbacks. Three slots are not a lot. There's no room for 5¼-inch drives, and just enough space for two half-height 3½-inch floppy drives and one 3½-inch hard disk. And the built-in disk interface could present problems if you want to add a hard drive larger than 100MB.

The system comes with 1MB of RAM; this can be upgraded to 8MB without slowing memory access by substituting 1MB SIMMS (when they become available) for the 128K SIMMS on the motherboard. Additional RAM can be installed via expansion boards, but access to this memory is limited to the 8-MHz speed of the I/O bus.

Peripherals are all excellent. The keyboard is a standard, high-quality, 101-key Key Tronic device. Unfortunately, Dell has followed IBM's classic (and awkward) design and placed the keyboard socket in the back of the cabinet. You have a choice of three monitors: the VGA Color, the higher resolution VGA Color Plus, and the VGA Monochrome.

Setup and configuration are easy, thanks to a slim but complete owner's manual. You also get a disk with menu-driven diagnostics. A ROM-based utility allows you to install peripherals without setting motherboard jumpers. Best of all, one year of service from Honeywell Bull is included at no extra cost. (On-site service is provided if you live within 100 miles of a Honeywell service center.)

Despite the 220's cramped system unit and limited expandability, any 80286 system that performs like an 80386 is worth applauding—even if it won't run 80386-specific software like *Windows/386*. When you add its tiny footprint, OS/2 capability, and surprisingly low price, the Dell 220 may inspire many users to decide they can live without that new 80386 for a few more years. —*John Diebold*

WHERE TO BUY

Dell 220
Dell Computer Corp.
P.O. Box 203818
Austin, TX 78720-9964
800/426-5150
List price: with 1MB RAM, 1.44MB 3½-inch floppy drive, VGA, monochrone monitor, 101-key keyboard $2299; with 1MB RAM, 40MB hard disk, 1.44MB 3½-inch floppy drive, VGA, color monitor, 101-key keyboard $3299
Accessories: 29ms 100MB hard drive $1599; 720K 3½-inch floppy drive $150, 1.44MB 3½-inch floppy drive $200; VGA Monochrome Monitor $200, VGA Color Monitor $400, VGA Color Plus Monitor $500; serial mouse $60; 2400-bps internal modem $200; 10-MHz 80287 math coprocessor $480; DOS 3.30 $120, OS/2 $325
Warranty: one year
Extended warranty: none
Technical support: toll-free number, M–F 8–5
Other support services: one-year service contract, extendable for about 10 percent of system price per year
For more information, see Products Featured in This Issue.

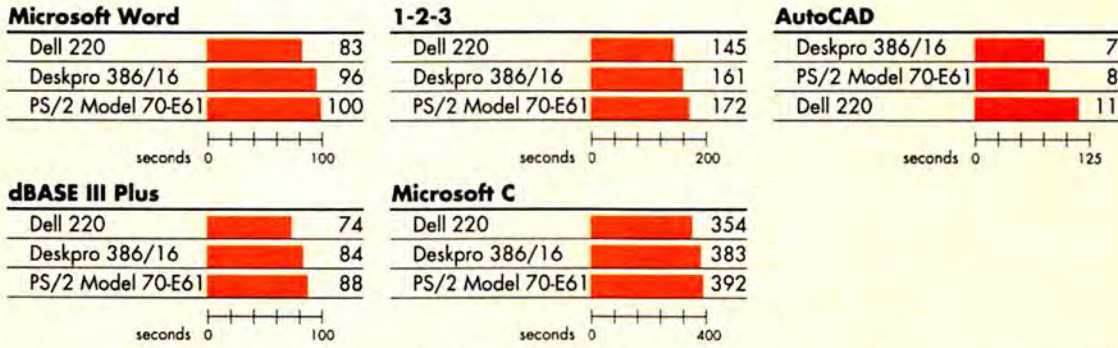
The Dell 220 is a bargain-priced, 20-MHz 80286 speed demon that outperforms some 80386 machines.

JOHN GREENLEIGH

NSTL TEST REPORT

Dell 220 Versus Two 80386 Systems

Dell's 20-MHz 80286 speedster easily outruns two 80386 systems in four out of five NSTL benchmarks. Slow performance on the AutoCAD test probably reflects the Dell's lack of a 80387 math coprocessor.



The Dell 220 was tested with a 40MB hard disk and a disk cache consisting of 256K of extended memory. The IBM PS/2 Model 70-E61 was tested with a 60MB hard disk and a disk cache consisting of 256K of extended memory. The Compaq Deskpro 386/16 was tested with a 43MB hard disk and a disk cache consisting of 256K of extended memory. All tests except for the *1-2-3* test were conducted with a coprocessor installed.

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.

Mach20

Multifunction 80286 accelerator board

PROS: Combines many functions in one slot, OS/2 compatible

CONS: Mediocre performance, complicated setup

All too often, as users attempt to take advantage of the tempting array of expansion boards for their poky PCs and XTs, they hit the slot barrier. The multifunction Mach20 accelerator board from Microsoft is designed to break the slot barrier by combining an 8-MHz 80286 accelerator-and-mouse-port board with three piggyback modules: Two work together to provide RAM expansion, and one lets you install 720K and 144MB 3½-inch drives and 1.2MB 5¼-inch drives in your trusty old PC.

The basic 80286 accelerator board, with a built-in socket for a Microsoft Mouse, costs $495 and includes no memory. Installation is straightforward: You slide the board into a vacant slot, after which you remove the PC's old 8088 CPU and replace it with a plug-and-cable assembly.

The Mach20 passed the NSTL Crash Test with flying colors, but as an 80286 accelerator it's a bit of an underachiever. According

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.

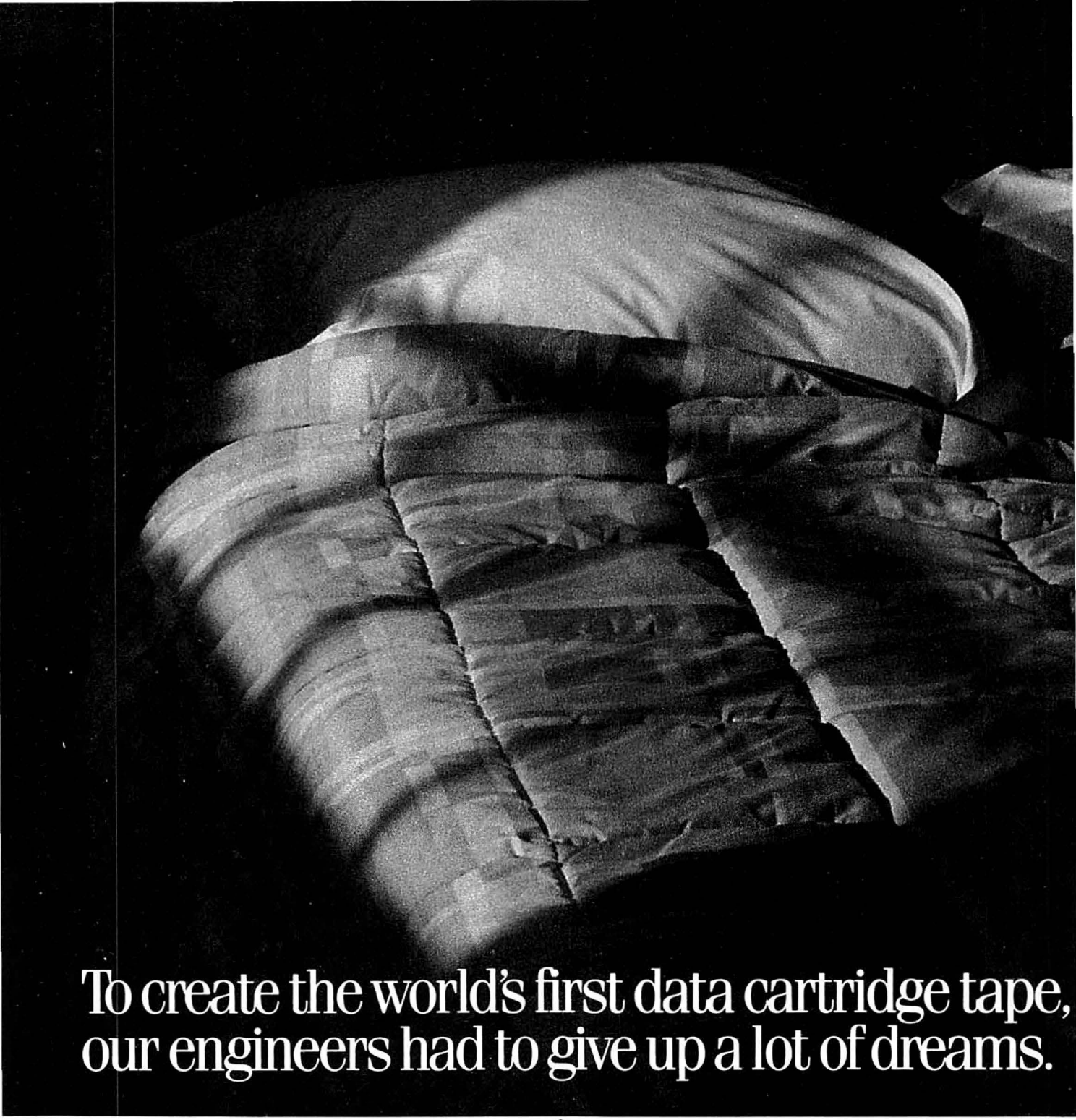
The right printers for right now, and in the future.
With the OmniLaser 2115, you have the flexibility you need for today's sophisticated printing applications. You also have the confidence of knowing that your OmniLaser offers a safe path to the applications of the future.

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

44256 © 1988 TI
OmniLaser is a trademark of Texas Instruments Incorporated. PostScript is a registered trademark of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packard.

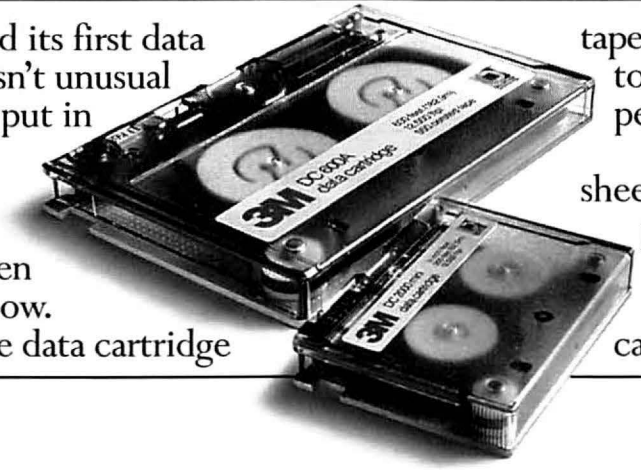


To create the world's first data cartridge tape, our engineers had to give up a lot of dreams.

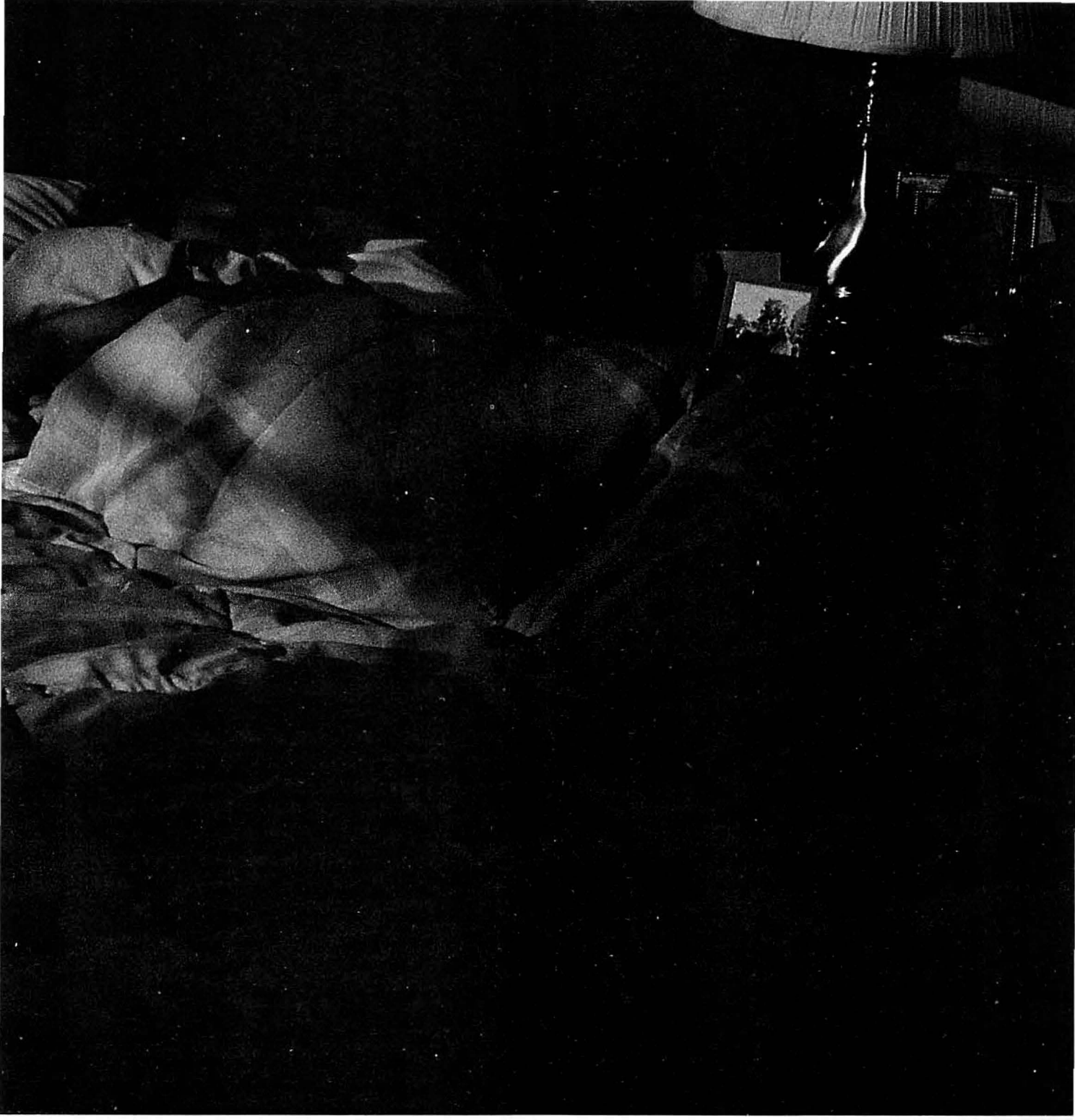
To bring the world its first data cartridge tape, it wasn't unusual for our engineers to put in a little overtime on their overtime. Or occasionally miss the late show. Or even miss the late, late show.

And even after the data cartridge tape was born, they still refused to lay low. It had to be perfected.

So, instead of counting sheep, our engineers counted patents. In fact, over ten of them are in use today. A number no other data cartridge tape manufacturer



© 3M 1988.



can even come close to matching.

During other sleepless nights, they'd toss and turn over technological breakthroughs like proprietary Blackwatch™ backcoating, No End Play (NEP) hub designs, Dura-Stat™ drive rollers and one piece tape guides for precision tracking.

The result was the ultimate data cartridge tape.

And to this day, it's number one in the world by a long shot.

So, if you're looking for data cartridges and diskettes that offer durability, longevity and superior error performance, try one of ours.

We guarantee they'll work as hard as our engineers do. Day. And night.

For more information, call 800-888-1889, Ext. 30.

Supporting the dream.

3M

Worldwide Sponsor
1988 Olympic Games

Circle 124 on reader service card

FEATURES EVALUATION

Dell 220 Compared to IBM PS/2 Model 50 Z

The Dell 220 offers high speed, high memory expansion, and low cost compared to the 50 Z. Unfortunately, its hard disk options are as limited as the 50 Z's.

	Dell 220	IBM PS/2 Model 50 Z
Standard features		
Price	$3299 [1]	$3995 [2]
CPU	80286	80286
Clock speed/wait states	20 MHz/ less than 1	10 MHz/0
Built into motherboard		
Parallel ports	1	1
Serial ports	2	2
Floppy disk controller	●	●
Video adapter	●	●
Mouse port	●	●
Coprocessor support	10-MHz 80287	10-MHz 80287
Memory capacity		
Amount shipped with unit	1MB	1MB
Maximum installable on motherboard	8MB	2MB
Expandability		
8/16-bit expansion slots/number free	3/3	3/3
8-bit expansion slots/number free	0/0	0/0
Half-/full-height storage device bays	2/1	3/0
120MB or larger hard disk available from manufacturer	○	○
Ergonomic design		
Front-panel reset button	○	○
Front-panel on/off switch	●	●
Front-panel keyboard socket	○	○
ROM-based setup software	●	○
Tilt-and-swivel monitor	●	●
Compact footprint	●	●
Complete documentation	●	●

● Yes ○ No

[1] Price based on 1MB RAM, 40MB hard disk, 1.44MB floppy drive, parallel port, two serial ports, VGA, color monitor, 101-key keyboard.

[2] Price based on 1MB RAM, 30MB hard disk, 1.44MB floppy drive, parallel port, two serial ports, VGA, color monitor, 101-key keyboard.

to the NSTL performance test, an IBM PC XT with the Mach20 installed ran only about half as fast as an Acer 910 on most tests. Although that's a lot better than an unmodified XT, users can get comparable speed increases with products that cost half as much, such as Orchid's Tiny Turbo.

Of course, lower-price accelerator boards may not run OS/2; in fact, when Microsoft gets its special Mach20 version of OS/2 out of beta testing, the Mach20 will be one of few boards that can. However, you'll need to install the optional Memory Plus module, since OS/2 requires a 16-bit data path.

The $395 Memory Plus module consists of two piggyback circuit boards and comes with 512K of 150ns RAM. Up to 3.5MB can be installed, but you'll have to get the memory chips yourself; Microsoft won't provide them. Microsoft does offer a LIM 4.0–compatible expanded memory driver. Memory Plus RAM can also be used to backfill conventional RAM to 640K.

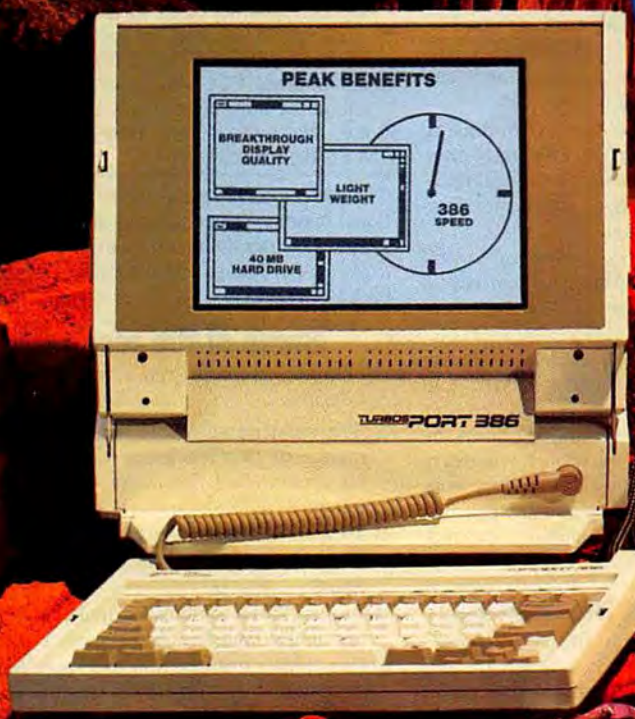
But the Memory Plus module has a couple of minuses. Other memory boards (including standbys like AST's SixPakPlus and Intel's AboveBoard) conflict with the Memory Plus, rendering it useless. Also, with both Memory Plus circuit boards attached, the Mach20 barely fits in the space allotted for a single XT-size board. Users will need to make sure that the board's circuit leads do not touch any adjacent expansion board.

The $99 Disk Plus floppy controller snaps into a Mach20 pin socket. However, configuring the Disk Plus—and, indeed, the whole Mach20 enchilada—is distressingly complicated. You must set numerous banks of jumpers on all three of the Mach20's components and consult a hardware interrupt chart to avoid conflicts.

Potential buyers should also be aware of one more possible problem: With all three piggyback modules installed, the puny 63.5-watt power supply in the original IBM PC is inadequate. (The 135-watt power supply in the XT and most clones should be fine.)

The Mach20 is a veritable Swiss army knife of options. But as with many multipurpose devices, performance of individual features may be less than optimal. Where speed

ALL TERRAIN VEHICLE.



ZENITH'S BATTERY-POWERED 386 PORTABLE WORKS AS WELL ON A MOUNTAINTOP AS IT DOES ON A DESKTOP.

ZENITH INNOVATES AGAIN—with the single most revolutionary portable computer ever created. The TurbosPort 386.™ The only *true* battery-powered 386 portable with all the performance of a desktop... and then some.

Perhaps the peak of TurbosPort 386's technology is Zenith's Page White™ display. A visible breakthrough that virtually duplicates printed-page clarity with sharp black images on a fluorescent backlit screen.

Inside TurbosPort is a tremendous power team, yet of diminuitive proportions. The 80386 microprocessor harnessed with a fast access 40MB hard disk lets you surmount all tasks effortlessly. And with zero wait state technology TurbosPort 386 gives you 50% greater speed than other 12MHz systems that still have wait states.

Plus, there are even more exclusives. Zenith's *Intelligent Power Management System*™ lets you control power usage for maximum battery life. And a detachable keyboard (unheard of on any other battery-powered 386 portable). These, combined with all the other breakthroughs help explain why Zenith has become the leader in battery-powered portables.

You may never scale a mountain with TurbosPort 386, but with 14.7 lbs. of desktop performance under your arm, you'll definitely reach new heights. For the name of your nearest Zenith Data Systems Dealer, call: 1-800-553-0559.

ZENITH | data systems

THE QUALITY GOES IN BEFORE THE NAME GOES ON®

© 1988, Zenith Data Systems

Circle 290 on reader service card

386 SYSTEMS

Is it time to buy? Which one is best?

Here's how to find out.

It's the future of personal computing. For power and speed, 386 PCs outclass all other machines.

For large spreadsheets and databases, the 386's dramatically faster performance is ideal. And for emerging applications like networking, desktop publishing, CAD, statistical analysis, expert systems and real-time animation, the 386 is *essential*!

You can expect to see an increasing number of programs that run efficiently *only* on a 386 system. To maximize the multitasking capabilities of OS/2, its tremendous processing power is a must.

But should you buy *now* — or *wait* for still further improvements? Which system is best — and what specific configuration suits your needs?

The choices are many — and potentially confusing. There are 16MHz, 20MHz and now 25MHz 386 machines. Huge differences in performance. Exaggerated promises by vendors. *Among the variables you must consider:* OS/2 capabilities, disk and memory caching, clock speeds, display adapters, real and protected modes, compatibility, expandability...and more.

New report has the answers.

Now there's a solution. *PC Digest*'s authoritative, comprehensive report on 386 systems. It's just off the press. With concrete recommendations based on objective laboratory tests. Including the first OS/2 multitasking tests for the 386. And an exclusive preview of IBM's 70 series and Compaq's 25MHz PC.

We tested 19 machines, including the *ALR FlexCache 386, AST Premium 386/20, Compaq Deskpro 16 and 20, Dell 310, Everex 20 and IBM's PS/2 70's and 80's.*

Our technicians evaluated each machine for ease of installation and handling, applications-based performance, features, documentation, and software incompatibilities.

In *PC Digest*'s new 386 report, you'll find an in-depth tutorial covering 386 technology (including memory caching, memory architecture and numeric co-processors)....Detailed writeups on each machine....Performance test results....

EXCLUSIVE!

First tests of the new IBM and COMPAQ 25MHz PCs!

Included with this report are the *first* benchmark tests of the newly announced IBM and Compaq 25MHz PCs. These are high-performance PCs with remarkable power and speed engineered into a small-footprint box. Which one is best? Here are the facts. A *PC Digest* exclusive!

Complete specifications (including configurations, options, prices, support and warranties) ....And a Master Summary Chart that shows *at a glance* our ratings and recommendations for each PC tested.

Some of the results.

Our tests uncovered some revealing conclusions:

- The outstanding across-the-board performance of two machines won them *PC Digest*'s coveted Five Stars — our highest rating.
- IBM's PS/2 Model 80 20MHz model was beaten by most of the other 20MHz systems tested.
- In the 20MHz systems, memory caching is essential to high-level performance.
- One 16MHz machine runs DOS applications acceptably, but functions *terribly* under OS/2.
- Avoid the machine that rated *dead last* — its performance in *every* category was well below average.

From PC World's official research facility.

Nothing else can match the systematic comparative ratings of *PC Digest*. That's why, last year, *PC World* chose NSTL as its official testing facility.

Like *Software Digest*, its well-known companion publication, *PC Digest* is fiercely independent and impartial. We accept no ads. We pull no punches.

JUST PUBLISHED! ***by NSTL*** *(National Software Testing Laboratories) — the official research facility of* **PC WORLD**

Our performance tests are *applications-based.* We test machines with popular software like the major spreadsheet and database programs. In contrast, many magazine reviews use misleading "raw processing" benchmarks that bear little relation to real-world business tasks.

Not surprisingly, *PC Digest* has become the single most trusted resource for objective evaluations of PC hardware.

Special offer to qualified computer professionals.

PC Digest's 386 report normally sells for $45. But as part of a campaign to identify DP/MIS professionals and PC coordinators, we are offering it for just $25.

There are some reasonable conditions to this offer. To demonstrate that you qualify, *you must include your business card or letterhead* with the coupon below. If you phone in your order, the operator will ask for your company, title and department. At this low price, we cannot bill. Check or credit card are accepted. If you're dissatisfied for any reason, we'll refund your payment.

Expanding software applications and capabilities will push PC hardware to its maximum potential. 386 technology will revolutionize business computing. Are you prepared?

The base cost of a 386 system can range from $2,599 to $11,295. For just $25, this remarkable new report can help you decide *whether* to buy, *when* to buy, and how to choose the *right* system.

CREDIT CARD? CALL TOLL-FREE:

☎1-800-223-7093

OR CLIP AND MAIL THIS COUPON:

NSTL National Software Testing Laboratories, 1 Winding Dr., Philadelphia, PA 19131

❑ **YES,** send me *PC Digest's* comprehensive report on 386 systems, regularly $45, at the special price of $25.

❑ Enclosed is a check for $25

❑ Charge my: ❑ MasterCard ❑ Visa ❑ American Express

Card no._____

Expiration date_____

Signature X_____

(No bill-me's, please)

PLEASE ATTACH YOUR BUSINESS CARD OR LETTERHEAD TO THIS COUPON.

(Note: This special offer will *not* be honored without proof that you are a computer professional.)

PCW 10/88

Lose Those Lonesome IBM Blues.

The largest group of IBM* and compatible PC users in the world shares its problems and solutions online every day in CompuServe's IBM Forums. And you can join them.

Keep up with the latest upgrades as soon as they're available. Get help with printer and disk utilities from experienced users. Plus support from IBM software authors and hardware vendors.

Why spend hours working the bugs out of a program when somebody has already solved the problem? How will OS/2 and Windows affect you? Visit a CompuServe IBM Forum and find out. There's no better way to get more out of your IBM or compatible.

To join CompuServe, see your computer dealer. To order direct or for more information, call 1 800 848-8199. In Ohio and Canada, call 1 614 457-0802. If you're already a member, type GO IBMNET at any ! prompt.

CompuServe®

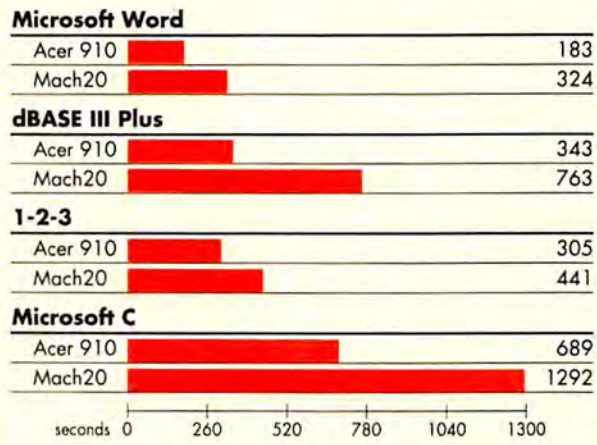
An H&R Block Company

Circle 28 on reader service card

NSTL TEST REPORT

80286 Accelerator Boards Compared

Installed in an IBM PC XT, the 8-MHz Mach20 80286 accelerator board runs significantly slower than the 10-MHz Acer 910.



The Microsoft Mach20 was installed on an IBM PC XT with a 10MB hard disk and 640K of RAM. The Acer 910 had a 44.5MB hard disk and 1MB of RAM. All machines were tested without a disk cache installed.

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 disk access is required, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0
The Microsoft C benchmark measures the time required to compile and link XLISP, 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.

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

is vital, users will be better off selecting one of the faster—and cheaper—80286 turbo boards. —*Lewis Perdue*

WHERE TO BUY

Mach20
Microsoft
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073
206/882-8089
List price: $495
Requirements: 8088-based PC, XT, or compatible
Accessories: Disk Plus $99; Memory Plus with 512K RAM $395; Microsoft Mouse with Microsoft Windows 2.01 and PC Paintbrush $165
Warranty: two years parts and labor
Extended warranty: none
Technical support: no toll-free number, M–F 8:30–6
Other support services: none
For more information, see Products Featured in This Issue.

Xerox 4020

Color ink jet printer

PROS: Good color graphics, decent printing speed

CONS: Requires expensive coated paper

If you need good-looking color transparencies, graphs, and graphics for presentations but can't afford $8000 for a high-end thermal-wax printer, the Xerox 4020 color ink jet may be the machine for you. A reasonably priced ($1495) printer with gorgeous color print quality, the 4020 also boasts unusually broad graphics software support. Although it costs $100 more to buy than HP's plain-paper Paintjet, it is easier and cheaper to use, and produces better-looking output.

The wide-carriage printer weighs only 24 pounds. It uses 20 ink nozzles and four ink colors—black, cyan, magenta, and yellow—to produce up to 4096 distinct shades. It can generate graphics and text at 120 dots per inch (dpi) in draft mode and 240 dpi in near letter quality (NLQ) mode. Its front-mounted control panel has push buttons

You may recognize the faces but not the name.

You'll recognize the page on the bottom as the one printed on the HP LaserJet Series II™—the industry standard for laser printing.

Notice that the page on top looks remarkably similar. In fact, it's identical right down to the HP typeface.

But it was printed on the Acer LP-76™—the only actual 100% HP-compatible laser printer available. With all six resident fonts and 21 optional font cartridges identical to those developed for HP.

Other laser printers talk about compatibility. But the Acer LP-76 is the first and only one to deliver true font compatibility with the HP LaserJet Series II. And that's very important. Especially when your office is producing large documents on multiple printers, and you want your fonts to look identical from page to page.

The Acer also duplicates such HP standards as 512K of memory. With 1, 2 and 4MB of memory expansion. Plus 300 DPI graphics, face-up and face-down output capabilities, and full access to any software that recognizes the Series II.

Of course, we stopped short of duplicating everything about the Series II.

For instance, the Acer LP-76 is faster, smaller, lighter and much less expensive.

So give us a call at (800) 538-1542. In California, (800) 782-1155 ext 76. We'll quickly help you place our name with the right face.

Acer

The Word for Value

Acer Technologies Corp.
401 Charcot Avenue
San Jose, CA 95131
(408) 922-0333

Canada: Acer Technologies Corp.
Tel.: (416) 674-2211

W. Germany: Acer Computer GmbH
Tel.: (0211) 6508-0

Japan: Acer Japan Corp.
Tel. (03) 865-0191 2

Taiwan: Acer Inc.
Tel.: (02) 713-2252

© 1988, Acer Technologies Corp.
Acer LP-76 is a trademark of Acer Technologies.
HP LaserJet Series II is a trademark of Hewlett-Packard.

Circle 179 on reader service card

telemart

Doing Business Since 1980 A Division of CW Marketing, Inc.

The Acknowledged Leader in the PC Mail Order Industry

FREE AIR EXPRESS SHIPPING
You Pay The Ground Shipping
We Pay the Air Difference

SOFTWARE

SPECIAL - LOGITECH MICE

LogiMouse	Call	LogiMouse with Logi Cadd	$101
LogiMouse with Paint Show	$ 87	Logi Buss Mouse with Logi Cadd	$101
Logi Buss Mouse with Paint Show	$ 87	LogiMouse with Publisher	$ 99
Logi Buss Mouse with Publisher	$ 99		

Fox Base Plus $185 — **SPECIAL** — **Microsoft Word 4.0** $185

WORD PROCESSORS

Easy Extra	$ 52
Word (Microsoft)	185
Multimate Advantage II	249
PFS: Professional Write	102
Volkswriter 3	132
Volkswriter Deluxe Plus	57
Webster New World Writer	53
Webster Spell Checker	32
Webster Thesaurus	37
Word Perfect	Call
Word Perfect Executive	Call
Word Perfect Library	Call
Wordstar Pro Pack 4.0	Call
Wordstar 2000 Plus Personal	205

PROJECT MANAGEMENT

Harvard Total Project Manager II	$ 309
Microsoft Project 4.0	287
Timeline 2.0	259

MONEY MANAGEMENT

Dollars & Sense w/Forcast	$ 92
Tobias Managing Your Money 4.0	114

DESKTOP PUBLISHING

Newsmaster II	$ 39
Pagemaker	Call
PFS: First Publisher	65
Ventura Publishing	475

LANGUAGES

Basic Compiler (Microsoft)	$ 175
C Complier (Microsoft)	259
Cobol Compiler (Microsoft)	415
Fortran Compiler (Microsoft) 4.1	259
Lattice C Compiler	209
Macro Assembler (Microsoft)	86
Pascal Compiler (Microsoft)	175
Quick Basic 4.0	57
Quick C	57
Ryan McFarlan Fortran	379
Ryan McFarlan Cobol	609
Turbo Basic	58
Turbo C	58
Turbo Pascal 4.0	58
Turbo Prolog	89
Turbo Prolog Toolbox	58

UTILITIES

1 DIR Plus	$ 46
Bookmark	56
Brooklyn Bridge	69
Carousel 2.0	43
Copy II PC	18
Copywrite	39
Corefast	89
Cruise Control	29
Cubit	Call
Disk Optimizer 3.0	Call
Disk Technician	56
Double DOS 4.0	Call
DS Back-Up Plus	46
Fastback	75
Fastback Plus	86
Keyworks	53
Mace Utilities	47
Microsoft Windows 2.03	57
Norton Commander	43
Norton Editor	35
Norton Utilities 4.0	46
Note It Plus	45
PC Tools Deluxe	36
Printworks for Lasers	67
Referee	38
Sidekick Plus	Call
Sideways	37
Smart Notes	43
SQZ Plus	53
Superkey	58
Take Two MGR	66
Turbo Editor Tool Box	58
Unlock D Plus	49
XTree Professional	61

ACCESSORIES

Copy II Option Board Deluxe	$ 99
Masterpiece	79
Masterpiece Plus	92
Masterpiece Remote	107
MousePad by Mousetrac	9
Summasketch 12x12 Plus	359

DISKETTES

Maxell MD-2 Qty. 100	$ 75
Maxell MD-2HD Qty. 100	149
Sony 5¼ Qty 100	65
Sony 3½ Qty. 100	159

TRAINING

Chuck Yeager Adv. Flight Simulator	$ 25
Lets C	38
Mavis Beacon Typing	29
MS Learning DOS	29
MS Flight Simulator	29
PC Logo	79
Turbo Tutor 4.0	42
Typing Instructor Encore	20
Typing Tutor IV	27

DATA BASE MANAGEMENT

Clipper	$ 368
dBase III Plus	369
dBase III LAN	599
DB-XL Diamond	105
Eureka	88
Genifer	188
Nutshell	72
Paradox 2.0	415
PFS: Professional File	119
Q & A	185
Quickcode Plus	119
Rapid File	179
Revelation	459
Revelation Bump Disk	239
R:Base Clout (New Ver.)	175
R:Base For DOS	425
Reflex	88
VP Expert	Call
VP Info	56

COMMUNICATIONS

Carbon Copy Plus	$ 105
CompuServe Subscription Kit	19
Crosstalk XVI	87
Crosstalk Mark IV	109
Mirror II	33
Remote II	87
Smartcom III	136

INTEGRATIVE SOFTWARE

Ability Plus	$ 137
Enable 2.0	352
Framework II	399
MS Works	85
PFS: 1st Choice	76
Smart Software System	Best Price
Symphony	435

GRAPHICS

Energraphics	$186
Freelance Plus	309
Generic CAD w/Dot Plot 3.0	72
Harvard Graphics 2.1	239
In-A-Vision	259
Microsoft Chart 3.0	229
News Room	30
News Room Professional	42
Printmaster Plus	29
PrintShop	32
Turbo Graphix Tool Box	58
VP Graphix	56
Windows Draw!! w/Clip Art	159

MICE

PC Mouse w/Paint (Buss or Serial)	85
PC Mouse w/Autosketch (Buss or Serial)	99
Microsoft Buss Mouse 1.0	92
Microsoft Serial Mouse 1.0	92
MS Buss Mouse w/CADD	107
MS Serial Mouse w/CADD	107
MS Buss Mouse w/Windows	122
MS Serial Mouse w/Windows	122
Optimouse (PC Mouse) w/Dr. Halo III	78

SPREADSHEETS

Cambridge Analyst	$ 79
4 Word	55
HAL	89
Lotus 1-2-3 Ver. 2.01	295
Lotus Manuscript	309
Lotus Report Writer	67
MS Excel	285
Multiplan 3.0 (Microsoft)	109
PFS Professional Plan	52
Quattro	138
Supercalc 4	275
Twin Classic	32
VP Planner	47
VP Planner Plus	Call

ACCOUNTING

ACCPAC	Call
DAC Easy Accounting	53
DAC Easy Payroll	53
In-House Accountant	105
One Write Plus 2.0	117
One Write A/R, A/P, Payroll	117
Time Slips III	109

1-800-634-9270

ORDER LINE

FCC Approved
Non-Infringing Bios
All First Quality Materials
1 Year Limited Warranty
IBM Compatible

MIT PC/XT TURBO
10 MHz, 640 K Memory,
150 Watt Power Supply,
AT Style Keyboard,
One Brand Name 360K
Floppy Drive,
AT-Style Case

$555

Turbo PC/XT w/640K & 2 Drives	$ 629
Turbo PC/XT w/640K, 1 Drive & 20 MG	$ 839
Turbo PC/XT w/640K, 1 Drive & 30 MG	$ 869
PC 286 12 MHz Zero Wait State w/1024K, 1.2 Floppy Drive	$1240
PC 286 12 MHz Zero Wait State w/1024K, 1.2 Floppy, 40 MG	$1623
MonGraphics Card with Parallel Printer Port	$ 55
Color Card w/Parallel Printer Port	$ 55
Amber Monitor w/Swivel Tilt (TTL)	$ 95
AT Multi I/O Card	$ 65
XT Multi I/O Card	$ 65
Color Monitor (RGB)	$ 255
Autoswitch EGA Card	$ 129
I/O Card (Serial/Parallel)	$ 38
I/O Card (Serial/Clock Calendar)	$ 39
Enhanced Keyboard	$ 65
1200B Modem (INT) W/SW	$ 69
1200B Modem (EXT) W/SW	$ 89
2400B Modem (INT) W/SW	$ 145
2400B Modem (EXT) W/SW	$ 159

HARDWARE

PRINTERS

Alps Allegro	$ 339
Other Models	Call
AST Turbo Lazer	4310
Citizen Printers	
120D	$ 149
180D	165
MSP 40	319
MSP 45	465
MSP 50	399
MSP 55	529
Premier 35	509
Diconix 150	309
300	480
Epson Printers	Call
FUJITSU	Call
Hewlett-Packard	
Desk Jet	779
Laser Jet Series II	1805
Paint Jet	1090
NEC P2200	355
P5200	520
P5300	685
Other Models	Call
Okidata (New Models)	Call
Panasonic 1080 I M2	159
1091 I M2	199
1092 I	325
1524	560
1592	409
1595	469
3131	305
3151	475
Laser 4450	1635
Star Micronics	Call
Toshiba 321 SL	489
341 SL	655
351 SX	945
Page Laser	2415

DISK DRIVES

Bernoulli Box	
10 Meg	$ 889
20 Meg	1255
40 Meg	1559
Beta Ext	1015
Beta Int	775
Seagate	
20 MG w/WD Controller	275
251-1	469
40 MG w/Cont	435
AT 40 MG	375
Other Models	Call
Teac 1.2 MEG AT	89
Floppy F55 BR	79
Toshiba 3.5 Dr 720K	90
3.5 Dr 1.4MB	115

MONITORS

Amdek	
410	130
432	149
V210A	85
NEC	
Monograph System	1299
Multisync II	585
Multisync Plus	899
Multisync XL	2069
Other Models	Call
Princeton Ultrasync	485
Samsung	Call
Sony Multiscan (1303)	545
Mitsubishi Diamond Scan	499
Zenith 1490	609

KEYBOARDS

Keytronics	
KB5151	$ 119
KB5153	149
KB101	85
Uniterruptible Power Source	Call

BOARDS

AST Hot Shot	$ 359
Six Pack Plus	115
VGA	249
Xformer	579
3G+ II	219
VGA	249
VGA +	320
Other Models	Call
ATI EGA Wonder	175
VIP VGA	265
Hercules	
Color Card	145
Graphics Card Plus	170
Incolor	199
Intel Inboard 386 PC	935
Inboard 386 AT w/cable	1029
4020	375
80287-6 **New**	175
Orchid Designer VGA	299
Tiny Turbo 286	249
VGA	220
Paradise	
Autoswitch 350	159
Autoswitch 480	170
VGA +	259
VGA Professional	Call
Video-7 Fastwrite	355
VGA	269
Vega Deluxe	180
V-RAM	475
Zenith 449 VGA	239

HARDCARDS

Plus 20 MG	$ 525
Plus 40 MG	659

TERMINALS

Wyse	
30	$ 285
50	369
85	439

COMPUTERS

AST	
Model 80	$1509
Model 140	2815
Model 340	4205
Model 390	5839
Other Models	Call
NEC	
Multispeed EL II	1495
Multispeed Hd	2329
Toshiba	
T-1000	749
T-1200F	1565
T-3120	3068
T-3200	3785
T-5100	4899
Wyse	
386	2735
Zenith Supersport/2	1655
Supersport 20 MG	2479
Supersport 286/Model 20	3445

MODEMS

Anchor 1200 Ext	89
1200B w/Software	59
2400 Ext	130
2400B w/Software	119
Hayes 1200	275
1200B	245
2400B	385
Prometheus	
1200B w/Software	75
2400B w/Software	129
Other Models	Call
US Robotics	
Password 1200	175
Courier 2400	289
Courier 2400E	335
HST 9600	635
Sporster PC	
2400B w/Software	119

- **No Charge for VISA and Mastercard**
- **We Do Not Charge Your Card Until Your Order is Shipped**
- You Pay the Ground Shipping $6.00 (Except Alaska and Hawaii) We Pay the Air Difference
- Free Air applies ONLY to orders up to 10 lbs. & Over $50.
- All products carry only manufacturer's warranties. We do not honor guarantees, rebates, trial period priviledges or promotional programs offered by manaufacturers.
- No APO, FPO, or international orders, please.
- **Call before submitting P.O.'s Ask for National Accounts**
- Personal and Company Checks Will Delay Shipping 3 weeks

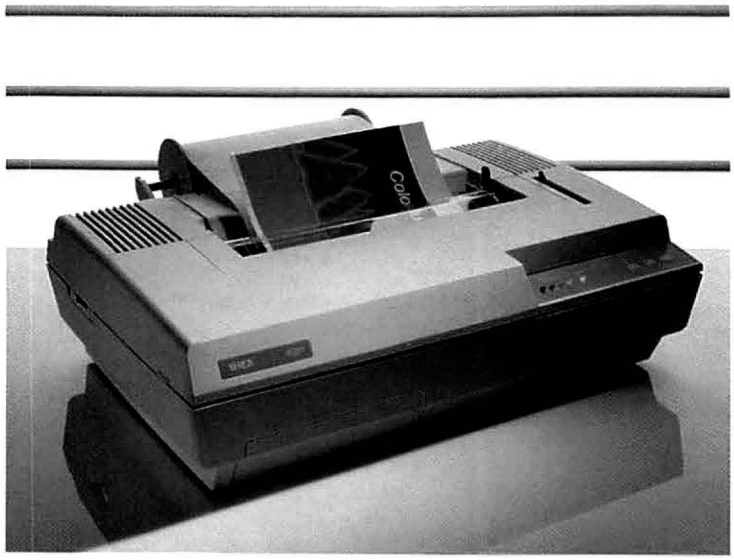
- Prices, Terms & Availability Subject to Change Without Notice
- Add 5% for C.O.D. Orders
- **We Do Not Guarantee Machine Compatibility**

Mailing Address:
8804 N. 23rd Ave./Phoenix, AZ 85021

- To Place an Order: 1-800-634-9270
- To Follow Up on an Order: (602) 944-2552
- Order Line Hours: Monday-Friday 7:00 a.m.-6:00 p.m. / Saturday 9:00 a.m.-1:00 p.m
- Order Processing (602) 944-1037 / 10:00 a.m-3:00 p.m. Monday-Friday

MEMBER MMC
MICROCOMPUTER MARKETING COUNCIL
of the Direct Marketing Association Inc

Circle 178 on reader service card.



The Xerox 4020 color ink jet printer.

JOHN GREENLEIGH

for start/stop, linefeed, and formfeed, plus LEDs to indicate paper out and low ink. Since it requires coated paper, operating the 4020 will run you between 13 and 20 cents a page, which is still considerably cheaper than the Paintjet's 25 cents per page.

This silent printing machine shines brightest with graphics—not a dot is left uninked—but you pay for quality with speed; in graphics mode, the 4020 performs only slightly faster than an old Epson MX. In text mode, however, the 4020 rolls out a 200-word, double-spaced page in 24 seconds draft, 45 seconds NLQ.

The 4020 comes with five resident fonts: 10-, 12-, and 17-pitch gothic; 10-pitch gothic italic; and 12-pitch roman. It offers 13 foreign-language character sets as well, plus expanded and compressed text, superscripts and subscripts, and underlining.

More than 150 software packages support the Xerox 4020, including *Ventura Publisher*, *PageMaker*, *Microsoft Windows*, *AutoCAD*, *GEM*, *Draw Applause*, *1-2-3*, and *WordStar*. For users whose software doesn't support the 4020, the unit also offers Diablo C150 emulation.

Setting up the printer is simple. Its four ink wells come prefilled. The key step is installing the maintenance fluid cartridge, which must be replaced every 800 pages. The 4020 lets you know when it's time to refill an ink color—about every 70 pages—by turning on a warning light.

Xerox sells rolls of coated paper in 8½- and 11-inch widths. The latter width lets you take advantage of the 4020's wide carriage to produce landscape output. Coated fanfold paper is also available.

While the Xerox 4020's speed and output quality can't compare to thermal-wax color printers like the Tektronix 4693D, it's much cheaper and delivers consistently good output. If you're looking for good color printing for in-house reports and transparencies, you can hardly do better for the price. —*Alan Southerton*

WHERE TO BUY

Xerox 4020
Xerox Corp.
901 Page Ave.
Fremont, CA 94538
415/791-4000
List price: $1495 (with one parallel or one serial port)
Accessories: 8½-by-11-inch coated paper (2500 sheets) $105, 8½-inch-by-82-foot coated roll (6 rolls) $77, 11-inch-by-82-foot coated roll (6 rolls) $95, 9½-by-11-inch coated fanfold paper (500 sheets) $60; transparencies (50 sheets) $67; ink cartridges (package of two) $11; maintenance fluid cartridge $18; maintenance fluid $14, printhead protection fluid $9; starter kit with roll feeder and various accessories $170
Warranty: one year parts and labor
Extended warranty: through dealer only
Technical support: no toll-free number, M–F 8–12:30, 1:30–6
For more information, see Products Featured in This Issue.

NEC MonoGraph

Full-page paper-white monitor

PROS: Speedy screen update, PostScript-compatible fonts in ROM

CONS: Doesn't work with all systems

If the thought of buying a full-page monitor to make desktop publishing more convenient conjures up visions of molasses-slow screen updates as the video board shuffles hundreds of thousands of pixels around, you'll be glad to hear about NEC's small-footprint MonoGraph. This $1999 monitor pairs an 8/16-bit

"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.

In fact, we've achieved an unbeatable standard of excellence in audio, video and computer magnetic media.

And it seems that our standards are catching on. Our own format for the 3.5" disk drive and floppy has received worldwide acclaim and is rapidly becoming the industry standard.

All of that engineering and technology went into our data cartridges as well, which is precisely why you can trust the storage of your critical documents and data to the Sony standard of excellence.

Such as the unsurpassed Sony QD-2000.

When you think about it, your data is your business. So why trust your data to anyone but the leader?

After all, trusting a standard of perfection isn't just a sign of pragmatism, it's a key to success. That's why people who insist on Sony are always one step ahead of the rest.

SONY.®
THE ONE AND ONLY.

© 1988 Sony Corporation of America. Sony and The One and Only are trademarks of Sony

Circle 54 on reader service card

REPLACE YO

PC WORLD
"Upgrade product of the year."
...PC World

"Editors' choice"
...PC Magazine

PC MAGAZINE EDITOR'S CHOICE

Installed in minutes, the Renegade 386™ motherboard turns any IBM PC, XT, AT or inexpensive clone into a powerful new computer, lightning fast with both old software AND new OS/2 releases.

Is this you?

You would like to have extraordinary computing speed and power. You want number crunching ability. You need complex CAD capabilities. Or graphics. Or multi-tasking.

And you haven't got it. (And you don't want to spend a fortune to replace good equipment with the newest standard.)

Weep no more. You can turn your *present* system into the latest, high-performance system that will *equal or exceed the best of the new computers.*

Renegade 386.™ A new heart and brain for your computer.

Renegade Technologies offers designers, engineers, architects, and computer-dependent businesses a simple and reliable alternative to obsolescence. Or the unreasonable expense of a new system.

Simply replace the "motherboard" of your present system with a Renegade 386™ motherboard.

It takes a screwdriver and less than 20 minutes. And costs but $1695.

That's *thousands of dollars less* than a new IBM System/2 Model 80.

But it gives you more than just the latest industry standard. You can run your old software on it. Probably anything you now use on your XT or AT. Big Blue can't do that.

You can use your present 16-bit peripherals. (If you've looked at PC "add-on" cards, you already know your old equipment would be useless.)

But with Renegade 386™ you'll have to find some other excuse to throw away your current modem, network card, EGA or disk controller cards.

Multi-task with Lotus 1-2-3 and other applications running side-by-side on the Microsoft Windows/386 desktop.

The Renegade 386™ board comes with an iron-clad *one year limited warranty.* It uses genuine U.S. made Intel 386 chips and is designed and manufactured in the U.S.A. by Hauppauge Computer Works. Hauppauge is a major developer of software support for Microsoft and IBM products, and is producer of the highly respected Hauppauge 8087 or 80287 highspeed math coprocessors. Over 50,000 have been sold.

Major computer magazine reviews in the last year have hailed our Hauppauge-made board as a major breakthrough in a high speed, high power, high performance upgrade product.

Not an accelerator card. Not a "turbo" gimmick. Renegade 386™ gives you a full-featured new computer.

Thanks to Renegade's 80386 microprocessor your computer will now boast a 32-bit data path—and a clock speed of 16 MHz with zero wait state access. Up to 8 expansion slots are provided depending on your computer configuration.

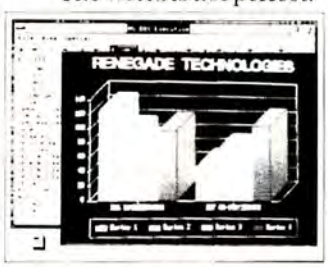
Your "new" computer also will now have 1 Megabyte of 100ns RAM. This is *not* a naked board. And it also includes a 32-bit high-speed RAM expansion slot which you can populate with up to *15 Mbytes* of system memory.

UR MOTHER

In practical terms that simply means that programs like Lotus 1-2-3 or new products like Foxbase 386, and almost anything else, *will run faster than anything you have ever seen.*

Which is a minor problem for some folks who are playing computer games on company time. Renegade 386™ may run them at speeds far too fast for human reactions.

The world is not perfect.



Faster, easier presentation graphics with newest software releases.

Otherwise Renegade 386™ is perfectly compatible with products like AutoCAD, Aldus PageMaker, Microsoft Windows, Ventura Publisher, the Novell Network and sizzlers like Paradox 386. We haven't yet found a popular program we can't run with it.

Power hungry? Equip Renegade 386™ with even more RAM—without speed loss.

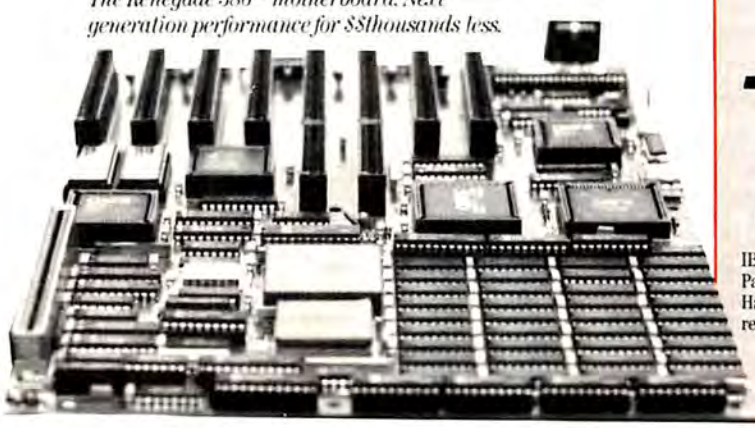
Add up to 15 Mbytes of system memory with Renegade™ expansion modules that plug right into your Renegade 386™ 32-bit expansion slot. *And run with no loss of speed* —something no IBM or Compaq model can match.

There's a lot of confusion in computer claims, but the fact is that with *zero* wait state, our 16 MHz is effectively the same as those highly touted machines running at 20 MHz with one wait state.

So plug in Renegade™ expansion modules in 2-and 4-Megabyte increments and run Windows 386 applications at the speed God intended.

$1695

The Renegade 386™ motherboard. Next generation performance for $8thousands less.



30 DAY TRIAL OFFER AND OUR NO-RISK GUARANTEE

We understand perfectly that you have no reason to believe anything you read. Including this ad. (We read too.)

So we invite you to evaluate the Renegade 386™ yourself. Call and order one. We'll send it with detailed, clear instructions. Use it in your own system, on your own work, for 30 days. Try it for brilliant presentation graphics, make massive and instant spreadsheet recalculation, run huge memory-hungry CAD programs. Wring it out—on anything your software is up to.

But don't stop there. Challenge your best computer technician. Or a consultant whose opinion you value. Ask them to compare Renegade 386,™ dollar for dollar, and feature for feature, with the best on the market.

After 30 days, if it isn't for you, for *any* reason, we'll take it back and write you a check immediately for your full purchase price.

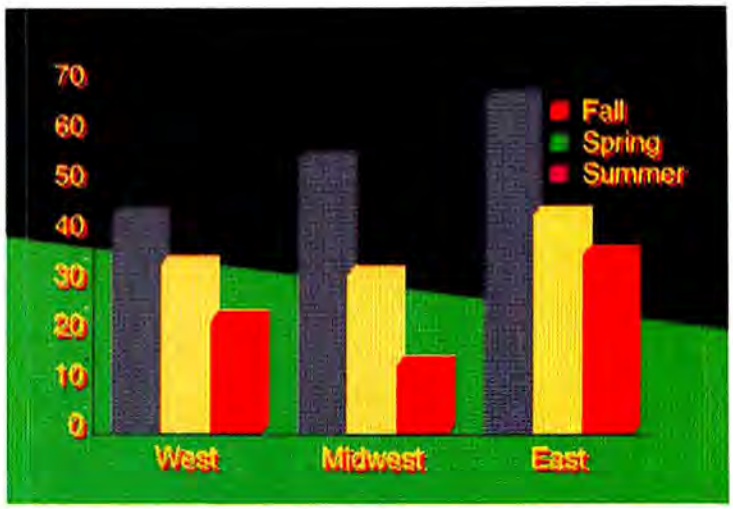
The risk is all ours. But we urge you not to wait. RAM chip prices are going up every day due to worldwide chip shortages. We can guarantee this current price only if you order now.

Call toll-free today. You have nothing to lose but yesterday's computer system.

1-800-426-2189

Renegade
TECHNOLOGIES
Redmond, Washington USA (206) 885-5700

IBM PC, AT, XT, Personal System/2, Microsoft Windows 386, Foxbase 386, Paradox 386, PageMaker, 1-2-3, Novell Network, Ventura Publisher, EGA, Intel, Hauppauge, Compaq and other brands and products are trademarks or registered trademarks of their respective holders.



Output from the Xerox 4020 color ink jet printer demonstrates high-quality graphics but requires coated paper.

video adapter with a built-in graphics coprocessor to make screen updates fly. Better yet, it costs $400 less than the only other similarly equipped monitor—the Verticom 2Page—and offers higher resolution.

The MonoGraph's 16-inch, portrait-mode, paper-white screen is easier to read than those on larger 19-inch monitors like the $2395 Viking 1—yet takes up no more desk space than NEC's MultiSync II monitor. It boasts 100-dpi resolution, delivering admirably crisp graphics and text. And unlike most "full-page" monitors, when you bring up *Ventura* in full-page mode, MonoGraph actually shows you a full page.

The MonoGraph achieves its speedy screen updates thanks to an on-board 82786 graphics coprocessor from Intel. Pushing pixels onto the screen at 1024-by-1024-pixel resolution, this chip rewrites the screen several times faster than would be possible if the system CPU were in charge.

Most full-page displays have their fonts in software; to speed performance the MonoGraph puts 15 high-resolution display fonts in hardware. Many full-page displays can't show kerning on screen; the MonoGraph's ROM fonts are kerned and PostScript compatible, so the screen image should preview the printed page exactly.

The MonoGraph system comes with software drivers for *GEM/3*, *Ventura Publisher*, and *Microsoft Windows*. It also provides hardware-level CGA emulation, so you won't need a second monitor for your regular programs—not even *Flight Simulator*. The CGA images (320- and 640-by-200-pixel resolution) are double scanned for improved 320- and 640-by-400-pixel resolution.

The MonoGraph's video board is unhampered by jumpers and DIP switches, making it a snap to install. Unfortunately, power requirements and hardware conflicts limit the systems you can install it *in*. The video board requires 75 watts, which is far beyond a PC's capacity; even some XTs will struggle under this load. And BIOS conflicts may cause compatibility problems with PCs such as the AMT 286. But NEC claims the display will work with 90 percent of the PCs on the market, including machines made by IBM, Compaq, and NEC.

The MonoGraph's high-speed screen updates, prekerned ROM fonts, large screen, and crisp paper-white image make it an excellent choice for desktop publishing. However, its large power consumption and BIOS problems prevent its use in some systems. This is definitely a case of try before you buy. —*TJ Byers*

WHERE TO BUY

NEC MonoGraph
NEC Home Electronics
1255 Michael Dr.
Wood Dale, IL 60191
312/860-9500
List price: $1999
Accessories: none
Requirements: 135-watt power supply
Warranty: one year parts and labor; CRT two years parts, one year labor
Extended warranty: none
Technical support: toll-free number, M–F 8–5
Other support services: 24-hour toll-free bulletin board
For more information, see Products Featured in This Issue.

John Diebold is a marine geophysicist specializing in computer analysis of seismic data. Lewis Perdue is the editor and publisher of PC Management Letter. *Alan Southerton is a senior technical writer for Progress Software in Bedford, Massachusetts. TJ Byers is a contributing editor for* PC World. ●

Introducing the new Blaser Star 2. The most cost efficient laser printer in its class.

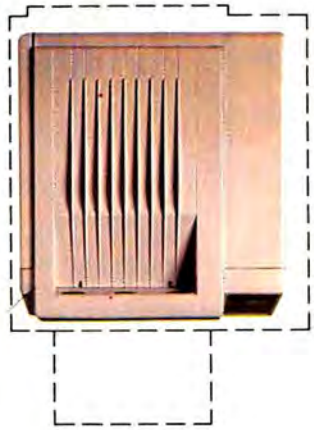
Operating costs are vital when selecting a long-term, cost-efficient laser printer. The Blaser Star 2 makes this decision for you by offering the best of both worlds—longer-life consumables at lower prices versus other laser printers in its class.

The Blaser Star 2 toner system also gives you the blackest blacks you've ever seen. Its unique high performance engine technology does more than just emulate the HP LaserJet Series II, Diablo 630, and Epson FX-80. It outperforms them. And this great performance is also available for OEMs.

At only 17"x18" Blaser Star 2 boasts the smallest footprint in the industry. And that's with no protruding trays. The Blaser Star 2 also has full page graphics (300x300 dpi) capabilities. Plus, with our advanced engineering you can do more. More fonts and more forms, up to 128 downloadable.

Add to all of these outstanding features an extended operating life, and you've got the best value in laser printers today.

Smallest footprint
Compare the small Blaser Star 2 17"x18" footprint with the HP LaserJet Series II



BLASER STAR 2

Blaser Industries, A Vodavi Company
8300 E. Raintree Drive
Scottsdale, AZ 85260
602-998-0400
1-800-322-3399

Circle 23 on reader service card

COMPUTER DIRECT

Will Not Be UNDERSOLD!

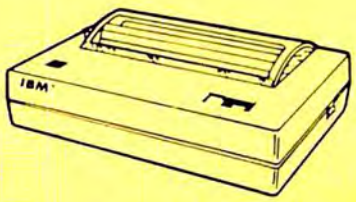
AND WE MEAN IT!*

Prices Expire 10-31-88

Free Catalog • Over 1,000 Software & Accessory Items In Stock

Genuine IBM® Printer

8½" Letter Size • 80 Column
Limited Quantities



- Upper & Lower Case (with true lower descenders)
- Advanced Dot Matrix - Heat Transfer
- Graphics With Commodore, & Apple Interfaces
- Ready to Hook Up To Serial Port Of IBM® PCjr.
- Low Cost Adapters For IBM®, Apple, Commodore, & Laser Computers
- Underline & Enlarged

Our Low Sale Price

$44.95

List $199

PC, XT & AT Compatible Internal Disk Drives

TEAC 360K - 5¼" Drive

- Double Sided/Double Density
- Fits IBM PC, XT & Compatibles
- Half Height
- List Price $199

$79.95

TEAC 1.2 M - 5¼" Drive

- 1.2 Mega Byte Memory
- Fits IBM AT & Compatibles
- Double Sided/Double Density
- List Price $199

$99.95

TEAC 720K - 3½" Drive

- Double Sided/Double Density
- Fits IBM PC, XT & Compatibles
- Half Height
- List Price $199

$99.95

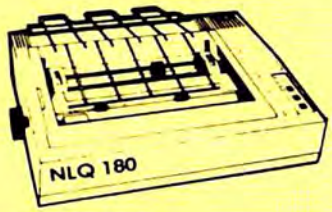
TEAC 1.44 M - 3½" Drive

- 1.44 Mega Byte Memory
- Fits IBM AT & Compatibles
- Double Sided/Double Density
- List Price $299

$139.95

Hi-Speed NLQ Printer

Lowest Price of 180 CPS Printer Available Anywhere



- High Speed Dot Matrix
- Near Letter Quality Selectable From Front Panel
- Italics - Elite - Condensed - Pica
- Tractor/Friction Feed
- Centronics Parallel Port
- * Lifetime Warranty On Print Head
- 6 Month Replacement Policy For Printer
- Dot Addressable Graphics
- 8K Print Buffer
- Low Cost Adapters Available

Our Low Sale Price

$149.95

List $499

Seagate

20 MEG Harddrive

- Supports MS DOS
- 20 Mega Byte Storage
- Auto Boots When Powered Up
- Floppy Disk Controller Included
- Fits IBM PC, XT & Compatibles
- ½ Height - Takes ½ the Room of Full Size Drives

Sale Price $249.95

List $499

Seagate

Super Fast ST 251 40 MEG Harddrive

- 38 ms Access
- Supports MS DOS
- 40 Mega Byte Storage
- Auto Boots When Powered Up
- ½ Height - Takes ½ the Room of Full Size Drives

Sale Price $389.95

List $699

5¼" Floppy Disks

Double Sided Double Density
Minimum Quantity 50
Maximum Quantity 250

19¢ each

100% Certified - Liftetime Guarantee

Box of 50 . . . . . **$9.50 (19¢ each)**
(without sleeves)

Box of 50. . . . . **$10.50 (21¢ each)**
(with sleeves)

Box of 100 (no limit) . . . **$24.00 (24¢ each)**
(with sleeves & labels)

Economy Sleeves	$1.00 per quantity of 50
Disk Labels	$3.95 per quantity of 100
Disk Notchers	$3.95 each

5¼" DS-DD

Includes Disks, Sleeves, Labels & Write Protects
no limit

24¢ each

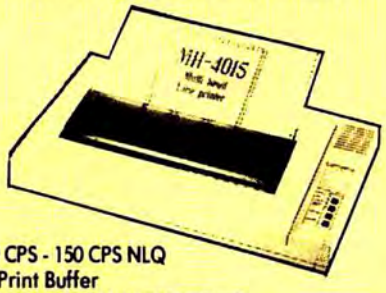
100% Certified • Lifetime Guarantee

Immediate Replacement if the disk ever fails!

Sold in lots of 100. . $24.00

720 CPS 15" Printer

Multi-Head Wide Carriage Printer With High Dot Resolution



- 720 CPS - 150 CPS NLQ
- 8K Print Buffer
- Print Speed of **214 LPM** In Draft
- 6 Print Heads Achieve High Dot Resolution In Higher Speed
- NLQ Speed Of 47.4 LPM
- 136 Column Wide Carriage
- IBM and Epson Mode
- Parallel Centronics Port

Our Low Sale Price

$799.95

List $1995

COMPUTER DIRECT
22292 N. Pepper Rd, Barrington, IL. 60010
Call (312) 382-5050 To Order!

* Illinois residents add 6½% sales tax. All orders must be in U.S. Dollars. We ship to all points in the U.S., CANADA, PUERTO RICO, & APO-FPO. Please call for charges outside continental U.S. or C.O.D. **MAIL ORDERS** enclose cashier check, money order, or personal check. Allow 14 days delivery, 2 to 7 days for phone orders and 1 day express mail. Prices, specifications & availability subject to change without notice. Shipping - $3.00 minimum, call for exact charges.Shipping and handling charges are not refundable. (Monitors only shipped in continental U.S.) **COMPUTER DIRECT** will match any valid nationally advertised delivered price on the exact same product with a comparable payment method (excluding any applicable sales taxes).

VISA — MASTERCARD — C.O.D.

COMPUTER DIRECT
Is 1st In PRICE, SUPPORT, & GUARANTEE!
WE LOVE OUR CUSTOMERS!

Prices Expire 10-31-88

15 Day Home Trial • 90 Day Immediate Replacement Policy

*15 MHz IBM® Turbo XT Compatible System

- 512K Professional Turbo XT Computer
- 360K Floppy Drive and Controller
- *15 MHz (Norton CI Rating)
- MS DOS 3.2 & GW Basic
- 12" Hi-Res 35 MHz Monochrome Monitor
- Genuine IBM® Printer With Interface
- One Roll Of Paper
- Word Processor, Spreadsheet & Data Base
- Complete DOS & System Tutor Included FREE!

Our Low Sale Price

$699.95

List $1995

*15 MHz IBM® XT Compatible Computer

Super Fast V20 CPU

- 512K Professional XT Turbo Computer
- 360K Floppy Drive and Controller
- *15 MHz (Norton CI Rating)
- MS DOS 3.2 & GW Basic
- Parallel, Serial & Game Ports
- TTL Monochrome Monitor Card
- Super Fast V20 CPU • "AT Style" Keyboard
- Security Keylock & Clock/Calendar

Our Low Sale Price

$599.95

List $1195

*16 MHz 286 IBM® AT Compatible Computer

OS/2 Compatible

101 Keys

- 80286 16 Bit Microprocessor
- 1.2 MEG Floppy Disk Drive
- *16 MHz (Landmark CPU Rating)
- 101 Key "AT Style" Keyboard • 0 Wait State
- BIOS w/Built-In Support for 3½" Drives
- Clock/Calendar & Security Keylock

$899.95 With Floppy/Hard Drive Controller Card, 512K RAM Memory Installed And Parallel & Serial Printer Ports

Our Low Sale Price

$599.95

List $2295

12" TTL Monochrome Monitor

For IBM & Compatibles

- High Resolution
- 80 Column
- Non-glare Screen
- 100 Lines At Center
- Super Low Sale Price

Our Low Sale Price

$59.95

List $199

IBM 300/1200 BPS Card Modem

- 1200 Baud Bell 212A/103 at 1200/300 BPS
- 100% Hayes Compatible
- Automatic Dialing & Answering
- Built-In Speaker With Volume Control
- Separate Voice and Data Jacks
- Both Touch Tone and Pulse Dialing
- Extensive Diagnostics
- Software Included

Our Low Sale Price $59.95 List $149

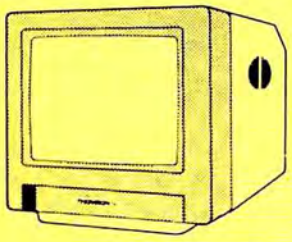
— Kiss Hco² —

IBM 300/1200/2400 BPS Card Modem

- Full or Half-Duplex Operations
- Hayes Compatible
- Auto Dial in Pulse, Tone & Tandem
- FCC Certified and Registered
- Includes Software
- Auto Originate and Answer Modes
- Reverse Mode Dial

Our Low Sale Price $119.95 List $349

13" RGB/Composite Color Monitor



THOMSON

The Vision of Personal Computers.

- Black Dot Screen
- 3 Monitors In One - Composite/RGB/80 Column
- Green Screen Only Switch
- Cables Included (please specify computer)

Our Low Sale Price

$199.95

List $499

Call **(312) 382-5050** *We Love Our Customers!* Mail

COMPUTER DIRECT
22292 N. Pepper Road
Barrington, IL. 60010

Circle 213 on reader service card

156 **PageMaker 3.0**
Automatic text flow and paragraph styles give *PageMaker* more clout in handling long documents.

158 **Draw Applause 1.0**
Ashton-Tate's exemplary business graphics package shines at color output.

164 **Manuscript 2.0**
Long popular for technical documentation, the Lotus word processor's new editing features suit it for long, complex documents.

172 **DataPerfect 2.0**
WordPerfect's data manager is idiosyncratic but works well with other WordPerfect family members.

176 **Forecast Pro**
Thanks to a clever built-in expert system, *Forecast Pro* gives you a statistical glimpse into your business's future.

PageMaker 3.0

Desktop publishing program

BEST BUY

PROS: Improved long-document handling through style sheets and automatic text flow, wraps text around irregularly shaped graphics, creates spot-color overlays

CONS: Unreliable hyphenation, lacks some advanced text editing features, no text search and replace, can't anchor graphics to text

Until recently, choosing a desktop publishing package was pretty simple. If you put out newsletters or other short documents that required page-by-page design, Aldus's *PageMaker* was clearly the best bet. For business reports, manuals, and other lengthy standardized documents, you bought Xerox's *Ventura Publisher*. But by adding formatting styles and automatic text flow to *PageMaker 3.0*, Aldus has narrowed the gap between its electronic drafting table and Ventura's long-document approach. The upgrade's only faults are error-prone hyphenation and *PageMaker*'s perennially poor text editing.

Like *Ventura*'s tags, *PageMaker 3.0*'s styles let you instantly specify formatting for paragraphs, headlines, captions, and other text elements throughout a document. You can pick the typeface size and style, alignment, tabs, and so on—even the color of text. The process is simple: Select the text, click on a style listed on screen, and watch the text transform. Creating styles is easy enough, and changing them is as easy as with *Ventura*.

Desktop publishers on deadline will appreciate *PageMaker 3.0*'s ability to quickly typeset word processed files. The program reads style names embedded at the beginning of each paragraph of a text file and assigns *PageMaker* styles to tagged elements once they're imported. *PageMaker* could always read text and a limited number of attributes (such as boldfacing and tabs) from such pop-

ular word processors as *WordPerfect 4.2* and *WordStar 3.3*. Aldus is now developing a series of installable "filters," which import and export entire word processing style sheets. A filter for *Microsoft Word* comes with *PageMaker 3.0*; one for *WordPerfect 5.0* was nearly ready at press time.

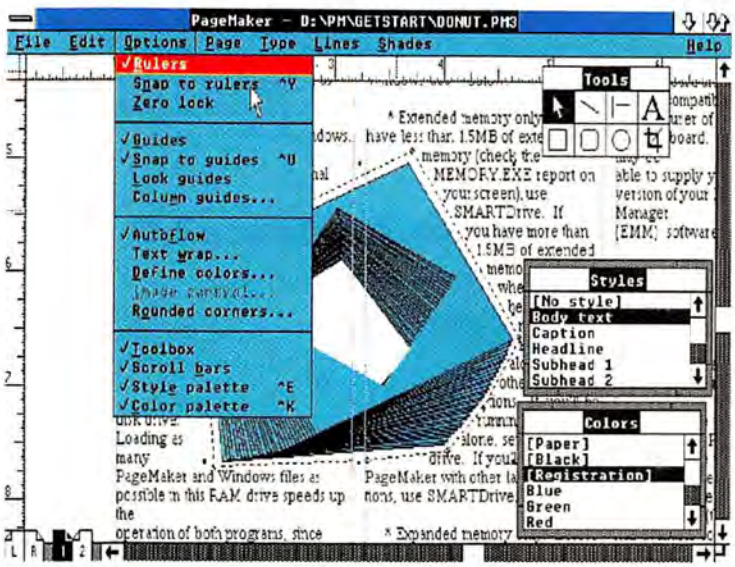
Autoflow, *PageMaker 3.0*'s second major enhancement, pours text from first page to last and adds any necessary extra pages automatically. No more dragging text around images or pushing it from one page to the next; text adroitly sidesteps any graphic element that's in the way, flows *through* images, or neatly fits around irregularly shaped graphics. (There is still no way to anchor text to graphics, however.)

If you're a designer, you'll welcome *PageMaker*'s spot-color support and scanned-image control. You can mix, name, and apply colors to any element on the page, then print the result on a Hewlett-Packard PaintJet color printer or as black-and-white separations with registration marks, ready for offset printing.

PageMaker's new image controls are just as impressive. From the image control menu, you adjust the contrast and brightness of a selected scanned or bit-mapped image by clicking on a graded scroll box. From the same dialog box, you can select halftone or line screens to superimpose over the original image.

For type hounds, Aldus has bundled Bitstream's *Fontware* font generation program, along with ten scalable typeface outlines in four families. Using the outlines, *Fontware* generates typefaces for both PostScript- and LaserJet-compatible printers in hundredth-of-a-point increments from 6 to 72 points.

Combined with *PageMaker*'s standard kerning and spacing controls, version 3.0 would satisfy the most exacting desktop typographers but for one serious pitfall: error-prone hyphenation. The program's algorithm/dictionary combination handles (or declines) most breaks correctly, but goofs inexcusably on such common words as *service* and *everyone*.



PageMaker 3.0's new spot-color and text-wrapping abilities extend the program's lead over Ventura Publisher in graphics handling.

And an old problem, *PageMaker*'s lack of text-processing functions, persists. The program still doesn't offer search and replace, automatic indexing, table of contents generation, or footnoting. On the other hand, Aldus deserves a gold star for *PageMaker*'s newly acquired ability to directly import, format, and align *1-2-3* and *Symphony* worksheets and *dBASE* files.

For desktop publishers who can't live without automatic indexing, table of contents generation, and footnotes, *Ventura Publisher* is still essential. But if you produce both short, design-intensive pieces *and* long text documents, *PageMaker 3.0* has become a very attractive choice. —*Luther Sperberg*

WHERE TO BUY

PageMaker 3.0
Aldus Corp.
411 1st Ave. S
Seattle, WA 98104
206/622-5500
List price: $795; upgrade from 1.0 $95; free if version 1.0a was bought after November 2, 1987
Requirements: 640K, hard disk, mouse, graphics card, DOS 3.10 or later version
Not copy protected
Technical support: 45 days free, no

toll-free number, M–F 7–6; extended support $100 per year (includes free or discounted upgrades, 5 hours toll-free phone support)
Other support services: CompuServe forum (GO ALDUS), free newsletter, introductory video $9.95
For more information, see Products Featured in This Issue.

Draw Applause 1.0

Business graphics package

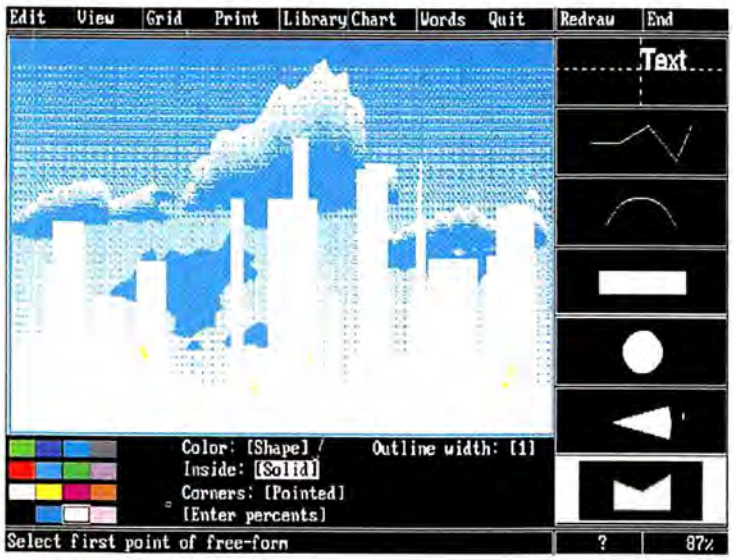
BEST BUY

PROS: Easy to use, good charting and drawing tools, excellent color slide capabilities

CONS: Limited 3-D options, RAM hungry

When Ashton-Tate released *Draw Applause*, it not only upgraded *Chart Master* but also challenged such powerful graphics packages as *Freelance Plus* and *Harvard Graphics* (see "Business Graphics Roundup," *PCW*, July 1988). *Applause* has solid charting and drawing tools and an innovative interface, but the package's real strength lies in such high-end color capabilities as a vast palette and sophisticated color shading.

Applause's mix of features includes VGA support, zoom and slide-show options, and a generous clip-art library. The program lets you easily create text, superimpose charts over complete images, and revise free-form objects. Moreover, *Applause* is fun to use. You rarely need to worry about backing out of a menu, undoing an undo, or losing control of an object you've temporarily hidden behind another object. On the downside, the current version requires 580K of RAM and offers neither bus mouse nor PostScript support. Ashton-Tate says an August upgrade needs only 512K of RAM and supports the bus mouse; a free PostScript driver is available from the company's customer support department.



Thanks to Draw Applause's graduated-color option, you can shade one hue into another, as in these clouds.

Applause combines a solid selection of basic chart types—bar, line, area, pie, tabular, and mixed—with a number of handy editing features. You can assign distinct colors to individual elements of a chart, place labels inside or outside chart elements, and size a chart so it fits neatly into *Applause*'s Drawing window.

In *Applause*'s Word Chart window, you can whip up text charts in nothing flat. This window comes with eight standard text layouts, which you can complement with 40 custom layouts. To enhance text, you can use rule, box, and drop-shadow options in all fonts (which range in size from 1 to 20 points). An automatic spacing option adjusts the amount of space between text lines. Text placement is also automatic, with options for vertical placement, centering, and right and left alignment.

While no match for *Freelance Plus* in data importing, *Applause* lets you key data into an 11-column-by-151-row data entry screen or import .DIF or .WK1 (but not .WKS) files. And *Applause* exports images in CGM (Computer Graphic Metafile) files, which can be read by *Ventura Publisher* and *PageMaker*. Finally, Ashton-Tate has thrown a lifeline to a group of users long isolated by incompatible file formats: a free translation utility lets *Applause* read files generated by Ashton-Tate's *Master Graphics* packages.

Compared to *Harvard Graphics*, *Applause*'s drawing talents are especially noteworthy. For example, you can copy an image up to 33 times to create a staggered depth effect and manipulate points in an existing object at lightning speed.

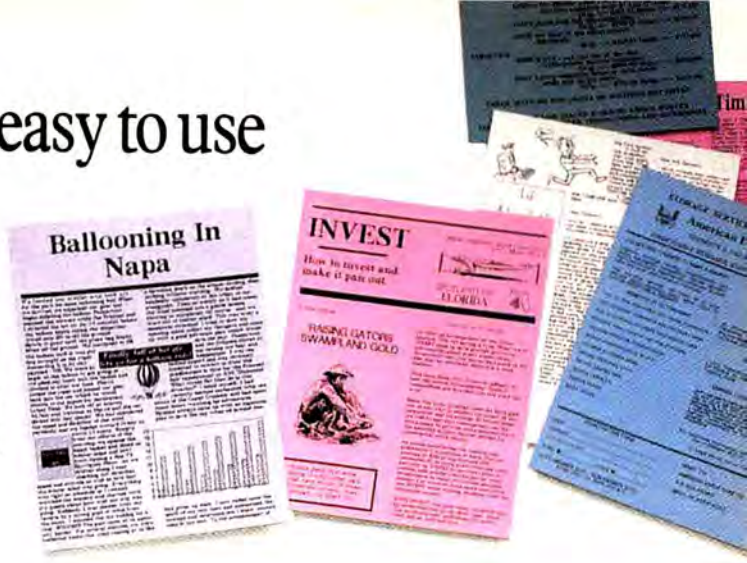
If you like menu choices close at hand rather than in pulldown menus, you'll like *Applause*'s main drawing screen. It's bor-

(continues)

"Calling NewsMaster easy to use is an understatement."
—*PC Magazine*

"NewsMaster's blend of text, graphics and ease of use is excellent."
—*Personal Computing*

"NewsMaster is an excellent low-end package... The more expensive and elaborate programs could learn a lot from its speed and simplicity."
—*DeskTop Publishing*



Imagine what they'll say about the new and improved version.

They'll like the more flexible page layout. They'll like the ability to capture graphics from Lotus 1-2-3,™ PC Paintbrush™ and other MS-DOS programs. And they'll especially like the better print quality.

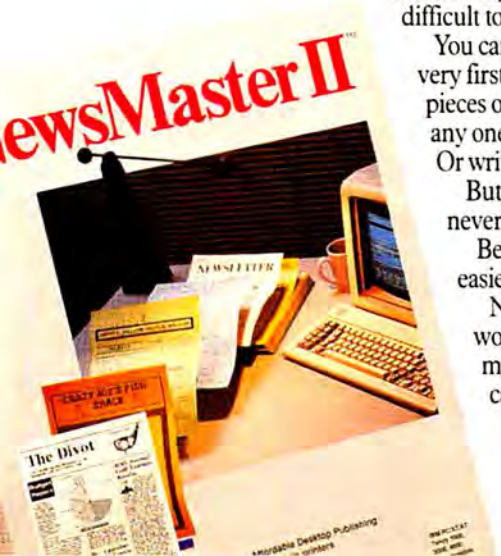
Introducing NewsMaster II,® the easiest desktop publishing software on the market. If you've always felt that desktop publishing was too difficult to master, NewsMaster II will change your mind.

You can create your own multiple-column newsletter. Or your very first recipe book illustrated with your choice of over 250 pieces of original art. Or you can print out a real estate report in any one of our 30 type fonts and vary the margins if you desire. Or write a short story using any one of our multiple printing modes.

But best of all, you can lose the manual. Because you'll probably never need it once NewsMaster II is up and running.

Before you buy any other desktop publisher, ask for a demo of the easiest desktop publisher. NewsMaster II.

NewsMaster II supports over 100 printers from dot matrix to laser, works with IBM PC® and compatibles, and it comes with a 30 day money-back guarantee. Available for $79.95 at your local dealer or call 800-443-0100, extension 238.



Unison World

A division of
Kyocera Unison, Inc.
P.O. Box 3056
Berkeley, California 94703

NEWSMASTER, NEWSMASTER II AND UNISON WORLD ARE REGISTERED TRADEMARKS OF KYOCERA UNISON, INC. LOTUS 1-2-3 IS A TRADEMARK OF LOTUS DEVELOPMENT CORPORATION. PC PAINTBRUSH IS A TRADEMARK OF Z-SOFT CORPORATION. IBM PC IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES, INC.

Circle 82 on reader service card

Swan Technologies

SWAN XT10

10MHz
Base System with Single 360K Drive.
Assembled & Tested IBM ® XT Compatible

- 10/4.77 MHz 8088-1
- 640K of RAM
- 150W Power Supply
- Ports: 1 Serial, 1 Parallel, 1 Game
- 8 Expansion Slots
- 101 Key, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Utilities Diskette, Full Documentation

Monographic System Also Includes:

- Switchable Monographic/CGA Compatible Video Card, with Parallel Port (2nd)
- Quality Hi-Resolution Amber Monitor w/Tilt & Swivel

$499 *Monitor not included*
With SWAN/MSDOS 3.3 Add $89

Mono System $639*

Mono System w/Dual Floppies $719

Mono System w/20MB Seagate #ST-225 .....$939*

Mono System w/30MB Seagate #ST-238 ..... $979*

**Single 360K Floppy Drive*

NEW! SWAN 286/10

10MHz
Base System with 1.2MB Drive.
Assembled & Tested IBM ® AT Compatible

- 80286 10/6 MHz Norton SI 11.2
- 512K of RAM Expandable to 1 MB
- 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, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full Documentation

Monographic System Also Includes:

- Switchable Monographic/CGA Compatible Video Card, with Parallel Port (2nd)
- Quality Hi-Resolution Amber Monitor w/Tilt & Swivel

$859 *Monitor not included*
With SWAN/MSDOS 3.3 Add $89

Mono System $999

Mono System w/20MB Seagate #ST-225 ..... $1249

Mono System w/40MB Seagate #ST-251 ..... $1399

Mono System w/80MB Seagate #ST-4096 .....$1699

Call For 1MB Upgrade Price!

Panasonic

1080i II $149
1091i II $179
1092i $319
1592 .....$389
1524 .....$599
1595 .....$469
3131 .....$319
3151 .....$519
Laser Printer ...$CALL

CITIZEN

120D $149
180D.....$CALL
MSP-40 .....$319
MSP-45 .....$CALL
MSP-55 .....$CALL
Premier 35 .....$539
Tribute.....$679

star

NX-1000 .....$159
NX-1000 Rainbow $229
NX-15 .....$349
ND-15.....$429
NB24-10.....$499
NB24-15.....$639
NX-2400 .....$CALL

Swan Modems
w/PC Talk III software

- Hayes ® compatible
- Auto answer/dial
- Tone and pulse

2400 baud internal $119
1200 baud internal $69
2400 baud external $135
1200 baud external $89

To order by mail: We accept money order, certified check, personal check. Allow 2 weeks for personal & company checks to clear. **Shipping:** $4.00 for software FOR ALL HARDWARE AND ANY ACCESSORY OVER 6lbs Call our Toll Free Number 1-800-468-9044 for shipping charges. Add $3.00 per box shipped COD. Additional shipping required on APO, FPO, AK, HI, and foreign orders. **Terms: PRICES REFLECT CASH DISCOUNT, ADD 1.9% FOR MASTERCARD OR VISA.** All products include factory warranty. **ALL SALES ARE FINAL** Defective items replaced or repaired at our discretion. Pennsylvania residents add 6% sales tax. Prices and terms subject to change without notice.

VISA MasterCard

tcp TUSSEY COMPUTER PRODUCTS P.O.BOX 1006 STATE COLLEGE, PA 16804 **1-800-468-9044**

DISTRIBUTED BY tcp

SWAN 286/12

12MHz

Base System with 1.2MB Drive,
Assembled & Tested IBM® AT Compatible

- 80286 12/6 MHz Norton SI 13.7
- 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, 6x16 bit, 2x8 bit
- 101 Key, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full Documentation

$1079 *Monitor not included*

With SWAN/MSDOS 3.3 Add $89

Mono System $1199

Mono System w/20MB
Seagate #ST-225 ..... $1449

Mono System w/40MB
Seagate #ST-251 ..... $1599

Mono System w/80MB
Seagate #ST-4096 ..... $1899

Call For 1MB Upgrade Price!

Monographic System Also Includes:

- **Switchable Monographic/CGA Compatible Video Card, with Parallel Port (2nd)**
- **Quality Hi-Resolution Amber Monitor w/Tilt & Swivel**

NEW! SWAN 386/16

16MHz

Base System with 1.2MB Drive,
Assembled & Tested IBM® PC Compatible

- 80386 16/8 MHz Norton SI 18.0
- 1MB RAM, 32 bit data bus
- 80387 Math Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 2 Serial, 1 Parallel on board
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots, 2x32 bit, 5x16 bit, & 1x8 bit
- 101 Key, Touch & Click Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette, Full

$1995 *Monitor not included*

With SWAN/MSDOS 3.3 Add $89

Mono System $2115

Mono System w/40MB
Seagate #ST-251 ..... $2499

Mono System w/80MB
Seagate #ST-4096 ..... $2799

Monographic System Also Includes:

- **Switchable Monographic/CGA Compatible Video Card, with Parallel Port (2nd)**
- **Quality Hi-Resolution Amber Monitor w/Tilt & Swivel**

Video Upgrades for Swan Systems

12" to 14" Monochrome: From standard 12" to 14" Flat Screen Monitor
Add $39

CGA: Monographic to Color System, with RGB Monitor
Add $170

EGA: Monographic to Enhanced Color System with 640 x 480 EGA card (CGA, MDA, HGA modes) and 14" EGA monitor
Add $399

VGA: Monographic to VGA Color system with VGA card (compatible with all 17 VGA modes) and 14" VGA monitor
Add $499

All Swan Systems Include...

30 DAY SATISFACTION GUARANTEE
Your complete satisfaction is our top priorty. Any ***Swan computer system*** may be returned within 30 days from the date of shipment for a full refund. *

FULL 1 YEAR WARRANTY
All Swan products include a full 1 year warranty on parts and labor. A second year SEW (Swan Extended Warranty) is available. Call or write for details.

FAST DELIVERY ... We ship within 24 hours. **

TECHNICAL SUPPORT IS TOLL-FREE Our technical and service staff is on call Mon-Fri 9-5 to answer all of your questions and make sure that you get the most from your system.

* 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.
** Custom Systems May Take Longer.

Purchase orders accepted from qualified corporations and institutions

Swan Video Cards

ALL CARDS INCLUDE:

- PARALLEL PRINTER PORT
- FULL 1 YR WARRANTY

SWITCHABLE
Switchable from Hercules ® to CGA
$69

EGA
- 640 X 480 Resolution
- EGA/CGA/TTL

$119

High Speed Hard Drives

- **Miniscribe 6085 (71MB)**
  28 ms Access/Full Height..... $779
- **Seagate ST-251-1 (40MB)**
  28 ms Access/1/2 Height..... $489
- **Seagate ST-4096 (80MB)**
  28 ms Access/Full Height..... $629

Swan Tape Drive

- QIC -40 operating standard
- Network compatible
- Full 1 year warranty

SWAN 40MB Drive, Internal . $339
SWAN 40MB Drive, External . $429

Call For Pricing on Tape Cartridges!

Swan AT-Style Keyboard

- 101 Key "Touch & Click" Keyboard
- XT & AT compatible
- Full 1 year warranty

$69

Circle 207 on reader service card

CALL TOLL FREE 1-800-468-9044

For Information
Call 814-234-2236
FAX 814-237-4450

tcp

FEATURES EVALUATION

Draw Applause: Master of Color

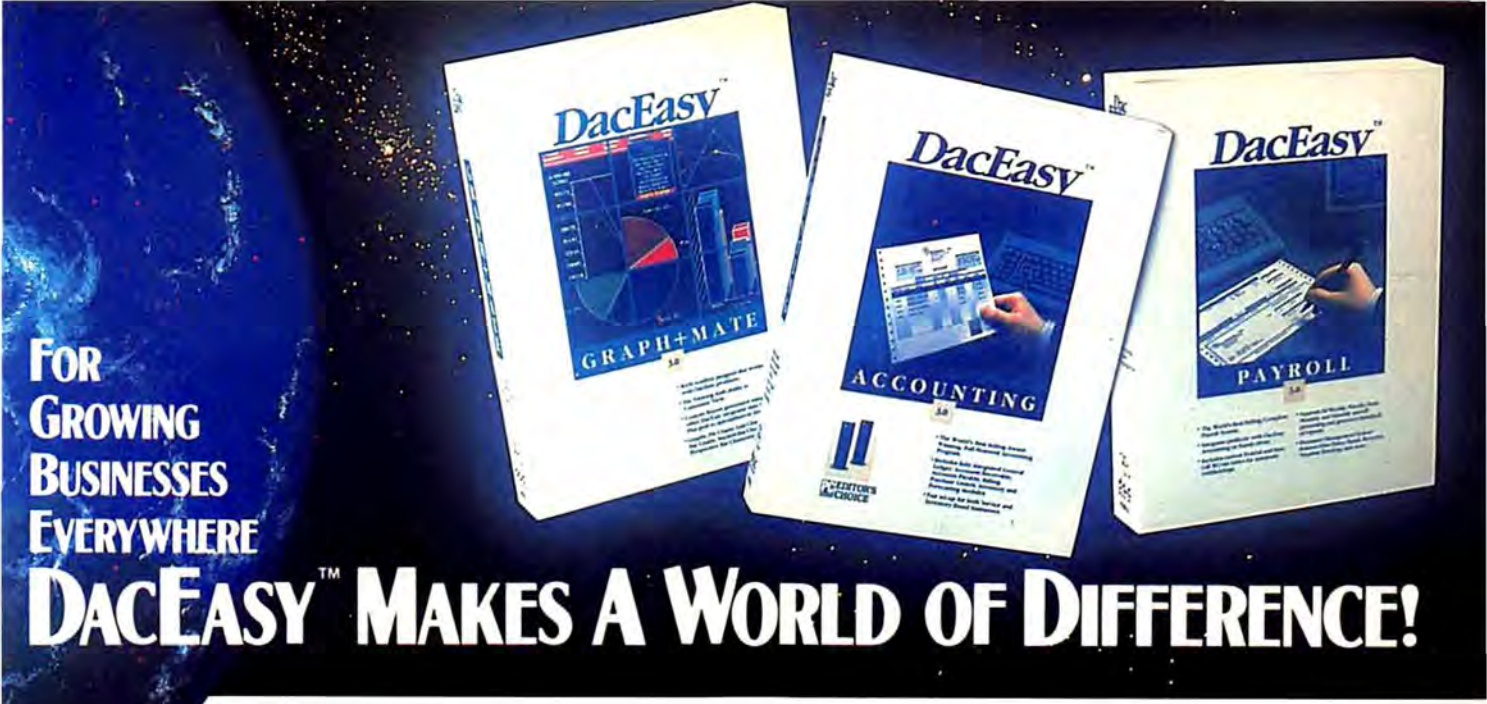
Ashton-Tate's outstanding package offers features to match those of Harvard Graphics and Freelance Plus.

● Yes
○ No
◒ Deficient

	Draw Applause 1.0	Harvard Graphics 2.1	Freelance Plus 2.0
Bar graphs			
Vertical/horizontal bar	●	●	●
Maximum data sets per clustered bar graph	10	8	8
Overlapped bars	◒[1]	●	○
3-D bars	●	●	○
Pictographs	●	○	○
Bar/line graphs	●	●	○
Step graphs	○	●	○
Change bar width/spacing	●	●	○
Pie charts			
Maximum slices per pie	16	12	16
Maximum exploded slices	16	12	16
Two- or four-pie charts	◒[1]	●	●
Proportional pie charts	○	●	○
3-D pie charts	●	●	○
Line graphs			
Scatter plots	○	●	●
Maximum line types	2	4	8
Maximum line markers	0	13	9
Maximum data points per line	150	240	120
Maximum data sets per line graph	10	8	8
Area graphs	●	●	○
Other graph types			
High/low/close	○	●	○
Bubble charts	○	○	○
Gantt charts	○	○	○
Word graphs	●	●	●
Free-form graphics			
Free-form lines/shapes	●	●	●
Maximum selectable patterns	7	12	15
Ellipses and arcs	●	●	●
Straight/rounded rectangles	●	●	●
Other geometric elements	●	●	◒[2]
Select all elements	●	●	●
Copy/move elements between files	●	◒[3]	●

	Draw Applause 1.0	Harvard Graphics 2.1	Freelance Plus 2.0
Free-form graphics			
Flip/rotate objects	●	○	◒
Undo command	●	●	●
Zoom feature	●	○	●
Rulers/grids	●	●	●
Data import			
Reads ASCII	○	●	●
Reads .WKS, .WK1	◒[4]	●	●
Reads .PIC	○	○	●
Reads dBASE	○	○	●
Reads Metafile	●	◒[1]	●
Reads .DIF	●	○	●
Miscellaneous			
Multiple typefaces and sizes	●	●	●
Slide-show feature	●	●	○
Borders or frames	●	●	●
Macro capabilities	○	●	○
Device support			
Mouse	●	●	●
PostScript driver	◒[5]	●	●
HP LaserJet Plus	●	●	●
HP HPGL–compatible plotters	●	●	●
Xerox 4020 color printer	●	●	●
Polaroid Palette	○	●	●
Polaroid Palette Plus	○	●	○
Epson dot matrix printers			
EX	●	●	○
FX	●	●	●
JX	○	●	○
LQ	○	●	○
LX	○	●	○
MX	○	●	●
RX	●	●	●

[1] Separate utility required.
[2] Available with clip art library.
[3] User must merge saved images on screen.
[4] .WK1 only.
[5] Driver available from company.



FOR GROWING BUSINESSES EVERYWHERE
DACEASY™ MAKES A WORLD OF DIFFERENCE!

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.

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 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.

DacEasy™. The World's Best Ongoing Customer Support and Training! Disk-based tutorials, FREE Getting Started Support, and a brand new video tutor are just a few of the many products and services Dac offers. Accounting and Payroll Tutors serve as on-screen supplements guiding you through installation to complete set-up with colorful graphics, sounds, primers and examples. And now, you can enjoy at your convenience, DacEasy Accounting Video Tutor, a two-hour VHS tape for a fun way to learn Accounting 3.0. Toll-free Extended Support plans and nationwide DacEasy seminars are also available.

A World of Difference in Price! DacEasy offers the growing business a world of products excelling in performance and price! Priced at $99.95 each are DacEasy Accounting (all seven modules), DacEasy Payroll and DacEasy Graph+Mate. And for a significant savings is the DacEasy BonusPack which includes DacEasy Accounting, Accounting Tutor, DacEasy Payroll and Payroll Tutor, for only $199.95. A great start to computerizing your growing business the DacEasy way.

To order DacEasy™ Accounting, Payroll and Graph+Mate by mail send $99.95 (each), BonusPack $199.95 to Dac Software (address below). (Plus $7.50 Shipping/Tx residents add sales tax/$17.50 shipping outside U.S.)

DacEasy™

Call 1-800-992-7779
(In Canada, Call 519-747-9633)

Dac Software
17950 Preston Road • Suite 800 • Dallas, TX 75252

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 (384k 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

dered on two sides by menus and graphic icons that correspond to text, lines, arcs, rectangles, circles, wedges, and polygons. Selecting an icon displays an option panel from which you can pick a color, a fill pattern, and an outline width or summon context-sensitive help.

When it comes to generating color slides, *Applause* matches the more specialized *35mm Express* and is far easier to use than dedicated graphic art tools like Zenographics' *Mirage*. Some *Applause* options are irresistible: Using graduated color, for example, you can create an image of a cloud that subtly shades from light gray to blue. The 64-color EGA and VGA palettes display 16 colors on screen simultaneously—from lavender to camouflage green—and dithering can expand the range to 1024 hues. If the program's five predefined palettes don't suit your taste, you can define up to 43 additional ones. *Applause*'s built-in communications option makes it easy to transmit images to the Ashton-Tate Graphic Service (which is actually MAGICorp, the same vendor that handles *35mm Express*).

Applause supports an acceptable mix of printers, including Hewlett-Packard and Xerox laser printers and such plotters as the HP ColorPro. A batch print mode lets you print up to 99 images at a sitting. But *Applause*'s lack of PostScript support is a major lapse.

In *Applause*, Ashton-Tate has created a well-rounded graphics package that combines ease of use and strong drawing and slide-producing capabilities. If you've ever wished *Harvard Graphics* could draw or *35mm Express* weren't so focused on slides, take a look at *Applause*. —*Alan Southerton*

WHERE TO BUY

Draw Applause 1.0
Ashton-Tate Graphics Products
1000 Bridgeport Ave.
Shelton, CT 06484
203/925-5600
List price: $495
Requirements: 640K; hard disk (1.3MB disk space required); EGA, PGC, VGA, or Vermont Micro Systems controller (and compatible monitor); DOS 2.10 or later version
Not copy protected
Technical support: 90 days, toll-free number, M–F 9–7; extended support $50 per year (15 calls, user guide, technical tips booklet, free monthly newsletter)
Other support services: monthly newsletter $18 per year; CompuServe forum (GO ASHTON); training kit (instructor's guide $109, participant's guide $24.95); one-day training at Ashton-Tate $190; on-site training for up to 16 people $1200
For more information, see Products Featured in This Issue.

Manuscript 2.0

Word processor

PROS: Well-integrated outliner, style sheets, formatting features

CONS: Hard to learn, awkward basic editing commands, slow

When Lotus first released *Manuscript 1.0* in 1986, people found its outline-based structure and document preview feature intriguing but didn't like the program's complex interface and lack of advanced editing tools. Thanks to an arsenal of new editing features—including excellent graphics import capabilities—*Manuscript 2.0* should grow beyond its limited popularity as a word processor for scientific and technical documentation.

Lotus has given *Manuscript* so many new features, it's hard to list them all. Version 2.0 offers macros, boilerplate libraries, and a thesaurus, and its cumbersome spelling checker has been improved. The program automatically updates *1-2-3* and *Symphony* worksheets and offers batch printing, improved footnoting, hyphenation, and header and footer routines. Other noteworthy additions include snaking columns, conditional mail merge, and style-sheet tags. And for good measure, Lotus tossed in automatic worksheet updating and excellent indexing, footnoting, and table layout features.

With its function keys, hot keys, and a *1-2-3*-like menu bar, *Manuscript*'s interface is largely unchanged, and the program is still a bear to learn. To ease the way, Lotus has im-

IN BUSINESS, BEING OUT OF CONTROL MEANS YOU'RE NEVER QUITE FINISHED WITH WORK. GRANDVIEW CAN HELP.

Overload. Once in a while, it happens to the best of us. GrandView helps fast. Without a big investment of time you don't have.

Its outlining quickly and easily captures to-do lists and other critical business information and organizes it (and you) automatically. Advanced writing instantly expands that information and formats it into stunning documents of any size or shape. And category cross-referencing makes tracking delegated tasks, details, or projects as easy as pressing a key.

All of which helps you get back in control now. And keeps you there.

Quite simply, GrandView works. Without pain. Without practice. Call now for your free demo disk (a $9.95 value). And see an easier future for yourself.

FREE DEMO DISK AND $50 REBATE, 800-888-0886 Ex. 733W

SYMANTEC™ *Suggested retail price $295. GrandView is a trademark of Symantec Corp. © 1988 Symantec Corp., 117 Easy Street, Mountain View, CA, 94043*

Circle 84 on reader service card

Orders? Queries?

□ **3½" format available from us. Specify when ordering.**
◉ **package includes both 5¼" and 3½" disks.**
Ⓡ **3½" format available from manufacturer by request. Call us for details.**
CP—copy-protected; **NCP**—not copy-protected.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software ... NCP
ⓇAlphaworks 1.0 *(integrated package)* ... $115.
□Advanced Keyworks 1.0 ... 175.
□ALPHA/three 1.1 *(dB3 file compatible)* ... 219.
American Small Business Computers
□Design CAD 3.0 *(NCP)* ... 159.
□Design CAD 3D 1.1 *(NCP)* ... 159.
Application Techniques ... NCP
◉Pizazz Plus ... 75.
Ashton-Tate ... NCP
□dBASE III Plus 1.1 ... call
◉MultiMate Advantage II 1.0 ... 299.
□Master Graphics Pack ... 299.
Best Programs ... NCP
□Label Master 3.1 *(mailing label program)* ... 29.
Bloc Development ... NCP
□FormTool 2.01 ... 59.
Borland International ... NCP
□Turbo BASIC 1.1 ... 67.
□Turbo C 1.5 ... 67.
□Turbo Pascal 4.0 ... 67.
□Superkey 1.1 ... 67.
□Reflex 1.1 ... 99.
□Eureka 1.0 ... 99.
◉Sidekick Plus 1.0 ... 129.
ⓇSprint 1.0 ... 129.
ⓇQuattro 1.0 w/SQZ!Plus 1.0 ... 159.
◉Paradox 2.0 *(easy-to-use database)* ... call
Broderbund ... CP
□Print Shop ... 39.
□Memory Mate 3.01 *(NCP)* ... 45.
Computer Associates ... NCP
◉SuperCalc 4 1.1 ... 299.
Core International ... NCP
□Corefast 2.0 ... 99.
Crosstalk Communications ... NCP
□Crosstalk XVI 3.61 ... 95.
□Crosstalk MK.4 1.0 ... 124.
Dac Software ... NCP
□Dac-Easy Payroll 3.0 ... 59.
□Dac-Easy Light 1.0 ... 45.
□Dac-Easy Accounting 3.0 ... 59.
□Dac-Easy Bonus Pak 3.0 ... 115.
Digital Research ... NCP
□Gem Draw Plus 2.01 ... 189.
□Gem Desktop Publisher 1.1 ... 259.
5th Generation ... NCP
◉Fastback Plus 1.01 ... 99.

PC Connection Software Special
through October 31, 1988

Accolade ... CP
Ⓡ**Testdrive**

If you've ever wondered what it would be like to experience the power and performance of the world's most exclusive cars, wonder no more. Accolade's Testdrive, as seen in *PC Magazine's* After Hours (Vol. 7, No. 14), puts you behind the wheel of five exceptional automobiles in a driving simulation guaranteed to ignite your adrenaline.

Is your heart strapped in? Good. Hit warp speed in a Ferrari Testarossa, blow the doors off with the Lotus Turbo Esprit, corner until the tires scream in a Porsche 911 Turbo, bring your oil to a boil in a Lamborghini Countach, and dust the competition in a Corvette.

Testdrive (for IBM PC/XT/AT/PS/2 and compatibles ... $22.

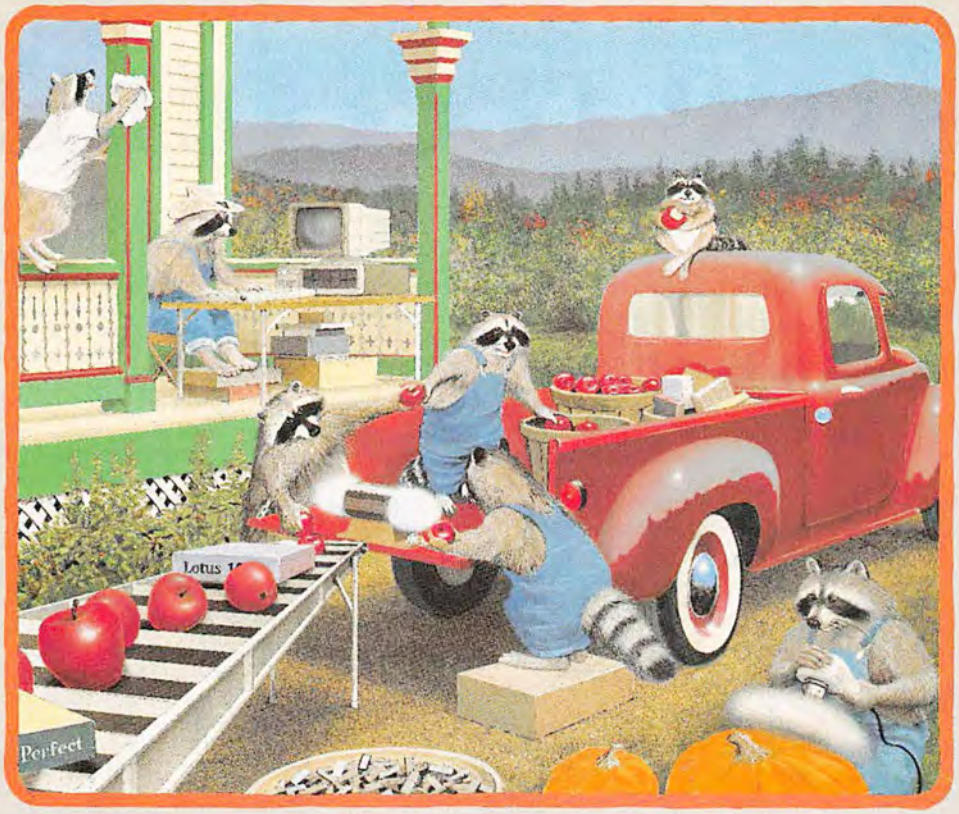
Fox Software ... NCP
Foxbase Plus 2.1 ... 209.
Funk Software ... NCP
□Sideways 3.21 *(creates wide printouts)* ... 42.
◉Worksheet Utilities 1.0 *(1-2-3 utilities)* ... 59.
General Information ... NCP
□Hot Line Two ... 57.
Generic Software ... NCP
◉Generic CADD Level 3 1.01 ... 109.
□Dot Plot 3.0 ... 35.
□Drafting Enhancements ... 35.
Harvard Associates ... NCP
PC LOGO 2.0 ... 89.
Hayes ... NCP
□Smartcom II 3.0 ... 89.
Hilgraeve Software ... NCP
□HyperACCESS 3.3 ... 89.
Individual Software ... NCP
◉Typing Instructor Encore ... 26.
□Professor DOS *(with Smartguide)* ... 33.
Intuit ... NCP
□Quicken 2.0 ... 35.
Javelin Software ... NCP
□Javelin Plus 2.01 ... 249.
Lotus ... NCP
□1-2-3 2.01 *(now not copy-protected)* ... call
□Symphony ... call
MacroPac International ... NCP
101 Macros for:
1-2-3 dBASE III Plus WordPerfect Excel ... *each* 42.
MECA ... CP
□Managing Your Money 4.0 ... 125.
Meridian Technology ... NCP
□CarbonCopy Plus 5.0 ... 115.

Micro Logic ... NCP
□Tornado 1.8 ... $55.
Microlytics ... NCP
□Gofer 1.0 *(text retrieval system)* ... 45.
□Wordfinder 4.0 *(electronic thesaurus)* ... 35.
MicroPro ... NCP
□WordStar Professional Release 5 ... 259.
□WordStar 2000 Plus Rel. 3 *(Personal Ed.)* ... 259.
Microrim ... NCP
◉R:BASE for DOS (version 2.1) ... 449.
Microsoft ... NCP
□Learning DOS *(for any DOS version)* ... 35.
□Windows 286 2.1 ... 69.
◉Works 1.05 ... 99.
◉Windows 386 2.1 ... 129.
Bookshelf 1.0 w/Amdek Laser Drive ... 799.
◉Word 4.0 ... 209.
◉Excel 2.0 *(requires 80286/80386 CPU)* ... 319.
□Quick BASIC 4.0 ... 69.
□Quick C 1.01 ... 69.
ⓇMacro Assembler 5.0 ... 99.
ⓇC Compiler 5.1 ... 299.
Migent ... NCP
◉Ability Plus 1.0 ... 149.
Monogram ... NCP
□Dollars & Sense 3.1 ... 105.
Nantucket Software ... NCP
◉Clipper *(Summer '87, dB3 Plus compiler)* 459.
New England Software ... NCP
◉Graph-in-the-Box Release 2 ... 75.
Nolo Press ... NCP
□WillMaker 3.0 ... 35.
North Edge Software ... NCP
□Timeslips III 3.3 ... 119.
Owl International ... NCP
□Guide 2.0 ... 143.
Paperback Software ... NCP
□VP-Planner Plus 2.0 ... 145.
□VP-Expert 2.0 *(expert system)* ... 145.
Paul Mace ... NCP
□H/Test-H/Format 2.0 *(hard-disk tools)* ... 49.
□Mace Utilities 4.1 *(DOS utilities)* ... 55.
Personal Computer Support Group ... NCP
□Lightning 4.80 ... 57.
◉Lucid 3-D 1.22 ... 89.
Personics ... NCP
ⓇSmartNotes 2.0 ... 49.
ⓇSeeMORE 1.0 ... 49.
Ⓡ@BASE 1.1 ... 119.
Peter Norton ... NCP
◉Norton Utilities 4.0 ... 55.
◉Advanced Utilities 1.0 ... 79.
ⓇDan Bricklin's Demo Program 2 ... 99.
Quarterdeck ... NCP
□DESQView 2.01 *(operating environment)* ... 79.
□Expanded Memory Manager 4.1 ... 39.
Revolution Software ... NCP
◉Cruise Control 3.02 ... 39.
Simon & Schuster ... NCP
□Typing Tutor IV ... 33.
ⓇProfessional Thesaurus 1.0 ... 79.
◉New World Writer II 1.0 ... 89.

For IBM Personal Computers exclusively.

PC CONNECTION®

COPYRIGHT PC CONNECTION, INC., 1988. PC CONNECTION, PCTV AND THE RACCOON CHARACTERS ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC. MARLOW, NH.



PC Polish.

Rise and Shine.
(Or, the incredible brightness of PCs).

Back when the IBM-PC was still a gleam in some engineer's eye, the inhabitants of Marlow, NH (pop. 555) already knew the value of getting a glow on. Nothing like a little luminosity to brighten up your day. So, whether we're polishing the pick of our local crop, buffing the bumpers on our buggies and bikes, or preparing your peripheral for packaging, we make sure that everything we do radiates perfection. Inside and out.

Get some sheen in your machine.

Over the years, PC owners of every persuasion (PC, XT, AT, PS/2) have taken a shine to the way we do business here in Marlow. Orders fly out with blazing speed. Our product ads dazzle with details about copy protection and warranties. And every sales rep is primed with a profusion of particulars pertaining to the power and performance of every product we peddle. So, next time your PC starts to lose its luster, give us a call. Remember, we have a special crew of technical titans to give customers toll-free support. They've explored the pinnacles and perimeters of printer performance. They can clarify the most convoluted cable connections. Rumor has it, they even know who put the RAM in the Ram-a-lam-a-ding-dong.

What's this about free macs?

At PC Connection we know that all that glitters need not be sold. Some of it should be given away. Like this month's delicious offer. An assortment of premium macs and other apples from nearby glitzy groves, packed in a classy, made-in-New Hampshire gift crate. It's free with any order of $500 or more between now and November 30.

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.

How about these apples? Packed in an old-style wood box with slide cover, featuring our delectable mascot. Offer not available to net accounts. One per customer.

For IBM Personal Computers exclusively.

PC CONNECTION®

©COPYRIGHT PC CONNECTION, INC., 1988. PC CONNECTION AND THE RACCOON CHARACTER(S) ARE REGISTERED TRADEMARKS OF PC CONNECTION, INC., MARLOW, NH.

Call us for a warm

Softlogic Solutions ... NCP
☐Software Carousel 2.02 . . . . . $49.
☐Disk Optimizer 4.0 *(w/Data Guardian)* . . . . 45.
Software Publishing ... NCP
☒Professional Plan 1.01 . . . . . 59.
☐PFS:First Publisher 2.0 . . . . . 79.
☒PFS:First Choice 2.0 . . . . . 89.
☒Professional File 2.0. . . . . 179.
☒Professional Write 2.0 . . . . . 179.
☒Harvard Graphics 2.1 . . . . . 299.
☒Harvard Graphics Accessories also available . . . . . call
☒Harvard Total Project Manager II . . . . . 379.
Stone & Assoc. ... NCP *(reqs. graph. brd.)*
My Letters,Numbers,Words *(ages 2 to 6)*. . 27.
Kids Stuff *(ages 2 to 6)*. . . . . 27.
Symantec/Turner Hall ... NCP
☒SQZ!Plus 1.01 . . . . . 59.
☒4Word 2.0 . . . . . 59.
☒Q & A Write 1.01 . . . . . 119.
☒Grandview 1.0. . . . . 175.
☐Q & A 3.0 *(database, word processor)* . . . 209.
☒Inbox *(E-mail)* . . . . . 349.
☐*Breakthrough* Timeline 3.0 . . . . . 349.
T/Maker ... NCP
ClickArt Business Images . . . . . 28.
The XTREE Co. ... NCP
☐XTREE Pro 1.0 . . . . . 69.
TOPS ... NCP
Flashcard (AppleTalk network card; 1 year warranty) . . . . . 169.
NetPrint 1.08 *(share printers)* . . . . . 119.
TOPS 2.0 . . . . . 119.
Traveling Software ... NCP
Battery Watch *(3½" only)* . . . . . 27.
☒LAP-LINK Plus 1.0. . . . . 85.
☒Desklink 2.0 . . . . . 99.
True BASIC, Inc. ... NCP
☐True BASIC 2.03 *(now includes Runtime)* . . 57.
☒Algebra *(includes both I & II)* . . . . . 32.
Vericomp ... NCP
☒SoftBytes 2.0. . . . . 35.
☒SoftBytes 386 2.53 . . . . . 49.
WordPerfect Corp. ... NCP
☒WordPerfect Library 2.0. . . . . 69.
☐WordPerfect 5.0. . . . . 255.
☒DataPerfect 2.0 . . . . . 299.
Xerox ... NCP
☒Ventura Publisher 1.1 . . . . . 549.

RECREATIONAL

Accolade ... CP *(reqs. graphics brd.)*
☒Hardball *(baseball simulation)* . . . . . 11.
☒Testdrive *(driving simulation)* . . . . . special
Electronic Arts ... CP *(reqs. graphics brd.)*
☐Chuck Yeager's Flight Simulator . . . . . 32.
Infocom ... NCP
☒Zork Trilogy . . . . . 33.
Microprose ... CP
☐F-15 Strike Eagle *(requires CGA)* . . . . . 22.
☐Gunship *(requires CGA or EGA)*. . . . . 32.

PC Connection Hardware Special
through October 31, 1988

Kraft Systems ... 1 year
High Speed Joystick Adapter Card and Introductory Bundle

Have you been waiting to try out a joystick on your new 16 MHz machine but haven't yet found a game port that can handle the speed? Wait no more.

Kraft Systems introduces the Kraft High Speed Joystick Adapter Card. Its unique six position switch allows you to match the clock speed of your IBM PC, XT, XT286, AT, or PS/2 Model 25 or 30 with your IBM-compatible joystick—all the way to 16 MHz.

High Speed Joystick Adapter Card (for IBM PC/XT/XT286/AT/PS/2 Models 25/30) $25.
Introductory Bundle (Three-button Premium Joystick w/New Joystick Adapter Card) 49.

Microsoft ... CP
☐Flight Simulator 3.0 *(reqs. graphics brd.)* . . 35.
Mindscape ... CP
☐Balance of Power *(reqs. graphics brd.)* . . . 30.
☐Deja Vu *(reqs. graphics brd.)*. . . . . 30.
Parlor Software ... CP
☐Bridge Parlor *(best Bridge simulation)* . . . . 49.
Sierra On-Line ... CP
☒Leisure Suit Larry *(requires CGA or EGA)* . . 25.
☒Space Quest II *(requires CGA or EGA)* . . . . 33.
☒King's Quest III *(requires CGA or EGA)*. . . . 33.
☒Police Quest *(requires CGA or EGA)*. . . . . 33.
Sphere, Inc. ... NCP
☒Tetris *(addicting mind teaser)* . . . . . 24.
☒Falcon *(F-16 simulation, reqs. graphics brd.)* 32.
Sublogic ... NCP
☐Jet 2.1 *(requires EGA or CGA)* . . . . . 33.
XOR ... NCP
☐NFL Challenge . . . . . 69.

HARDWARE

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

AST Research ... 2 years
I/O Mini 2 C/S/P. . . . . 89.

1-800/243-8088

PC Connection 530W
6 Mill Street
Marlow, NH 03456
603/446-3383 **FAX** 603/446-7791

SixPakPlus 64k C/S/P
(now upgrades to 576k). . . . . call
SixPakPremium 256k C/S/P
(upgrades to 1 Meg or 2 Meg w/Piggyback) . call
Advantage Premium 512k S/P
(upgrades to 1 Meg or 2 Meg w/Piggyback) . call
Advantage 2 512k *(for PS/2 Models 50/60)* . . call
Advantage 2-386 *(for PS/2 Model 80)*. . . . . call
RAMpage Plus 286 512k *(for XT/XT286/AT)* . call
RAMpage! Plus MC 512k
(for PS/2 Models 50/60). . . . . call
Amdek ... 1 year
LaserDrive-1 *(CD-ROM Drive; 90-day wrty.)* 629.
Compucable ... 2 years
2-Position switch box . . . . . 29.
3-Position switch box . . . . . 39.
Cuesta ... 1 year
Datasaver 400 Watt *(standby power unit)* 459.
Curtis ... lifetime
ACCESSORIES
Disk Holder DB-1 *(holds 50 5¼" disks)* . . . . . 8.
Printer Stand PS-1 . . . . . 18.
Universal System Stand SS-3 . . . . . 25.
DS-1 Switch Box *(controls 2 printers)* . . . . . 33.
CABLES
Smartmodem-to-PC Cable *(9 feet)* . . . . . 17.
Printer-to-IBM cable *(9 feet)* . . . . . 17.
SURGE SUPPRESSORS
Safestrip SP-3 *(6 outlets; 1 year wrty.)* . . . . . 21.
Diamond SP-1 *(6 outlets)*. . . . . 32.
Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* . . . 59.
Ruby-Plus *(w/FAX & modem protection)* . . . . 69.
DCA ... 1 year
Irma 2 *(3270 emulation board)*. . . . . 729.
Epson ... 1 year
We are an authorized Epson Service Center.
FX-850 *(80 col., 264 cps, 9 pin)* . . . . . call
FX-1050 *(136 col., 264 cps, 9 pin)* . . . . . call
LQ-500 *(80 col., 180 cps, 24 pin)* . . . . . call
LQ-850 printer *(80 col., 264 cps, 24 pin)*. . . . call
LQ-1050 printer *(136 col., 264 cps, 24 pin)* . . call
LQ-2550 printer *(136 col., 400 cps, 24 pin)* . . call
LX-800 printer *(80 col., 180 cps, 9 pin)* . . . . . call
Printer-to-IBM cable (6 feet) . . . . . 15.
Everex ... 1 year
1200 Baud Internal Modem . . . . . 79.
2400 Baud Internal Modem . . . . . 149.
5th Generation ... 6 months
Logical Connection 256k . . . . . 459.
Logical Connection 512k. . . . . 529.
Hayes ... 2 years
Smartmodem 1200 . . . . . 299.
Smartmodem 1200B *(with Smartcom II)* . . . 299.
Smartmodem 1200B *(no software)*. . . . . 265.
Smartmodem 2400 . . . . . 449.
Smartmodem 2400B *(with Smartcom II)* . . . 449.
Hercules ... 2 years
Graphics Card Plus. . . . . 189.
Network Card Plus *(with TOPS DOS)* . . . . . 349.
Intel ... 5 years
2400B Modem 2 *(internal modem for PS/2 Models 50/60/80)* . . . . . 279.

For IBM Personal Computers exclusively.

PC CONNECTION®

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

toll-free reception.

Inboard 386/PC w/1 Meg . . . . . $969.
Inboard 386/AT 0k *(req. installation kit)* . . . . 949.
Inboard Installation Kit *(specify computer)* . . 139.
Aboveboard 286 512k . . . . . 389.
Aboveboard PS/286 512k S/P . . . . . 419.
Aboveboard 2 0k *(for Micro Channel)* . . . . 279.
8087 *(for IBM-PC & XT)* . . . . . 105.
8087-2 *(for PS/2 Models 25 & 30)* . . . . . 149.
80287 *(for AT & XT286)* . . . . . 165.
80287-8 *(for 8 MHz 80286 machines)* . . . . . 239.
80287-10 *(for PS/2 Models 50 & 60)* . . . . . 279.
80387 *(for 16 MHz PS/2 Model 80)* . . . . . 469.
80387-20 *(for 20 MHz PS/2 Model 80)* . . . . . 679.
80387-25 *(for 25 MHz PS/2 Model 70)* . . . . . 879.

Kensington Microware ... 1 year
Masterpiece . . . . . 94.
Masterpiece Plus . . . . . 109.

key tronic ... 3 years
101 Plus Keyboard *(enhanced layout)* . . . . . 99.

Kraft ... 1 year
Three-button Joystick *(w/$10 rebate coupon)* . 33.
High Speed Joystick Adapter Card . . . . . special

KYE International ... lifetime
Dyna Mouse GM-6 Plus *(w/Dr. Halo III)* . . . . . 59.

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.

Microsoft ... lifetime
SPECIFY BUS OR SERIAL VERSION
Mouse with Paintbrush . . . . . 109.
Mouse with Easy CAD . . . . . 125.
Mouse with Windows and Paintbrush . . . . . 145.

Migent ... 1 year
Pocket Modem *(1200 baud, incl. software)* . . . 119.

MSC Technologies ... lifetime
SPECIFY BUS OR SERIAL VERSION
OmniMouse w/Designer Pop-up menus
(serial only; 1 year warranty) . . . . . 57.
PC Mouse w/PC Paint+ . . . . . 89.
PC Mouse w/Autosketch . . . . . 105.

NEC ... 2 years
Multisync II *(800 x 560 max. resolution)* . . . . call

NSI Logic ... 3 years
Smart EGA Plus *(supports 800x600 res.)* . . 179.
Smart VGA *(supports full VGA specs)* . . . . . 229.

Orchid Technologies ... 2 years
Tiny Turbo 286 . . . . . 289.
Designer VGA . . . . . 349.
Ramquest 2 . . . . . 549.

PC Cooling Systems ... 1 year
REPLACEMENT POWER SUPPLIES
Turbo Cool 150 *(run 25° - 40° cooler)* . . . . . 129.
Turbo Cool 200 *(run 30° - 45° cooler)* . . . . . 169.
Silencer 200 *(69% noise reduction)* . . . . . 149.

Personal Computer Support Group...1 year
Breakthrough 286 Accelerator Board *(8 MHz)* 299.
Breakthrough 286 Accelerator Board *(12 MHz)* 449.

Practical Peripherals ... 5 years
Microbuffer Inline *(par. print buffer w/32k)* 135.
P/Link *(parallel line extender w/32k)* . . . . . 109.

1200 Baud Internal Modem *(w/ProComm)* . $69.
1200 Baud External Modem *(mini)* . . . . . 79.
2400 Baud Internal Modem *(w/ProComm)* 159.
2400 Baud External Modem . . . . . 189.

Princeton Graphics ... 1 year
Ultrasync *(supports CGA, EGA, VGA)* . . . . . 549.

Toshiba ... 1 year
P321SL printer *(80 col., 216 cps, w/tractor)* 529.
T1000 Laptop *(80C88, 6.4 lbs., 5 hr. battery)* call
T1200 Laptop *(80C86, 10 MHz, 20 Meg)* . . . call
T1200 Backlit version now available . . . . . call
T3200 Laptop *(80286, 12 MHz, 40 Meg)* . . . call
T5100 *(80386, 16 MHz, 40 Meg)* . . . . . call
768k Ram Card for T1000 . . . . . 299.

Video 7 ... 2 years
VEGA Deluxe *(supports 640x480)* . . . . . 219.
VEGA VGA *(supports full VGA specs)* . . . . . 287.

DRIVES

IOMEGA ... 1 year
Bernoulli II Single 20 Meg Internal *(5¼")* . . 779.
Bernoulli II Dual 20 Meg External *(5¼")* . . 1679.
20 Meg cartridge *(5¼")* . . . . . 59.
Bernoulli Box 40 Meg *(8")* . . . . . 1679.
20 Meg cartridge *(8")* . . . . . 82.
PC2 Card . . . . . 169.
PC2B Card *(bootable card for PC/XT/AT)* . . 229.
PC4 Card *(for PS/2 Model 50/60/80)* . . . . . 299.

Mountain Computer ... 1 year
40 Meg Internal Tape Drive *(XT, AT or PS/2)* . 379.
40 Meg External Tape Drive *(XT, AT or PS/2)* 479.
60 Meg External Tape Drive w/Power
Supply & Controller *(AT or PS/2)* . . . . . 1199.

Plus Development ... 1 year
Hardcard 20 Meg *(49 ms)* . . . . . 549.
Hardcard 40 Meg *(39 ms)* . . . . . 699.

Seagate ... 1 year
FREE PCTV® Hard Drive Installation Tape with the purchase of 20 Meg Seagate drive for the IBM PC (not for AT). Specify Beta or VHS.
20 Meg Internal Hard Drive ST225 *(w/controller and cables, 65 ms)* . . . . . 299.
30 Meg Internal Hard Drive ST238 *(w/controller and cables, 65 ms)* . . . . . 329.
40 Meg Internal Hard Drive for AT *(40 ms)* . 439.
40 Meg Internal Hard Drive for XT
(w/controller and cables, 40 ms) . . . . . 499.

TEAC ... 1 year
PC, XT 360k Drive *(5¼" half-height)* . . . . . 99.
720k Drive *(3½" half-height, specify XT or AT)* 99.

Toshiba ... 1 year
AT 360k Drive *(5¼" half-height)* . . . . . 89.

1-800/243-8088

PC Connection 530W
6 Mill Street
Marlow, NH 03456
603/446-3383 **FAX** 603/446-7791

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-DD *(10 disks per box)* . . . . . 23.
Verbatim Datalife *(10 disks per box)* . . . . . 22.

3½" DS/DD Diskettes *(720k)*
Sony *(10 disks per box)* . . . . . 18.
Fuji *(10 disks per box)* . . . . . 19.
Maxell *(10 disks per box)* . . . . . 20.

3½" DS/High-Density Diskettes *(1.44 Meg)*
Fuji *(10 disks per box)* . . . . . 55.
Maxell *(10 disks per box)* . . . . . 59.

MISCELLANEOUS

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

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

PC Connection Computer Toolkit . . . . . 22.

OUR POLICY

- We accept VISA and MASTERCARD only.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail, charged by weight.
- Allow 1 week for personal and company checks to clear.
- COD max. $1000. Cash, cashier's check, or money order.
- 120 day limited warranty on all products.*
- To order, call us Monday through Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

SHIPPING

Note: Accounts on net terms pay actual shipping.

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

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

Alaska and outside Continental US:
- Call 603/446-3383 for information.

For IBM Personal Computers exclusively.

PC CONNECTION®

*DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION.

proved the menus, enriched the help system, and replaced embedded backslash commands with markers that you choose from a menu.

Manuscript's file management has been streamlined with a temporary exit to DOS, an automatic save function, and document summaries that display and sort files by size, date, and name. Version 2.0 beefs up file conversion with enhanced DCA support, graphics support that includes PostScript and TIFF files, and conversions for leading scanners, paint programs, and CAD packages.

Without changing *Manuscript*'s hierarchical approach to formatting, Lotus has added a "named block" feature (similar to *Microsoft Word*'s style-sheet tags) that will better accommodate documents with diverse formats. *Manuscript 2.0* supports up to nine snaking columns, and you can balance the columns to fill out a page by automatically adding space between lines, blocks, and sections. You can also float graphics, tables, and white space, or tie them to the surrounding text.

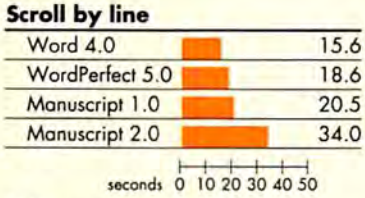
Manuscript's widely imitated previewing function is now streamlined with menus. You can jump to a page, switch to half-page magnification, zoom in on a graphic, and greek text for faster screen refresh. Moving in and out of preview mode is still somewhat slow, but you can preview specific blocks, sections, graphics, and equations separately. One of the most welcome new editing features is a well-implemented macro function that re-

NSTL TEST REPORT

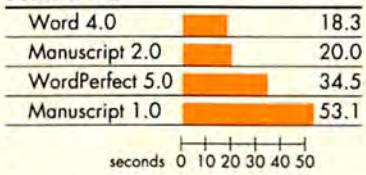
Manuscript 2.0

Though its features are much improved, Manuscript 2.0 generally runs slower than Word 4.0 and WordPerfect 5.0, and sometimes slower than version 1.0.

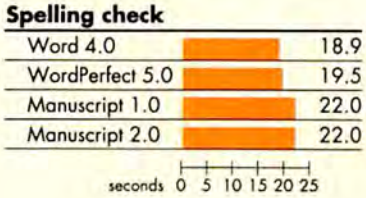
Scroll by line



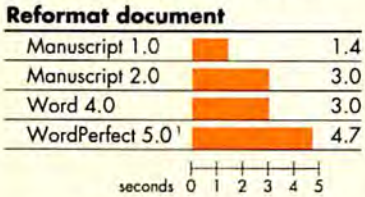
Print a file



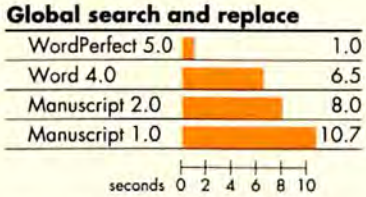
Spelling check



Reformat document



Global search and replace



[1] These results measure 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 and a 30MB hard disk running under DOS 3.20. All tests except the spelling check used an 8-page (480-line) text file consisting of groups of 4 characters separated by spaces (e.g., *aaaa bbbb cccc*). The file was formatted at 60 lines per page, with margins set at 1 and 60. A carriage return and blank line followed every 9 lines of text. This pattern was repeated throughout the document. Times were measured from the keystroke initiating the test until control was returned to the user.

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

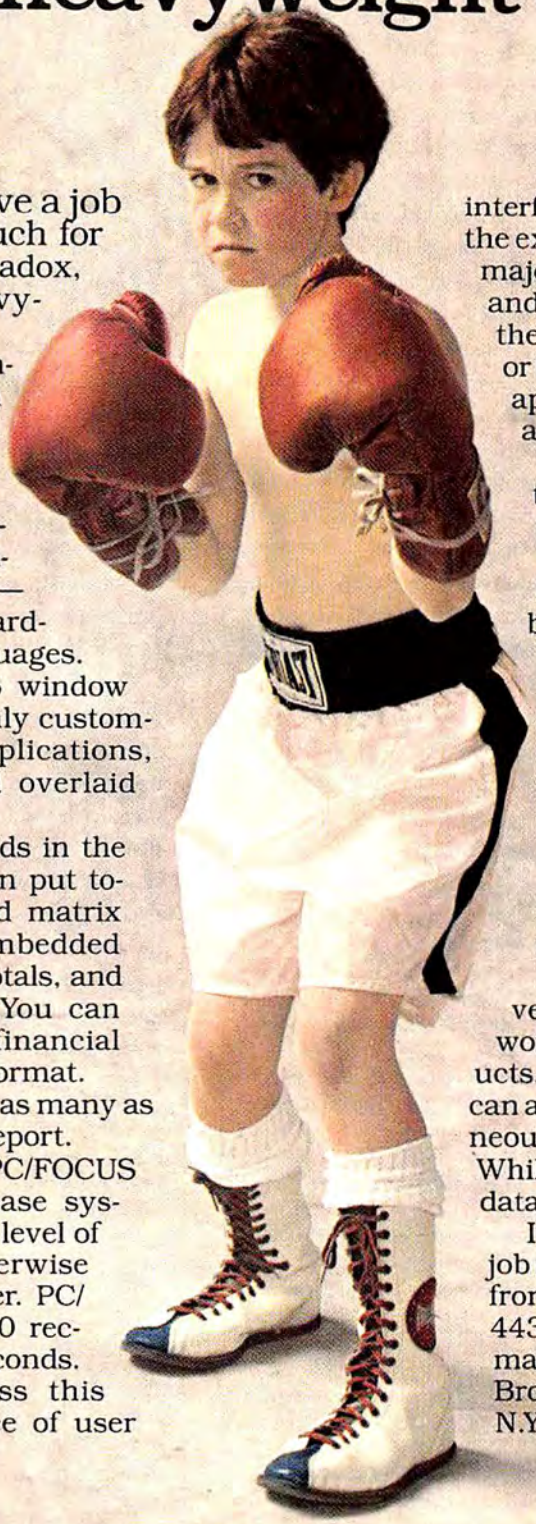
Print a file
This benchmark used a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement. The performance text file was "printed" to the device at the maximum speed supported by the program. Times with an actual printer would be greater.

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 (consisting of 30 paragraphs of 14 lines each) after the file had been read into each program and saved in that program's format.

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

Can your lightweight database handle a heavyweight challenge?



When you have a job that's too much for dBASE or Paradox, turn to the real heavyweight. PC/FOCUS.

PC/FOCUS is the number one fourth-generation language, with its own powerful database system. It's complete enough to create the complex reports and applications that others can't—without resorting to hard-to-learn procedural languages.

With the PC/FOCUS window painter, you can do highly customized, menu-driven applications, with help screens and overlaid windows.

Using just a few words in the PC/FOCUS 4GL, you can put together highly structured matrix reports that include imbedded data, row and column totals, and customized headings. You can create any standard financial report in your preferred format.

And you can draw on as many as 16 different files for one report.

With the powerful PC/FOCUS shared-relational database system, you can report at a level of detail that would otherwise require a large computer. PC/FOCUS can scan 50,000 records in less than three seconds.

And you can access this power through a choice of user interfaces. A command mode lets the experienced user develop major applications quickly. A point-and-pick windowed interface lets the casual user make a query—or build a substantial application—using only the arrow keys and the enter key.

What's more, any application you develop in the FOCUS language can immediately be run on any of the larger computers supported by FOCUS.

PC/FOCUS includes modules for graphics, statistics, and communications. And there are optional modules including EQL—an English language interface, spreadsheets with goal-seeking capabilities, and interfaces to dBASE and other PC database systems.

There's also a MultiUser version of PC/FOCUS that works with the major LAN products. In a network, up to 32 users can access one database simultaneously without record lockup. While PC/FOCUS maintains your data integrity.

If you've got a heavyweight job to do, get some real muscle from PC/FOCUS. Call 1-212-736-4433, Ext. 3700. Or write Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001.

PC/FOCUS
Information Builders, Inc.

Circle 259 on reader service card

cords and plays back keystroke sequences. Although there is no macro programming language, you can nest and edit macros. A new Library function stores boilerplate text that you can insert with a few keystrokes.

For all the improvements, *Manuscript 2.0* retains some failings. You still can't delete by line, sentence, or paragraph, for example, and the commands for deleting to the end or beginning of a line are so cumbersome that you might as well cut and paste. The program may be a whiz at formatting, but it's merely adequate for everyday text editing. And *Manuscript 2.0* is somewhat slower than *Word* and *WordPerfect*—and sometimes slower than version 1.0.

Those who dismissed *Manuscript 1.0* as interesting but incomplete should take another look. The program is still perfect for technical documentation, and version 2.0's numerous editing features considerably expand its scope. If your formatting needs are simple and training time is short, go elsewhere. But if you want an office word processor that handles long, complex documents, *Manuscript 2.0* is highly recommended. *—Eric Brown*

WHERE TO BUY

Manuscript 2.0
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500
List price: $495, upgrade from version 1.0 $75
Requirements: 512K (640K recommended), hard disk, graphics adapter for document preview
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8:30–8
Other support services: 90-day limited warranty; extended support free for first six months, then $150 per year (includes toll-free technical support hot line, quarterly newsletter, support guide, demo disks for other Lotus products); training kit $350; authorized training centers nationwide; CompuServe Lotus "B" Forum (GO LOTUSB)
For more information, see Products Featured in This Issue.

DataPerfect 2.0

Data management program

PROS: Menu-driven, good data validation and reporting, requires just 192K of RAM, integrates well with other WordPerfect products

CONS: Slow; confusing terminology; awkward data entry; must export data to edit files or change field structure; expensive

When WordPerfect Corporation released its first data management package early this year, the company's fans may have wished it had stuck to word processing. A $595 quasi-relational program, *DataPerfect* links files in a variety of ways, offers good data validation and reporting, and works well with *WordPerfect* and its *Library* shell. However, maintaining the data base is cumbersome, and *DataPerfect* lacks an application generator and a programming language. Finally, as NSTL tests show, it runs very slowly.

DataPerfect requires only 192K of RAM, but it is awkward to install and its select-and-do, function-key rhythm takes getting used to. To data base vets, *DataPerfect*'s nomenclature will also seem strange: Instead of files, the program uses "panels" (three-part entities that comprise a data file, an index file, and a structure file), which are linked with "doors" and "doorways." *DataPerfect* permits an adequate 80 files per data base and 80 fields per file; a panel is also a data entry template, however, and there's only one screen form per panel.

Once you master *DataPerfect*'s vocabulary, defining a data base is straightforward enough. Linking files is also easy, and *DataPerfect* allows one-to-one, one-to-many, many-to-one, and many-to-many relationships, provided all related files have a common field. But because *DataPerfect* stores data in structured files rather than using the flexible table format of a *Paradox*, trouble begins when you add or delete a field or change a field type.

You must first go to *DataPerfect*'s Report/Export menu and export the data file. With cursor control still inside *DataPerfect*'s menu, you delete all records in the panel and redefine the fields. When you import the saved data file back, *DataPerfect* changes

Practice makes WordPerfect.

The evolution of WordPerfect.

From a good idea, a great product can evolve. But it takes people with vision who can nurture and refine it. And it requires users who appreciate it. Loyal users who call with questions and suggestions.

In the case of WordPerfect word processing, we're fortunate to have both exceptional product designers and users. So fortunate, in fact, that we've produced the number-one selling word processor for two years running.

We think it's because we listen to our users, and we respond with products that reflect their needs. And by doing more of the same—by *practicing* what we know best—we'll continue to make WordPerfect the leader in sales, service and customer satisfaction.

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

WordPerfect
CORPORATION

WordPerfect is a registered trademark of WordPerfect Corporation.

Circle 175 on reader service card

Where does PC WORLD

Answer: to NSTL — America's leading computer

If you need the highest level of comparative data... NSTL's *PC Digest* is the solution.

Last year, *PC World* designated National Software Testing Laboratories as its official research facility. And for good reason.

NSTL is the leading independent research organization exclusively devoted to testing PC hardware and software. Our knowledge, experience and skilled technical staff enable us to generate analytical data so accurate, comprehensive and meaningful that no one else can match it.

PC Digest is our comparative ratings report on IBM-compatible PCs and peripherals. It's the *authoritative* source for objective, scientific hardware evaluations.

Granted, this unusual publication is not for everyone. But if you need to go *beyond* the ads and the reviews...if you require a *deeper level of analysis*...if your work calls for *complete* and *systematic* data to guide your buying decisions...then *PC Digest* is the only place to turn.

The ultimate hardware reference tool.

Today, the PC marketplace is more crowded and confused than *ever* before.

PC Digest evaluates a wide range of PCs and peripherals.

How can you be *certain* a piece of equipment will prove reliable? That it will do all it claims? That it will be compatible with your existing system? How can you make truly *informed* buying decisions?

There's only one *sure* way to evaluate the hundreds of competitive products. They must be *tested*. Head-to-head. Feature by feature. Against precise, scientific benchmarks. Performing real-world business tasks.

Only *PC Digest* performs this exacting research process. There is no other resource that even comes close.

Every major PC and peripheral is evaluated.

New equipment is a major investment. And, for most organizations, buying PCs and peripherals is a *continuous* process — not a one-time event.

Skilled engineers spend weeks methodically testing each piece of equipment.

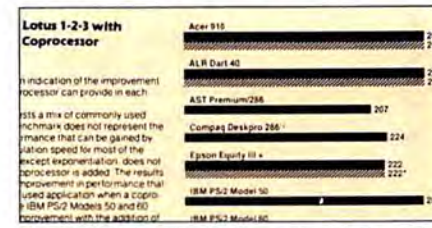
PC Digest can help you make the *right* decisions — and *avoid* expensive mistakes. Arriving each month, it's an *ongoing* reference source for a wide range of products. For example:

✓IBM and compatible 286 and 386 machines ✓Laptops ✓Modems ✓Laser printers ✓Backup systems ✓VGA boards ✓Monitors ✓Network adapters ✓Memory expansion cards ✓Disk drives ✓Hard disk cards ✓Other mass storage devices ✓Accelerator boards ✓Dot-matrix printers ✓Co-processors ✓Scanners ✓And more

For each product, we determine: How easy is it to set up? What are its features and capabilities? What special system requirements are necessary? How well does it work with major business software? How fast does it perform typical tasks? How good is the documentation? How does it function under DOS and OS/2?

We tell you which products are *best* — and which have *problems*. And we make *specific recommendations* based on the hard data our tests uncover. (Specifications and prices are included.)

Users applaud *PC Digest*'s graphic format. Test results are clear, readable and accessible. Quick-reading charts show how products stack up against each other.



Benchmark test results show how each product scored while running major business software programs.

Couldn't the concrete, research-based data supplied *only* by *PC Digest* help you improve your product selection decisions — and save you time, money and hassles?

Objective, scientific testing standards.

Why is *PC Digest* so widely used — and so highly regarded?

For a start, no one else can equal NSTL's resources. Our laboratory facilities are state-of-the-art. Our staff of skilled engineers and technicians draws upon a wealth of "hands-on" experience that can be gained only by scientifically testing PC products day after day.

PC World announces an innovative partnership.

"*PC World* has entered into an unprecedented arrangement to have our review process conducted by National Software Testing Laboratories.... NSTL has the reputation for undertaking the most comprehensive performance and versatility tests of software and hardware products in our industry....They're going to *tell* it like it is — not *sell* it like it is."

— **David Bunnell,** Chairman

"We've recognized the increasing need for performance testing that measures products from a real-world perspective....That's why we have selected National Software Testing Laboratories of Philadelphia, Pa. as the exclusive test facility for all products reviewed in *PC World*."

— **Richard Landry,** Editor

"*PC World* is proud to include benchmarks and evaluations from the industry's leading source of unbiased product information....NSTL has earned a reputation as the Underwriters Laboratories of the PC industry. Renowned for its exacting, objective methodology, [its] solid reputation has been built by a staff as fastidious as a team of wary tax auditors."

— **Eric Knorr,** Senior Associate Editor

go to test equipment?

testing lab.

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

PC Digest is fiercely independent. We have a firm policy of accepting *no ads.* That gives us the freedom to be *fully objective and unbiased* in our product evaluations.

Without vested interests of any kind, we can be *totally* impartial. We're free to print *exactly* what our tests reveal — and we don't pull our punches.

Monthly "Buyer's Alert" keeps you on top.

Selecting equipment is a never-ending process. That's why *PC Digest* monitors the fast-changing PC marketplace on an *ongoing* basis. It keeps you a jump *ahead* of events.

So it's not surprising that *PC Digest* frequently "scoops" the computer industry press. With the *first* comprehensive benchmark tests of IBM's PS/2 line. The *first* tests of the Compaq and IBM 25MHz PCs. And the *first* tests of OS/2's multitasking abilities.

ACCELERATOR BOARD FEATURES	Breakthru 286	Fastcache 286	Inboard 386	Mach 10	PCturbo 286e-10	Raccoard 286	SpeedPac
Speeds up IBM PC-1	Y	Y	N	Y	Y	Y,R	Y	N
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N	N
Microprocessor	80286	80286	80386	8086	80286	80286	80286	80
Memory Cache	16K	8K	64K	8K	N	8K	8K	12
On-board memory	N	N	OP1	N	1024K	N	N	N
Computer processor retained	N	Y	N	N	Y	N	N	N
Change Speed	Y,S	Y,S	Y,S	Y,E	Y,S	Y,I	Y,I	Y
Change speed without rebooting	Y,S	N	Y,S	Y,E	Y,S	N	N	Y
Change speed within application	N	Y,K	Y,K	N	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N	Y
RAM disk included	N	Y	N	N	Y	N	N	Y
Print spooler included	N	Y	N	N	Y	N	N	Y
Loopshort card	SH	SH	I	I	I	SH	SH	

Which products have the capabilities you want? Our technicians verify each feature.

Each issue includes *Buyer's Alert.* This useful monthly newsletter previews new products and new models...forecasts technology changes and trends...gives you an inside look at vendor policy changes...and much more.

An important plus: With *PC Digest,* everything you need to know is in *one* place. So you don't have to plow through stacks of material searching for the answers you need.

Each product receives its own detailed report.

New changes and pressures ahead! Will you be ready?

Warning! The personal computing environment is moving *faster.* The pressures will intensify. Will you be prepared?

Technology is proliferating at dizzying speed. Networking is reshaping the way business functions. The 386 systems and OS/2 will create tough new price/performance decisions.

Expect more competing vendor claims and more hype. New compatibility problems. Product shortages and price increases. In sum, more *confusion* than ever before!

Today, with DP budgets tighter, with the new emphasis on documenting computer productivity and bottom-line payoff, every purchasing decision will have to be justified. *PC Digest* gives you the hard data you need to *confirm* your decisions, and *defend* them.

Thousands of DP managers, MIS directors, PC coordinators, small business owners and independent consultants subscribe to *PC Digest.* They read it, rely on it, and turn their well-thumbed back issues into an indispensable reference and purchasing tool.

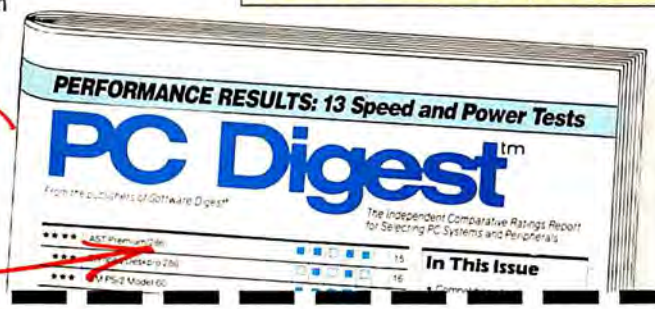
Isn't it time you joined them — and armed yourself with the kind of vital intelligence you won't find *anywhere* else?

Prove it for yourself. Give us the word and we'll begin a no-risk introductory subscription.

For fastest service, **CALL TOLL-FREE:**

☎1-800-223-7093

FAX? *Complete the coupon below and use our Fax number: (215) 877-1508*



The Master Ratings Chart on each issue's front cover provides at-a-glance comparative data on every product.

☐ **YES,** begin our no-risk trial subscription (12 monthly issues) to *PC Digest.* You'll send the current issue, without obligation, on a 15-day examination basis. If we're dissatisfied, we have the right to cancel within 15 days. The current issue remains ours to keep without charge.

❑ $185 check enclosed ❑ Bill us

❑ Charge to: ❑ MasterCard ❑ Visa ❑ American Express

Acct. no._____ Exp._____

Signature X_____

Name_____

Title / Dept._____

Company_____

Address_____

No P.O. box numbers, please

City_____ State_____ Zip_____

Phone (____)_____

(in case we have a question about your order)

NSTL NATIONAL SOFTWARE TESTING LABORATORIES
One Winding Drive,
Philadelphia, PA 19131-9990

PCW1088-A

NSTL TEST REPORT

DataPerfect 2.0

DataPerfect finds single records quickly, but it lags way behind flat-file Q&A and menu-driven relational DataEase in other operations.

DataEase 2.5 release 3, DataPerfect 2.0, and Q&A 3.0 were tested on an 8-MHz IBM AT Model 339 with 640K, a 30MB hard disk, and DOS 3.20.

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

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

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

Group record search without an index
From different locations in two 10,000-record files, groups of 100 records were selected on a nonindexed field (using relational operators to establish the selection criteria). The records were sorted in ascending order, and a long field was output to a null printer.

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

each record according to the new definitions. Contrast this awkward process with the point-and-shoot editing used by *Q&A*.

Note, however, that *DataPerfect* packs several potent features: Data validation is especially thorough and can use the formula language to test fields. All Boolean operators are available for searches, as are nested conditionals and a CASE statement. Reporting is also strong: *DataPerfect* comes with six short report formats, including columnar, delimited ASCII, and *WordPerfect* merge formats, and you can define and save up to 150 custom reports. You can even define report selections that depend on formulas, conditionals, and variables—no mean feat for a program that lacks a command line and a macro language.

Used in conjunction with *WordPerfect* and *Library*, *DataPerfect* can access even more formatting and presentation tools, along with a macro language that combines operations from all three programs. And therein lies the package's obvious—and perhaps only—niche. If you already use Orem's offerings, *DataPerfect* is an acceptable, if expensive, adjunct. Otherwise, *Q&A* is a cheaper and classier choice at the low end, and *DataEase* or *Advanced Revelation* at the high. —*Marlene Nesary*

WHERE TO BUY

DataPerfect 2.0
WordPerfect Corp.
288 W. Center St.
Orem, Utah 84057
801/225-5000
List price: $595
Requirements: 192K, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, toll-free number, M–F 6:30 a.m.–8:30 p.m.
Other support services: newsletter $36 per year
For more information, see Products Featured in This Issue.

Forecast Pro

Statistical forecasting program

PROS: Sophisticated forecasting methodologies, handy built-in expert system

CONS: Awkward installation and data entry, limited choice of methodologies, sketchy documentation

As any disaster survivor will attest, knowing what can happen tomorrow will help you plan a lot more effectively today. For exam-

Above & beyond the call.

Software

Word Processing/ Desktop Publishing

Byline	$ 199
Microsoft Word	$ 229
Multimate Advantage-II	$ 279
Lotus Manuscript	$ 339
Office Writer/Speller	$ 249
Pagemaker 3.0	$ 569
PFS: Prof Write	$ 119
Publisher's Type Foundry	$ 259
Ventura Publisher	$ 519
Word Perfect 5.0	$ 195
Wordstar Pro 5.0	$ 199
Wordstar 2000 + 3.0	$ 229
Xywrite III +	$ 229

Database Systems

Clipper	$ 389
DBase III Plus	$ 389
Data Perfect	$ 269
DBase IV	$Call
Foxbase +	$ 199
Paradox 2	$ 429
PFS: Prof File	$ 149
Q&A	$ 209
R Base for DOS	$ 479
RapidFile	$ 199
Reflex	$ 99
Omnis Quartz	$ 469

Spreadsheets/ Integrated Packages

Javelin +	$ 169
Lotus 1-2-3	$ 309
Lotus Hal	$ 49
Microsoft Excell	$ 319
Microsoft Works	$ 139
Plan Perfect	$ 179
Quattro	$ 129
Smart System	$ 449
SuperCalc 4	$ 289
Symphony	$ 495

Communications

Carbon Copy +	$ 119
Crosstalk XVI	$ 99
Crosstalk MK 4	$ 125
Relay Gold	$ 149
Smarterm (Persoft)	$Call
Smartcom III	$ 149

Statistics

SPSS/PC +	$ 699
Statgraphics 2.6	$ 479
Systat 4.0/ W/Graphics	$ 499 $649

Desktop Environments

MS Windows	$ 69
Sidekick Plus	$ 129

Graphics

Boeing Graph	$ 219
Chartmaster	$ 219
Design CAD	$ 159
Diagraph	$ 259
Diagram Master	$ 199
Freelance Plus	$ 329
Harvard Graphics	$ 279
MS Chart	$ 269
PC Paintbrush Plus	$ 89
Picture Perfect	$ 199
Presentation Pak	$ 349
Publishers Paintbrush	$ 159
Signmaster	$ 139

Project Management

Harvard Total Project Manager II	$ 369
Microsoft Project 4.0	$ 329
Superproject Plus	$ 289
Timeline 3.0	$ 349

Languages/Utilities

Fastback +	$ 99
Lattice C	$ 229
Norton Advanced	$ 79
Microsoft C	$ 299
Mace Utilities	$ 65
MS Fortran 4.0	$ 299
Quick Basic/Quick C	$ 69
Turbo Basic/Turbo C	$ 65
Turbo Pascal	$ 65

Accounting

AccPac BPI	$ 279
Great Plains	$ 499
Peachtree Comp II	$ 159

Hardware*

Computers

AST Premium 286	$ Call
Samsung	$ Call
Sharp PC4502-A	$1175
Toshiba 3100/20 +	$ Call

Multifunction Boards

AST Advantage Premium (512K)	$ 309
AST 6 Pak Plus (64K)	$ 129
AST Premium (256K)	$ 219
AST Rampage 286	$ 419
Everex RAM 4000	$ 299
Inboard 386AT	$1050
Inboard 386 PC	$ 750
Intel AboveBoard	$ Call

Display Boards

ATI EGA Wonder +	$ 199
Hercules Network Card Plus W/Tops	$ 349
Paradise VGA Plus	$ 259

Modems

Hayes 1200/1200B	$ 299
Hayes 2400/2400B	$ 449
US Robotics 1200B	$ 109
US Robotics 2400B	$ 189
Ventel 2400/2400B	$ 389
Ventel 2400/2-PS2	$ 299

Networking

Arcnet Board	$ 149
Novell Adv.Netware 286	$1499
Novell ELS	$ 399

Emulation Boards

AST 5251-11 +	$ 629
Irma/2 PCA/MCA	$ 725
Quadram Mainlink IV W/ Software	$ 399

Monitors

Amdek 210A	$ 99
NEC MultiSync II	$ 649
Princeton HX-12 +	$ 439
Princeton MAX-12E	$ 149
Samsung Color	$ 229

Printers/Plotters

Epson FX-286E	$ 499
Epson LQ1050	$ 779
HP 7475A	$1499
HP Laserjet II	$1750
LQ-500	$ Call
NEC 3550	$ 789
NEC P2200	$ 369
Okidata 320	$ 375
Okidata 321	$ 519
Okidata 393	$1050
Okidata 293E	$ 675
Panasonic	$ Call
The Complete Hand Scanner	$ 169
Toshiba P321SL	$ 549
Toshiba P341SL	$ 749
Toshiba P351M2	$ 999

Mass Storage/Backup

Bernoulli II Dual	$1799
Irwin Tape Drives	$ Call
Mountain 40MB Int Tape	$ 389
Plus HardCard 20MB	$ 519
Plus HardCard 40MB	$ 719
Seagate ST251-1	$ 529
Seagate ST 225 W/int	$ 289
Seagate ST238 W/int	$ 319
Sysgen Bridge	$ 299

Input Devices

Keytronics KB 101	$ 109
Logitech Hi-res Mouse	$ 99
Logitech M8 Mouse W/ Paintshow	$ 69
Microsoft Mouse	$ 109
PC Mouse w/Paint	$ 99

Accessories

Curtis Ruby	$ 59
DataShield S-100	$ 69
Logical Connection	$ 329
Masterpiece Plus	$ 125
256K Ram Set	$Call
8087 Math Chip	$ 119
80287-8/80287-10	$289/$339
80387-16/80387-20	$529/$775

***CALL FOR SHIPPING COST**

ATTENTION CORPORATE BUYERS!!

Join over 1000 major corporations and institutions who have selected **SOFTLINE** as their primary vendor. Here's why:

- **Wide Selection**—We carry over 1000 "corporate" titles. We will assist you to source those difficult requests.
- **Low Price** Our motto has always been "Sample our Service. Price shall never be an issue."
- **Fast Delivery** For those last minute rush orders, we offer convenient overnight delivery.
- **P.O.'s, of Course!!** We accept purchase orders from qualified organizations. Ask about our customized purchasing programs for volume buyers.

ATTENTION INTERNATIONAL BUYERS!!

We process export orders to thousands of companies worldwide. Convenient TELEX and FAX facilities available.

Contact: **Fay Chayne,** Intl. Sales Manager.

Celebrating 5 Years of Excellence

1-800-221-1260

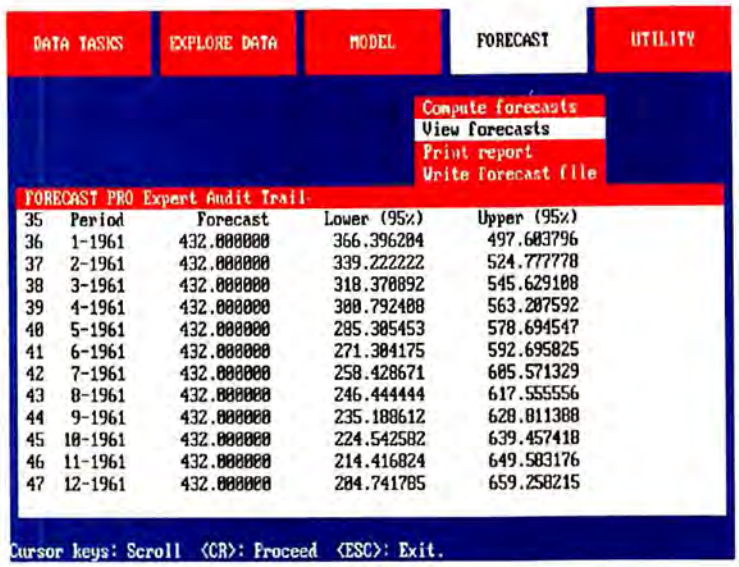
Customer Service Hours: 9 AM—5 PM, Mon.—Fri.
In New York State call (718) 438-6057
FREE SHIPPING
on all orders over $1,000.00, credit card orders and prepaid orders.

MasterCard VISA

Softline

1333 60th Street
Brooklyn, NY 11219
TELEX: 627-30170 or 910-240-3918
FAX: (718) 438-2315

Our Policy: • All returns require prior authorization • 20% Restocking fee on returns • POs accepted from qualified organizations • Visa or Mastercharge—add 3% • COD, Cash M.O. or bank check only—add $5.00 per order • Prepaid personal or company check—allow two weeks to clear • Shipping via UPS surface—add $5.00 per item, UPS Blue—add $10.00 per item • Prices subject to change, call for latest prices.



Forecast Pro graphs data within the program but yields only a table of numbers when printed out.

ple, deducing from experience how seasonal temperature fluctuations, income tax refunds, or holidays will affect demand for products can help a company plan for future demand without over- or underproducing. With a program like Business Forecast Systems' $495 *Forecast Pro*, even a small business can use historical data to accurately project future product, staffing, and service needs.

Thanks to an ingenious built-in expert system, menu-driven *Forecast Pro* guides managers and other nonstatisticians from initial analysis of data through model development and final forecast.

Having said that, it's too bad that this generally well-designed program has a number of annoying shortcomings. Installing *Forecast Pro* is a chore, as is entering data. And while *Forecast Pro* offers exponential smoothing, Box-Jenkins, and stepwise multiple regression, it lacks robust decomposition and adaptive filtering methodologies.

Getting started is the most tedious part of *Forecast Pro*. Installation instructions are scattered, and such simple operations as selecting forecast variables are difficult. Entering data is irksome as well; the program lets you enter values for only one variable at a time. The solution: Enter values in a word processing file or *1-2-3* worksheet and import the data into *Forecast Pro* as an ASCII or .PRN file.

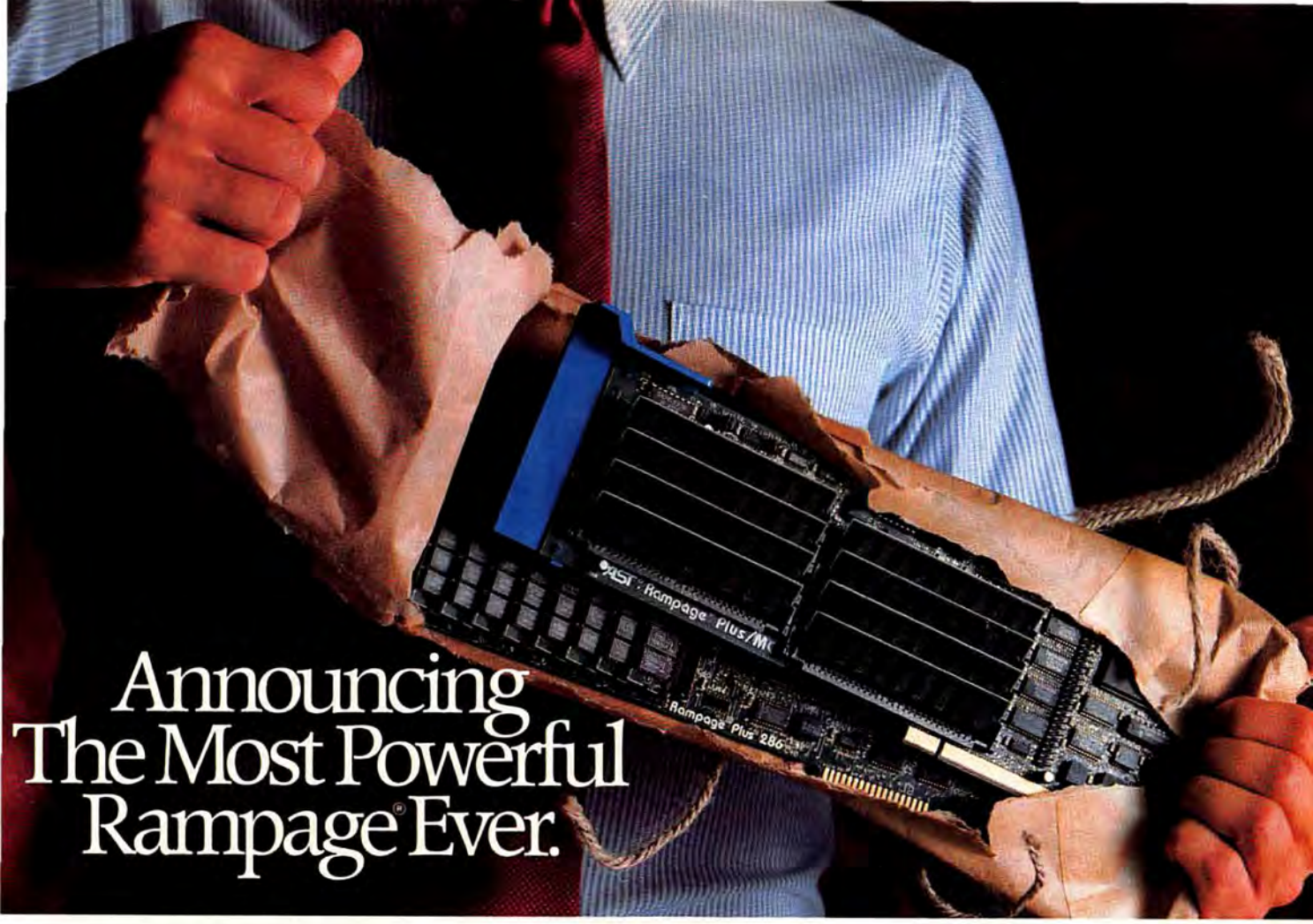
For nonexperts, the program's main attraction is its rule-based expert system. It examines raw cyclical or seasonal data, factors in random fluctuations, and suggests the most appropriate forecasting technique for your data. As you refine the chosen model, *Forecast Pro* maintains an audit-trail text file of the process and recommends ways to better fit the model to your data. Finally, you specify how far into the future you would like the program to forecast, then print the forecast to disk or to a printer.

Despite its disjointed documentation and limited selection of forecasting methodologies, *Forecast Pro* compares favorably with such competitors as *Forecast Plus*, *Wisard Professional*, and *SmartForecast II*. For companies that want forecasting—but not the trouble and expense of doing it on a mainframe—*Forecast Pro* can improve the chances for a better bottom line. —*Phillip Good*

WHERE TO BUY

Forecast Pro
Business Forecast Systems
55 Wheeler St.
Cambridge, MA 02138
617/354-3745
List price: $495
Requirements: 256K, two disk drives (hard disk and math coprocessor recommended), DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5
Other support services: user BBS, quarterly newsletter free to registered users
For more information, see Products Featured in This Issue.

Luther Sperberg is a freelance writer and desktop publishing trainer in New York City. Alan Southerton is a senior technical writer for Progress Software in Bedford, Massachusetts. Eric Brown is a contributing editor for PC World. *Marlene Nesary is an assistant editor for* PC World. *Phillip Good is the editor and publisher of* The Annual Report on Statistical Software *in La Cañada, California.* ●



Announcing The Most Powerful Rampage® Ever.

RampagePlus From AST.

These days, to really get power, you've got to have a Rampage. RampagePlus from AST—the most powerful memory/multifunction boards you can buy.

With RampagePlus/MC for your IBM® PS/2™ Model 50/60, or RampagePlus 286 for your AT® or compatible, you can have: up to eight megabytes of memory. EMS 4.0 compatibility. OS/2™ compatibility. And, optional I/O piggyback modules. There's nothing like them anywhere.

	Computer	Memory	Hardware Software Compatibility	I/O Piggyback Modules (optional)
RampagePlus/MC	PS/2 Model 50/60	up to 8 MB	EMS 4.0 EEMS EMS 3.2 OS/2	Serial/ Serial or Serial/ Parallel
RampagePlus 286	AT or Compatible (XT form factor)	up to 8 MB	EMS 4.0 EEMS EMS 3.2 OS/2	Serial/ Serial or Serial/ Parallel

By making the one simple decision to buy RampagePlus, you can postpone making a lot of other decisions. If you're asking yourself: Do I need the extra functionality of EMS 4.0? Should I plan on converting to OS/2? Can I get the same power from my AT compatible as I can with a PS/2? Will I need to save slots for input/output boards? RampagePlus takes care of it all.

Of course, you'll be going on a Rampage designed by AST. That makes your decision even easier. After all, year after year, we've sold more memory/multifunction boards than any other company. Great boards, like SixPakPlus® and Advantage® And, after selling over three million boards, we're proud to say the RampagePlus boards are the best we've ever built.

For one, they are the first memory boards to offer 100% EMS 4.0 compatibility. RampagePlus 286 has 12.5 MHz speed designed especially for fast AT compatibles, while RampagePlus/MC runs with zero wait-states to get the most out of your PS/2s. And, both RampagePlus boards include SuperPak,™ AST's utility software programs.

Finally, there's one thing you'll find on a RampagePlus that you won't find on any other memory board, the AST name. And that means that you can make a safe decision and go on a Rampage, all at the same time. To find out how, call AST, **(714) 863-0181, Operator AA27,** or send us the coupon.

AST® RESEARCH INC.

AST is proud to sponsor NBC's telecast of the 1988 Summer Olympics

Times Have Changed.

Yes, send me more information on: ☐ RampagePlus/MC ☐ RampagePlus 286
☐ Have an AST representative call me.

Name _____

Title _____ Phone (_____) _____

Company _____

Address _____

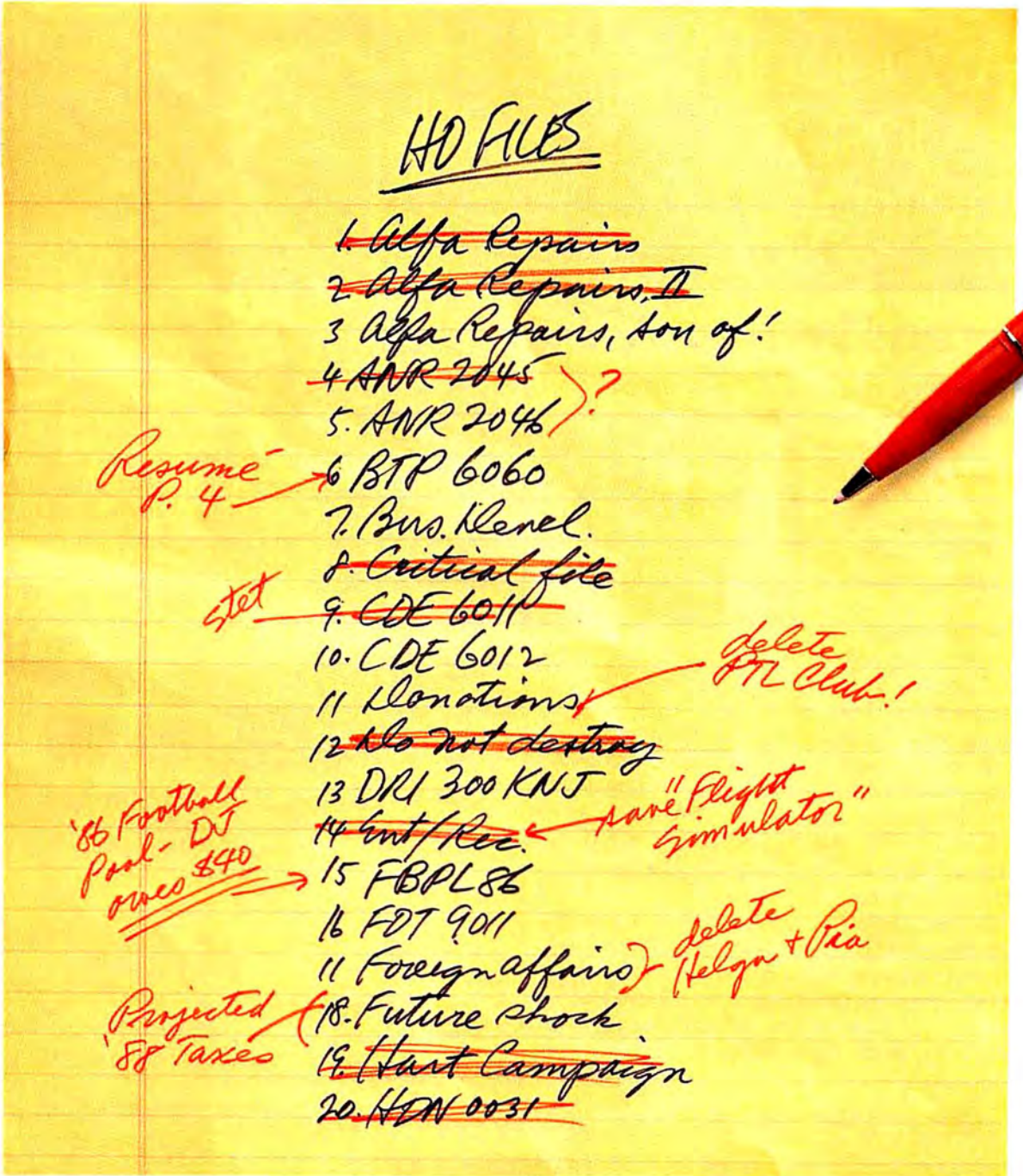
City/State/Zip _____

Send to: AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714-4992, Attn: M.C.

AST markets products worldwide—in Europe and the Middle East, call 44 1 568 4350; in the Far East, call: 852 5 717223; in Canada, call: 416 826 7514. AST, AST logo, Rampage, SixPakPlus and Advantage registered and SuperPak trademark AST Research, Inc. IBM and AT registered and PS/2 and OS/2 trademarks International Business Machines, Corp Copyright © 1988 AST Research, Inc. All rights reserved.

Circle 53 on reader service card

The agony of delete.



9:34 Tuesday night. You're working on a report that's going to top 80 pages. It's got charts, graphs, database files from the company mainframe, it's a monster.

About halfway through, you decide to make a backup file so you can tweak the original without losing it. And up comes a familiar message.

Your hard disk has 75K left. And you need at least 220K.

At this point, the next hour gets very predictable. You pull up the directories, looking for files to delete. Which isn't all that simple. Did ANR 2046 replace ANR 2045, or do you still need both of them? And then there's your resume. Did you put it at the back of BTP 6060 or somewhere else?

The only way is to browse those files one at a time, and delete the ones you can. Which can definitely affect the mood of the evening.

Worse yet, when your drive gets that full, you have to go through the whole exercise at least once a month. Until you do something about it.

But now, there's a clean, simple way to end this nightmare. Plus Hardcard.™ It's a 40 MB hard disk on a 1" card. And it fits in a single slot. So you won't have to throw out your old drive to make room.

With Hardcard, you get a full 40 MB of fresh new storage. Meaning you get to keep the files on your original disk.

Even if you've never had the back of your PC off before, you can install Hardcard in no time flat. There are no connector cables. No adapter cards. And you won't have to buy a new power supply.

Since Hardcard is engineered so lean and tight, it uses less power than ordinary hard disk drives. And lasts two to four times longer. It even leaves the rest of your PC open for turboboards, graphics cards, or whatever.

Plus Hardcard. It comes in 20 and 40 MB versions for the IBM® PC, XT,™ and AT® computers, and compatibles. Even for the new Personal System/2,™ Models 25 and 30. So if you've spent one too many nights cleaning up old files, just ask your computer dealer for a Hardcard demonstration. Or call (800) 826-8022 for the dealer nearest you.

And get ready for the thrill of victory. Which sure beats the agony of delete.

Plus™ Hardcard™

Plus Development Corp.
is a subsidiary of Quantum Corp.

Plus and Hardcard are trademarks of Plus Development Corp. © 1987 Plus Development Corp. Personal System/2 and XT are trademarks and IBM and AT are registered trademarks of International Business Machines Corp.

WORLD CLASS AWARDS

THE READERS' CHOICE

WES NIHEI

Part reader survey, part wish list, part raffle, the World Class Awards defies pigeonholing and packs a few surprises. One thing is certain: PC World readers know their hardware and software. This year, the sixth annual World Class contest showcases a collection of 35 software and hardware products worth over $30,000, handpicked by our readers.

Not surprisingly, readers played the favorites as far as software was concerned and bet the house on more powerful hardware from established vendors. With the exception of Intel and Epson, all of last year's winning hardware manufacturers took top honors this year, many with updated versions of their 1987 winners.

PC World congratulates those manufacturers whose products received the readers' seal of approval. Although these selections should not be construed as endorsements by PC World, they are a telling gauge of reader preference.

The tables on the following pages list the winning products plus those receiving a significant portion of the votes cast in each category. The Others category represents the combined percentage of all remaining products; the larger this number, the more products there were vying for the votes of PC World readers.

TOM WOLF/ONYX

Arthur Booth

THE WINNERS' CIRCLE

As always, three lucky readers were selected by random drawing from among the thousands of World Class Awards entrants for first, second, and third place prizes.

World Class goes to Washington, D.C., this year to award first prize to Arthur Booth. A project manager with the National Oceanic and Atmospheric Administration, Booth uses an IBM PC XT at work and an Eagle PC at home. He's a confirmed shareware supporter but is glad he can raise his sights, thanks to his new Compaq 386/20—the top-ranked desktop computer—and 33 other hardware and software products included in his World Class haul.

Stan Schowalter of Orange, California, pulls down second prize, a Compaq Portable 386. No stranger to powerhouse computing, Schowalter is the director of MIS for TRW mortgage document services. He uses an AST Premium/386 at the office, but his new Portable 386 will displace the Epson Equity II at home.

Third prize, a Toshiba T3100 laptop, goes to Virgil Swartzlander of Gibsonburg, Ohio. Swartzlander runs a public accounting business when he isn't fulfilling his duties as treasurer for Sandusky County, a post he's held for 30 years. He's a relative newcomer to personal computing, having purchased an IBM PC XT just two years ago so he could process clients' tax returns with *PC/Tax Cut*. What other applications does he use? None. "I didn't realize how good other software could be, but it looks like I'll be using a lot more now."

BLAKE LITTLE

Stan Schowalter

BRUCE ZAKE

Virgil Swartzlander

Big Blue's Blues, Compaq's Triumph

The Intel 80386's emergence this year as the processor of choice sways readers' choices for desktop and transportable computers. But IBM's trumpeting of its PS/2 line (including the 80386-based Model 80) fell on deaf ears. Readers overwhelmingly opted for the Compaq Deskpro 386/20 and pushed Compaq's Portable 386 to the top of the transportables heap.

Compaq's dominance in the transportables category is hardly a surprise, but the company has outdone itself in the desktop world, wresting the World Class title from IBM two years running, first with the 16-MHz Deskpro 386 and now with the 386/20. Has IBM lost touch with its customers? "The 386/20 has blazing speed, especially if you install a numeric coprocessor," says reader Brenton Drakeford, president of Las Colinas Computers in Irving, Texas. "It's the best-engineered piece of hardware I've seen, and I've used IBM, AT&T, and a fairly broad spectrum of other PCs. Every new Compaq machine is better than the last one."

The Toshiba T3100 and the Zenith Z-183 took the number one and two spots, respectively, in the laptop category, with the T3100 hanging on to first place for the second year in a row. But the ubiquitous 80386 made its presence felt, powering the Toshiba T5100 to a strong third place finish. In printers, IBM tasted defeat as former partner Epson rebounded from last year's second place showing to take first, second, third, and fourth with four dot matrix printers, led by the LQ-2500. Last year's winner, the IBM Proprinter, plummeted to sixth place.

In other hardware categories, readers chose to upgrade their favorites rather than switch brands. Hewlett-Packard, NEC, Video-7, and Plus Development once more won the laser printer, monitor, graphics board, and storage categories, respectively, each with new versions of last year's winners. Two notable surprises: The NEC LC890, an LED printer, took second among laser printers, supplanting the Apple LaserWriter as the top PostScript printer, and Intel's AboveBoard upset the perennial winner—AST Research's SixPakPlus—as the champion memory expansion board.

This year we also bid a fond farewell to IBM's XT and AT—two of the machines that started the revolution. In their place, fittingly, is the PS/2 Model 80, this year's most promising newcomer. Will the PS/2 be the one to inspire our readers' techno-lust next year? Stay tuned.

Keep-It-Simple Software

In choosing their software favorites, readers either stayed with the familiar or opted for new solutions that emphasized ease of use. Key examples: first-time winners *ProComm*, *Q&A*, and QuickBASIC. Not surprisingly, perennial winners such as *WordPerfect*, *1-2-3*, and *dBASE III Plus* remained kings of their respective hills—although not without challenges.

1-2-3 reigns as spreadsheet supreme, but new arrivals *Excel* and *Quattro* made strong showings despite having been on the market less than a year. *Excel*'s top-notch graphics and innovative features helped make it the most promising software newcomer and even earned it votes in the financial analysis category. "*Excel*'s built-in ability to produce sophisticated graphics makes the difference," says reader Bill Ibbs, professor of civil engineering at the University of California at Berkeley. "I've used *1-2-3* and *Quattro*, but people make decisions by looking at trends—not by looking at raw numbers."

Alex Stickney, assistant controller at the *Austin American-Statesman* in Austin, Texas, offers further testimony: "I don't require graphics; I chose *Excel* for its excellent worksheet-linking capability. It's difficult to compile data from different departments and create a high-level budget with *1-2-3*—a program I've used most of my career. But *Excel* can do it easily."

The success of *ProComm* is the best evidence that understandable, functional software will win out. A shareware communications package in the best tradition of *PC-Talk*, *ProComm* from Datastorm Technologies emerged from the world of shareware to knock *Crosstalk XVI* out of the World Class top spot and surpass *Smartcom II* and *III*. Apparently, an accessible interface and communications muscle make for an irresistible combination. Says World Class winner Arthur Booth, "*ProComm* is extremely easy to learn and use, but it's not limited. I can use it to maintain a bulletin board with ten co-workers spread out across the United States or access mainframe data for my projects." How successful might Datastorm's brainchild be? *ProComm Plus*, released as a retail product in January, finished fifth this year.

Expect more surprises in next year's World Class contest. OS/2, the new PS/2s, and 25-MHz 80386 systems may prove the catalysts for a new round of winners. But it takes more than potential to impress *PC World* readers—*HAL*, last year's most promising newcomer, mustered only a nominal repeat appearance in that category this year.

PC World thanks all the readers who took the time to share their opinions and invites everyone to take part again in 1989's contest. What new products will scale the World Class heights? You be the judge. ●

Wes Nihei is an assistant editor for PC World.

HARDWARE

DESKTOP COMPUTER

%	Product	Manufacturer
22	**Compaq Deskpro 386/20**	**Compaq Computer**
14	Compaq Deskpro 386	Compaq Computer
11	IBM PS/2 Model 80	IBM
5	AST Premium/286	AST Research
4	IBM PS/2 Model 50	IBM
44	Others	

83% of respondents voted in this category

TRANSPORTABLE COMPUTER

%	Product	Manufacturer
35	**Compaq Portable 386**	**Compaq Computer**
25	Compaq Portable III	Compaq Computer
16	Compaq Portable 386/20	Compaq Computer
5	Compaq Portable II	Compaq Computer
2	Toshiba T5100	Toshiba America
17	Others	

47% of respondents voted in this category

LAPTOP COMPUTER

%	Product	Manufacturer
20	**Toshiba T3100**	**Toshiba America**
14	Zenith Z-183	Zenith Data Systems
12	Toshiba T5100	Toshiba America
9	Toshiba T1000	Toshiba America
7	Toshiba T3200	Toshiba America
38	Others	

47% of respondents voted in this category

DOT MATRIX/NLQ PRINTER

%	Product	Manufacturer
8	**Epson LQ-2500**	**Epson America**
7	Epson FX-286e	Epson America
5	Epson LQ-1050	Epson America
4	Epson LQ-850	Epson America
4	Toshiba P351	Toshiba America
3	IBM Proprinter XL-24	IBM
69	Others	

71% of respondents voted in this category

All totals equal 100%.

PHOTOS BY STAN MUSILEK

MONITOR

%	Product	Manufacturer
13	**NEC MultiSync II**	**NEC**
12	NEC MultiSync	NEC
11	NEC MultiSync Plus	NEC
11	Zenith ZCM 1490	Zenith Data Systems
5	Princeton Ultrasync	Princeton Graphic Systems
48	Others	

59% of respondents voted in this category

LASER PRINTER

%	Product	Manufacturer
67	**HP LaserJet Series II**	**Hewlett-Packard**
8	NEC LC890	NEC
3	Apple LaserWriter	Apple
3	HP LaserJet	Hewlett-Packard
2	HP LaserJet Plus	Hewlett-Packard
17	Others	

52% of respondents voted in this category

MODEM

%	Product	Manufacturer
21	**Smartmodem 2400**	**Hayes Microcomputer Products**
12	Smartmodem 2400B	Hayes Microcomputer Products
11	V-series Smartmodem 9600	Hayes Microcomputer Products
8	Smartmodem 1200	Hayes Microcomputer Products
6	Smartmodem 1200B	Hayes Microcomputer Products
42	Others	

48% of respondents voted in this category

GRAPHICS BOARD

%	Product	Manufacturer
15	**Vega VGA**	**Video-7**
8	Vega Deluxe	Video-7
7	Hercules Graphics Card Plus	Hercules
4	IBM VGA 8514	IBM
3	EGA Wonder	ATI Technologies
63	Others	

36% of respondents voted in this category

INPUT DEVICE

%	Product	Manufacturer
37	**Microsoft Mouse**	**Microsoft Corp.**
28	Logitech C7 Mouse	Logitech
7	PC Mouse	Mouse Systems
2	HP ScanJet	Hewlett-Packard
26	Others	

34% of respondents voted in this category

MASS STORAGE

%	Product	Manufacturer
13	**Hardcard 40**	**Plus Development**
8	ST 225	Seagate
7	Bernoulli 20 + 20	Iomega
7	ST 251	Seagate
5	Bernoulli Box II	Iomega
5	ST 238	Seagate
55	Others	

32% of respondents voted in this category

MEMORY EXPANSION BOARD

%	Product	Manufacturer
20	**AboveBoard**	**Intel**
11	SixPakPlus	AST Research
10	Rampage AT	AST Research
9	Advantage Premium	AST Research
7	SixPak Premium	AST Research
43	Others	

29% of respondents voted in this category

LOCAL AREA NETWORK—NETWORK BOARD

%	Product	Manufacturer
24	**Token-Ring**	**IBM**
4	ArcNet	Novell
4	EtherLink	3Com
3	EtherLink Plus	3Com
3	IRMA	DCA
3	PC-110 Network	Standard Microsystems
59	Others	

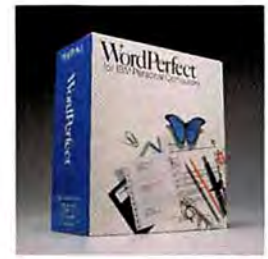
12% of respondents voted in this category

MOST PROMISING NEWCOMER—HARDWARE

%	Product	Manufacturer
9	**IBM PS/2 Model 80**	**IBM**
7	Compaq Deskpro 386/20	Compaq Computer
4	AST Premium/386	AST Research
4	Inboard 386	Intel
3	386 Motherboard	Hauppauge Computer Works
73	Others	

27% of respondents voted in this category

SOFTWARE



WORD PROCESSING

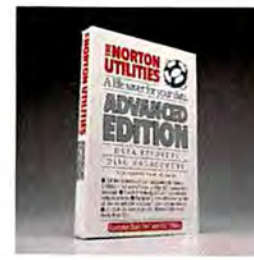
%	Product	Manufacturer
35	**WordPerfect**	**WordPerfect**
19	Microsoft Word	Microsoft Corp.
5	PFS: Professional Write	Software Publishing
4	WordStar 4.0	MicroPro
4	WordStar Professional	MicroPro
33	Others	

84% of respondents voted in this category

SPREADSHEET

%	Product	Manufacturer
40	**1-2-3**	**Lotus Development**
21	Microsoft Excel	Microsoft Corp.
12	Quattro	Borland Int'l
4	SuperCalc 4	Computer Associates
3	Symphony	Lotus Development
2	Lucid 3-D	PCSG
18	Others	

73% of respondents voted in this category



UTILITY

%	Product	Manufacturer
24	**Norton Utilities**	**Peter Norton Computing**
19	Norton Utilities Advanced	Peter Norton Computing
9	PC Tools Deluxe	Central Point Software
6	PC Tools	Central Point Software
3	Xtree Pro	Executive Systems
39	Others	

54% of respondents voted in this category

RELATIONAL DATA BASE

%	Product	Manufacturer
38	**dBASE III Plus**	**Ashton-Tate**
15	Paradox	Borland/Ansa
8	R:base System V	Microrim
4	R:base for DOS	Microrim
3	Foxbase +	Fox Software
32	Others	

52% of respondents voted in this category

COMMUNICATIONS

%	Product	Manufacturer
22	**ProComm**	**Datastorm Technologies**
11	Smartcom III	Hayes Microcomputer Products
9	Smartcom II	Hayes Microcomputer Products
8	Crosstalk XVI	DCA/Crosstalk Communications
7	ProComm Plus	Datastorm Technologies
43	Others	

41% of respondents voted in this category

PROGRAMMING LANGUAGE

%	Product	Manufacturer
23	**QuickBASIC**	**Microsoft Corp.**
22	Turbo Pascal	Borland Int'l
16	Microsoft C	Microsoft Corp.
11	Turbo C	Borland Int'l
5	Microsoft QuickC	Microsoft Corp.
23	Others	

39% of respondents voted in this category

OPERATING ENVIRONMENT

%	Product	Manufacturer
24	**Microsoft Windows**	**Microsoft Corp.**
17	Desqview	Quarterdeck Office Systems
12	Microsoft Windows/386	Microsoft Corp.
11	MS DOS/PC DOS 3.30	Microsoft/IBM
8	MS DOS/PC DOS 3.20	Microsoft/IBM
5	OS/2	IBM
23	Others	

38% of respondents voted in this category

DESKTOP PUBLISHING

%	Product	Manufacturer
41	**Ventura Publisher**	**Xerox**
33	PageMaker	Aldus
9	PFS: First Publisher	Software Publishing
2	Byline	Ashton-Tate
2	GEM Desktop Publisher	Digital Research
13	Others	

36% of respondents voted in this category

DESKTOP ORGANIZER

%	Product	Manufacturer
38	**SideKick**	**Borland Int'l**
16	Metro	Lotus Development
11	WordPerfect Library	WordPerfect
5	SideKick Plus	Borland Int'l
3	Memory Mate	Brøderbund
27	Others	

31% of respondents voted in this category

GAME

%	Product	Manufacturer
18	**Microsoft Flight Simulator**	**Microsoft Corp.**
7	Gunship	MicroProse
5	Chuck Yeager's Advanced Flight Simulator	Electronic Arts
3	Leisure Suit Larry	Sierra On-Line
3	Mean 18	Accolade
3	Star Flight	Electronic Arts
61	Others	

30% of respondents voted in this category

INTEGRATED

%	Product	Manufacturer
21	**Symphony**	**Lotus Development**
17	Framework II	Ashton-Tate
14	Microsoft Works	Microsoft Corp.
11	Enable	Software Group
10	Smart System	Innovative Software
27	Others	

27% of respondents voted in this category

BUSINESS GRAPHICS

%	Product	Manufacturer
34	**Harvard Graphics**	**Software Publishing**
11	Freelance Plus	Lotus Development
10	Harvard Presentation Graphics	Software Publishing
5	Microsoft Chart	Microsoft Corp.
3	Boeing Graph	Boeing
37	Others	

26% of respondents voted in this category

FLAT-FILE DATA BASE

%	Product	Manufacturer
20	**Q&A**	**Symantec**
15	PFS: Professional File	Software Publishing
13	Reflex	Borland Int'l
12	PC-File +	ButtonWare
2	RapidFile	Ashton-Tate
38	Others	

23% of respondents voted in this category

PHOTOS BY STAN MUSEK

ACCOUNTING

%	Product	Manufacturer
27	**DacEasy**	**Dac Software**
15	Peachtree Complete II	Peachtree
4	Solomon III	TLB
3	Quicken/2	Intuit
2	Accounting Systems II	Peachtree
2	NewViews	Q.W. Page
47	Others	

22% of respondents voted in this category

WORD PROCESSING UTILITY

%	Product	Manufacturer
16	**WordPerfect Library**	**WordPerfect**
8	Turbo Lightning	Borland Int'l
5	Pageview	Microsoft Corp.
5	Word Finder	Microlytics
4	RightWriter	RightSoft
62	Others	

21% of respondents voted in this category

TAX PLANNING OR PREPARATION

%	Product	Manufacturer
55	**Turbo Tax**	**ChipSoft**
13	Tax Preparer	HowardSoft
7	PC/Tax Cut	Best Programs
6	Andrew Tobias' Managing Your Money	MECA Ventures
3	J. K. Lasser's Your Income Tax	Simon & Schuster Software
16	Others	

21% of respondents voted in this category

PERSONAL FINANCE

%	Product	Manufacturer
55	**Andrew Tobias' Managing Your Money**	**MECA Ventures**
16	Dollars and Sense	Monogram
11	Quicken	Intuit
4	Money Counts	Parsons Technology
3	DacEasy Light	Dac Software
11	Others	

21% of respondents voted in this category

COMPUTER-AIDED DESIGN

%	Product	Manufacturer
46	**AutoCAD**	**Autodesk**
13	Generic CADD	Generic Software
7	DesignCAD	ASBC
5	Designer	Micrografx
3	DesignCAD-3D	ASBC
26	Others	

20% of respondents voted in this category

LOCAL AREA NETWORK—NETWORK OPERATING SYSTEM

%	Product	Manufacturer
25	**Netware**	**Novell**
17	Advanced Netware	Novell
6	3+	3Com
5	PC LAN Program	IBM
4	Vines	Banyan Systems
43	Others	

15% of respondents voted in this category

FINANCIAL ANALYSIS

%	Product	Manufacturer
21	**1-2-3**	**Lotus Development**
17	Andrew Tobias' Managing Your Money	MECA Ventures
12	Javelin Plus	Javelin Software
7	Microsoft Excel	Microsoft Corp.
5	Javelin	Javelin Software
38	Others	

11% of respondents voted in this category

DESKTOP PUBLISHING UTILITY

%	Product	Manufacturer
18	**Publisher's Paintbrush**	**Z-Soft**
5	GEM Draw Plus	Digital Research
5	Fontware	Bitstream
4	Designer	Micrografx
4	PageMaker Portfolio	Aldus
64	Others	

10% of respondents voted in this category

MOST PROMISING NEWCOMER—SOFTWARE

%	Product	Manufacturer
19	**Microsoft Excel**	**Microsoft Corp.**
9	Quattro	Borland Int'l
3	OS/2	IBM
2	Microsoft Windows	Microsoft Corp.
2	WordPerfect 5.0	WordPerfect
65	Others	

32% of respondents voted in this category

PHOTOS BY STAN WOLSIEFF

WHERE TO BUY

1-2-3
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500

AboveBoard
Intel Corp.
5200 N.E. Elam Young Pkwy.
Mailstop C03-07
Hillsboro, OR 97124-6497
503/629-7354

Andrew Tobias' Managing Your Money
MECA Ventures
355 Riverside Ave.
Westport, CT 06880
203/222-9150

AutoCAD
Autodesk, Inc.
2320 Marinship Way
Sausalito, CA 94965
415/332-2344

Compaq Deskpro 386/20
Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
800/231-0900

Compaq Portable 386
Compaq Computer Corp.

DacEasy
Dac Software
17950 Preston Rd. #800
Dallas, TX 75252
800/992-7779

dBASE III Plus
Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502
213/329-8000

Epson LQ-2500
Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
800/922-8911

Excel
Microsoft Corp.
16011 N.E. 36th Way, Box 97017
Redmond, WA 98073-9717
206/882-8080

Flight Simulator
Microsoft Corp.

Hardcard 40
Plus Development
1778 McCarthy Blvd.
Milpitas, CA 95035
408/434-6900

Harvard Graphics
Software Publishing Corp.
1901 Landings Dr.
Mountain View, CA 94043
408/848-4391

HP LaserJet Series II
Hewlett-Packard
Customer Information Center
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900

Microsoft Mouse
Microsoft Corp.

Microsoft Windows
Microsoft Corp.

NEC MultiSync II
NEC Home Electronics (USA), Inc.
1255 Michael Dr.
Wood Dale, IL 60191-1094
800/826-2255

Netware
Novell, Inc.
122 East 1700 S
Provo, UT 84601
800/453-1267

Norton Utilities
Peter Norton Computing
2210 Wilshire Blvd. #186
Santa Monica, CA 90401
213/319-2000

ProComm
Datastorm Technologies
1621 Towne Drive, Ste. G
Columbia, MO 65202
314/449-7012

PS/2 Model 80
IBM
Information Systems Group
900 King St.
Rye Brook, NY 10573
201/358-5689

Publisher's Paintbrush
Z-Soft Corp.
450 Franklin Roadway #100
Marietta, GA 30067
404/980-1950

Q&A
Symantec
Breakthrough Software Division
10201 Torre Ave.
Cupertino, CA 95014-2132
408/253-9600

QuickBASIC
Microsoft Corp.

SideKick
Borland Int'l
1800 Green Hills Rd.
Scotts Valley, CA 95066
408/438-8400

Smartmodem2400
Hayes Microcomputer Products
P.O. Box 105203
Atlanta, GA 30348
404/441-1617

Symphony
Lotus Development Corp.

Token-Ring
IBM

Toshiba T3100
Toshiba America, Inc.
Information Systems Div.
9740 Irvine Blvd.
Irvine, CA 92718
800/457-7777

Turbo Tax
ChipSoft
5045 Shoreham Pl. #100
San Diego, CA 92122
619/581-2233

Vega VGA
Video-7
46335 Landing Pkwy.
Fremont, CA 94538
800/238-0101, 800/962-5700 California

Ventura Publisher
Xerox Desktop Software
Xerox Corp.
1301 Ridgeview Dr.
Mailstop 179
Lewisville, TX 75067
800/822-8221

WordPerfect
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
801/225-5000

WordPerfect Library
WordPerfect Corp. ●

IS YOUR PC READY FOR OS/2?

WHEN WE SUBJECTED 33 PCs TO A BATTERY OF OS/2 PERFORMANCE BENCHMARKS—USING JUST-RELEASED OS/2 APPLICATIONS—THE RESULTS WERE DRAMATIC.

Eric Knorr

IBM and Microsoft assert that any PC with an 80286 or 80386 CPU can run OS/2. True enough—but how fast? To find out, National Software Testing Laboratories (NSTL) recently ran a suite of ground-breaking OS/2 benchmarks on thirteen 80286 and twenty 80386 machines. The conclusion: Most of today's 80286 machines are ill-equipped for OS/2 computing.

NSTL's OS/2 benchmarks numbered seven in all. The three single-task benchmarks are similar to the lab's standard DOS speed tests, only with brand-new OS/2 software: IBM's *DisplayWrite 4/2* and *C/2*, and Microrim's *R:base for OS/2*. The multitasking benchmarks used the three applications in various combinations. NSTL also ran its usual *1-2-3* tests in OS/2's DOS compatibility box.

Why did most of the 80286 machines do so poorly? OS/2, and especially multitasking under OS/2, requires large quantities of RAM—from 3MB to as much as 16MB. For acceptable performance, that RAM should be accessed at or near the full speed of the CPU. Of the thirteen 80286 machines tested, only IBM's PS/2 Models 50 and 60 and the AST Premium/286 accommodate over 1MB of zero-wait-state, CPU-speed RAM.

Raw clock speed and faster hard disks also help give the 80386 class a solid lead. The slowest 20-MHz 80386 machine, the IBM PS/2 Model 70-121, ran 38 percent faster than the top-performing Premium/286; the slowest 16-MHz 80386 PC, the ITT Xtra Professional Series 700, beat the Premium/286 by 16 percent. However, the newly released 12-MHz version of the Premium/286 may turn the tables.

Due to the Series 700's debilitating wait state, the 12-MHz, zero-wait-state Premium/286 should be able to access memory just as quickly as the Series 700, even though the two PCs' CPUs are different. (The 32-bit advantage of the 80386 is wasted on a 16-bit operating system like OS/2.) Thus, the poor OS/2 performance rating for most 80286 machines has more to do with the lower clock speeds and limited fast RAM endemic to the AT class than with any inherent deficiency in the 80286 chip.

NSTL's multitasking benchmarks demonstrate the importance of large fast-RAM capacity. The results also support one of OS/2's key selling points: its efficient method of assigning priorities among multiple tasks. As Microsoft claims, the task you work with on screen takes precedence, leaving background tasks such as printing, sorting, and searching for leftover CPU time. Background tasks may take a long time to complete, but NSTL's technicians confirm that the apparent speed of the on-screen application (particularly its keystroke response) degrades only slightly when you load applications behind it.

Consider the plight of the 12-MHz Compaq Deskpro 286, which accommodates a maximum 2.1MB of one-wait-state RAM on the motherboard. The unit's speedy cousin, the Deskpro 386/20, outfitted with a 32K, zero-wait-state memory cache backed up by 5MB of system memory, completed multitasking Test 3 (which employs two concurrent *DisplayWrite 4/2* sessions) in 1 minute, 59 seconds; the Deskpro 286 did it in 5 minutes, 46 seconds. In Test 2, which adds a disk-intensive *R:base for OS/2* session and an IBM C/2 routine to the two *DisplayWrite 4/2* tasks, the Deskpro 386/20 did the job in 9 minutes, 52 seconds, while the Deskpro 286 finished in 27 minutes, 2 seconds. With both machines, adding the two additional tasks increased total execution time by a factor of about 5; the threefold advantage enjoyed by the Deskpro 386/20 stayed more or less constant.

If a system has a low motherboard memory capacity (and/or a dedicated memory slot), installing a memory board on the expansion bus would seem an obvious way to beef up performance. Unfortunately, most systems access memory on the expansion bus at a much slower speed than they access motherboard memory. To make matters worse, OS/2 (unlike DOS) loads applications in higher memory first.

That means that if you've installed a memory expansion board, both OS/2 and its applications fill up the board's RAM before they fill the faster motherboard memory. Consequently, when NSTL tested Dell's System 200, the machine was slower with 3.6MB of RAM—2MB of which resided on an Intel Above-Board—than it was with 1.6MB of motherboard RAM alone.

The winning 80386 PC, not surprisingly, was the 25-MHz Deskpro 386/25. Generally, performance among the 80386 machines was remarkably varied. One thing is clear: Memory caching helps.

The winning 20-MHz 80386 machine was the cache-based Everex STEP 386/20, followed closely by the ALR FlexCache 20386, the Dell System 310, and the Deskpro 386/20. While all four units run at 20 MHz and use memory caching, the STEP 386/20 has a large 256K cache and a proprietary caching architecture; the three others use Intel's 82385 cache controller to manage a 32K cache, a design pioneered by the Deskpro 386/20.

The IBM PS/2 Model 70-121, slowest of the 20-MHz contenders, does not use memory caching. Neither do the Model 80-111 or the AST Premium/386, which are only slightly faster than the Model 70-121. In addition, the low scores of the 20-MHz Models 70 and 80 suggest that whatever benefits the Micro Channel may have for OS/2-based multitasking are eclipsed by the advantages of memory caching. Perhaps this is why the new 25-MHz Model 70-A21—like the new Deskpro 386/25—sports an 82385 cache controller and 64K of cache RAM.

All the 20-MHz PCs tested employ a high-performance ESDI hard disk with a 1:1 interleave plus disk-caching software. An ESDI drive gets the most out of a 20-MHz or 25-MHz system; otherwise, the CPU ends up waiting for hard disk

System Configurations

	Processor speed (MHz)	Amount of RAM as tested (MB)[1]	Maximum fast RAM installable (MB)[2]	Type of coprocessor	Speed of coprocessor (MHz)	Size of hard disk (MB)	Hard disk access time (ms)	Hard disk interleave
80286 systems								
Acer 910	10[3]	4	1	80287	8	44.5	28	2:1
ALR Dart-40	10[4]	4	2	80287	10	44.5	28	2:1
AST Premium/286	10	3	4[5]	80287	8	44.5	28	2:1
Compaq Deskpro 286	12	4.1	2.1	80287	8	42.6	29	2:1
Dell System 200	12.5	4.1	4.6	80287	8/12[6]	42.5	28	2:1
Epson Equity III+	12	3.1	640K[7]	80287	8	44.5	28	2:1
IBM PS/2 Model 50	10	3	16[8]	80287	10	20	80	1:1
IBM PS/2 Model 50 Z	10	3	16[8]	80286	10	30	39	1:1
IBM PS/2 Model 60	10	3	16[8]	80287	10	44.5	40	1:1
Mitsubishi MP 286-340E	12	4.6	4.6	80287	8	42.6	28	2:1
NCR PC810	10	3.1	640K	80287	8	21.3	40	2:1
Tandy 3000	12	4.6	640K	80287	8/10[9]	44.5	28	2:1
Wyse PC 286	12.5	3.5	1	80287	10	42.6	28	2:1
16-MHz 80386 systems								
Acer 1100	16	5	9	80387	16	72	24	3:1
Compaq Deskpro 386	16	4	13	80387	16	43	27	2:1
Compaq Deskpro 386S	16	4	13	80387SX	16	40	29	1:1
Dell System 300	16	4	6	80287	8	42	27	2:1
IBM PS/2 Model 70-E61	16	3	6	80387	16	60	29	1:1
IBM PS/2 Model 80-71	16	3	6	80387	16	70	30	1:1
ITT Xtra Professional Series 700	16	4	16	80287	10	43	27	2:1
Mitsubishi MP 386	16	5	10	80387	16	43	27	2:1
NCR PC916	16	4	8	80387	16	32	35	3:1
Tandy 4000	16	4	4	80287	8	44	31	3:1
Wyse PC 386	16	4	18	80387	16	43	27	1:1
Zenith Z-386	16	3	16	80387	16	72	26	2:1
20-MHz 80386 systems								
ALR FlexCache 20386	20	4	10	80387	20	151	19	1:1
AST Premium/386	20	4	13	80387	20	89	19	1:1
Compaq Deskpro 386/20	20	5	16	80387	20	135	17	1:1
Dell System 310	20	4	16	80387	20	89	19	1:1
Everex STEP 386/20	20	4	16	80387	20	80	31	1:1
IBM PS/2 Model 70-121	20	3	6	80387	20	120	23	1:1
IBM PS/2 Model 80-111	20	4	4	80387	20	115	28	1:1
25-MHz 80386 systems								
Compaq Deskpro 386/25	25	3	16	80387	25	300	20	1:1

[1] Although the systems tested had different amounts of RAM, none of the OS/2 tests required more than 3MB.

[2] Fast RAM is defined as RAM accessed at or near the speed of the CPU (that is, through the memory bus, not the expansion bus).

[3] The Acer's processor speed must be dropped to 6 MHz to make the expansion bus compatible with the standard bus.

[4] The ALR's processor speed must be dropped to 8 MHz to make the expansion bus compatible with the standard bus.

[5] The AST Fastslots are capable of 10 MHz with zero wait states.

[6] The Dell System 200 has an adjustable CMOS coprocessor setting that allows the coprocessor to perform at either fast or slow speed.

[7] The Epson has expansion bus states adjustable from one to four wait states.

[8] The IBM PS/2 Model 50 and 60 Micro Channel expansion bus is capable of zero-wait-state operation.

[9] The Tandy has an oscillator that must be installed to allow the coprocessor to operate at 10 MHz.

I/O, slowing down disk-intensive operations (a SCSI drive does even better). And because multiple sessions increase the number of random seeks, a hard disk's average access time is critical. All but one of the four winning systems have fast hard disks with average access times under 20 milliseconds.

Although NSTL's benchmarks represent the most comprehensive application-based OS/2 speed tests to date, keep in mind that the applications used for these benchmarks are first-generation OS/2 programs not fully optimized for OS/2. Also, the tests were performed without the Presentation Manager. Even with future OS/2 programs that take full advantage of multithreading, the processing overhead incurred by the Presentation Manager is sure to slow things down even further—an especially gloomy sce-

NSTL TEST REPORT

80286 systems	Multitasking test 1	Multitasking test 2	Multitasking test 3
Acer 910	583	1450	293
ALR Dart-40	596	1465	294
AST Premium/286	480	1181	228
Compaq Deskpro 286	675	1622	346
Dell System 200			
with AboveBoard	633	1938	353
without AboveBoard [2]	n/a	n/a	n/a
Epson Equity III+	814	2048	350
IBM PS/2 Model 50	614	1601	307
IBM PS/2 Model 50 Z	470	1358	257
IBM PS/2 Model 60	580	1460	291
Mitsubishi MP 286-340E	690	1721	353
NCR PC810	704	1748	349
Tandy 3000	829	2090	434
Wyse PC 286	800	1987	357
	seconds 0 1000	seconds 0 3000	seconds 0 500
16-MHz 80386 systems			
Acer 1100	337	808	160
Compaq Deskpro 386	350	851	169
Compaq Deskpro 386S	382	935	191
Dell System 300	335	798	151
IBM PS/2 Model 70-E61	353	873	176
IBM PS/2 Model 80-71	334	840	172
ITT Xtra Professional Series 700	407	980	192
Mitsubishi MP 386	389	936	180
NCR PC916	356	847	159
Tandy 4000	391	919	183
Wyse PC 386	341	814	157
Zenith Z-386	339	810	153
	seconds 0 500	seconds 0 1000	seconds 0 200
20-MHz 80386 systems			
ALR FlexCache 20386	240	563	118
AST Premium/386	273	653	136
Compaq Deskpro 386/20	246	592	119
Dell System 310	243	573	109
Everex STEP 386/20	235	560	110
IBM PS/2 Model 70-121	303	724	114
IBM PS/2 Model 80-111	276	673	140
25-MHz 80386 systems			
Compaq Deskpro 386/25	221	503	102
	seconds 0 400	seconds 0 800	seconds 0 200

[1] The Acer 910 was limited to 512K of "conventional" memory when extended memory was used, which prevented the 1-2-3 benchmark from being run in the compatibility box.

[2] Dell could populate the motherboard with only 2MB, which was sufficient to run just two of the OS/2 benchmarks. The AboveBoard added 2MB to the expansion bus.

Multitasking test 1
The *DisplayWrite 4/2* benchmark is run in the foreground. The *R:base for OS/2* benchmark is run in the background along with a session of *DisplayWrite 4/2* printing a 35-page document to the spooler and, eventually, to an IBM Proprinter II. Time is measured from when the foreground *DisplayWrite 4/2* benchmark begins until the *R:base for OS/2* benchmark ends. The time it takes for printing to finish is not included.

Multitasking test 2
The *DisplayWrite 4/2* benchmark is run in the foreground. The *R:base for OS/2* and IBM C/2 benchmarks are run in the background along with a session of *DisplayWrite 4/2* printing a 35-page document to the spooler and, eventually, to an IBM Proprinter II. Time is measured from when the foreground *DisplayWrite 4/2* benchmark begins until the IBM C/2 benchmark ends. The time it takes for printing to finish is not included.

Multitasking test 3
The *DisplayWrite 4/2* benchmark is run in the foreground while a background session of *DisplayWrite 4/2* prints a 35-page document to the OS/2 spooler and, eventually, to an IBM Proprinter II. Time is measured from when the *DisplayWrite 4/2* benchmark begins until that benchmark ends. The time it takes for printing to finish is not included.

IBM DisplayWrite 4/2
Although the hard disk access rate plays a small part in

nario for most of today's 80286 PCs.

It's a mistake to jump to conclusions based purely on current performance benchmarks, because no one yet knows how users will exploit multitasking. With multitasking, it's work throughput that counts; executing tasks simultaneously is always faster than performing them one after another. Nonetheless, watching a system with a meager memory capacity slow to a crawl is no picnic. Early returns indicate that the ideal platform for OS/2 is a 20-MHz (or faster) 80386 machine with memory caching, enough room for 16MB of zero-wait-state memory, and a swift ESDI or SCSI hard disk. In short, the fastest PC you can afford. ●

Eric Knorr is a senior editor for PC World.

this benchmark, processing and memory access speeds are the most significant factors. Memory architecture affects memory access speed: Systems that require additional memory in standard expansion slots to run OS/2 exhibit below-average performance.

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

IBM C/2

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

R:base for OS/2

Processing and hard disk random-access speeds are the most significant factors for this benchmark. Disk caching, if present, will dramatically improve apparent disk access speed. This benchmark measures the time it takes to produce a report based on a three-file join, select, and sort.

1-2-3 in OS/2's compatibility box

The *1-2-3* benchmark used for DOS is run in OS/2's DOS compatibility box. It uses a macro to perform a series of recalculations and depends almost entirely on a system's processing and memory access speeds. The test gives an indication of the performance of the system running a program in the compatibility box. It is performed with the coprocessor installed.

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

D·O·S LIVES!

THE RUMORS OF DOS'S DEMISE HAVE BEEN GREATLY EXAGGERATED. AS THE RELEASE OF DOS 4.00 SHOWS, THERE'S LIFE IN THE OLD WORKHORSE YET.

SCOTT SPANBAUER AND ROBERT LUHN

OS/2 may indeed propel personal computing to a higher plane—someday. But until meaty, multithreaded OS/2 applications arrive—and until 80386-based systems with 4MB of RAM are priced around $2000—DOS will have to do.

Fortunately, IBM hasn't rested on its money bags. This latest release of the venerable operating system is infused with new features, including a graphic user interface similar to OS/2's Presentation Manager and some extras that even OS/2 lacks.

Among DOS 4.00's many enhancements are EMS 4.0 expanded memory support, the ability to create hard disk partitions of up to 2 gigabytes (versus DOS 3.30's and OS/2's 32MB limit), an automated installation program, and in-context help. But the most welcome enhancement (especially for newcomers) is a mouse- or keyboard-driven graphic (or text-mode) shell that lets you pluck DOS commands from pulldown menus, run programs with the click of a mouse, manage files and subdirectories in *Xtree*-like fashion, and create custom help screens and dialog boxes in a flash. You'll never struggle with a DOS prompt again, and you'll be prepared for the future, too, since the shell's Start Programs and File System screens closely mimic their counterparts in the OS/2 Presentation Manager (see the preview "Windows on OS/2," *PCW*, September 1988).

Just keep in mind that the DOS 4.00 shell isn't strictly an environment—it can't run programs in multiple on-screen windows. But at least you're not restricted to programs written specifically for the interface; all existing DOS programs and batch files (with the exception of *Windows 2.03* and a few early copies of *Windows/386 2.10*) run from the shell without a hitch.

The DOS Shell Game

DOS shells like *Xtree* are naturally popular with new users: These shells display a comprehensible directory tree and allow you to perform copy, move, delete, and other operations on files en masse. But if you want to run a program, you must typically exit to the DOS prompt, log on to the proper subdirectory, type the name of the command file (or batch file), and press <Enter>. DOS 4.00 fills this gap, seamlessly merging the simplicity of a shell with the power of batch files.

Start Programs, the shell's opening screen, initially lists a handful of DOS utilities and the File System program. Double-clicking a listed item or highlighting it and pressing <Enter> clears the shell from the screen and runs the program; exit the program, and Start Programs reappears automatically. To add a program to the list, you pick a menu command and supply the name of the program in the subsequent on-screen form, as well as the commands you'd normally put in a batch file to locate and execute the program (such as CD\WORD and WORD/C).

A Tree, and More

At first glance the File System screen resembles *Xtree*, complete with a scrollable directory tree in one window and file listings in another. Pulldown menu options reveal impressive capabilities: You can view two directories at a time or, better still, view all the files on a drive sorted by name, extension, size, or date, regardless of subdirectory. You can not only perform move, copy, rename, and delete operations on individual files or groups of files, you can also change a file's hidden, read-only, and archive attributes. A DOS 4.00 feature that will give *Xtree*'s authors nightmares, however, is the ability to link a data file with its application. Double-click a *1-2-3* worksheet, for example, and *1-2-3* is loaded and the worksheet opened.

DOS Better

Even those who prefer the DOS prompt to DOS 4.00's user-friendliness should consider upgrading—a fast and easy task, thanks to the automated install program. You'll find numerous small enhancements to existing commands and utilities (see the sidebar below) and a couple of major improvements. Disk partitions can exceed 32MB, making life easier for data base, graphics, and CAD users who frequently manipulate multimegabyte files. Microsoft claims that DOS 4.00's larger File Allocation Tables will also speed file access.

The expanded memory barrier has been broken, too, now that DOS supports EMS 4.0 expanded memory boards and IBM's XMA boards. Software developers are the first beneficiaries of this change, since they can now rely on the DOS EMS drivers instead of having to provide their own. Eventually, it may mean less complicated installation of *Framework*, *1-2-3*, *Desqview*, and other programs that automatically use expanded memory. For the time being, the drivers allow you to create RAM disks in expanded memory with DOS's VDISK.SYS, speed disk operations by allocating up to 10,000 buffers in expanded memory, and treat extended memory on 80386-based machines as expanded memory. However, you can't run the shell or DOS itself in expanded memory.

It's easy to add your favorite programs—with customized help screens—to DOS 4.00's Start Programs display.

As with past versions of DOS, you can buy DOS 4.00 from IBM dealers (for $150, $95 if you're upgrading) or obtain it from your system vendor. Either way, you're getting a deal. The makers of *Xtree*, *Q-DOS II*, *The Norton Commander*, and other DOS shells that benefited from DOS's past failings, however, had better scamper back to the drawing boards. DOS does more, does it better, and in most cases, does it for less. ●

Scott Spanbauer is an assistant editor and Robert Luhn a senior editor for PC World.

DOS 4.00 COMMANDS: NEW AND IMPROVED

NEW

MEM Displays conventional and extended memory allocation.

SWITCHES Allows older programs to work with the enhanced keyboard.

ENHANCED

ANSI.SYS Reassigns extended-key values, prevents applications from changing the number of screen display lines specified by MODE, and prevents use of extended keyboard functions.

BACKUP Automatically formats unformatted target disks.

BUFFERS Permits 10,000 buffers in expanded memory.

CHKDSK Notes size and number of available clusters.

DEL/ERASE Asks for confirmation before deleting file.

FDISK Accepts partition size in megabytes or in percentage of total disk space.

FORMAT /V:*label* skips prompt to enter volume label after formatting; /F:*size* allows you to format low-capacity disks in high-capacity drives.

GRAPHICS Supports EGA and VGA print screens as well as output in 19 shades of gray or 8 colors.

MODE Specifies keystroke repeat rates, number of lines on screen, and asynchronous parameters.

REPLACE Replaces target disk files with more recent source disk files.

SYS Recognizes source drive and path names.

TIME Accepts 12-hour format entries.

TREE Generates treelike directory display.

VDISK Works with expanded memory.

ON-LINE SERVICES AND DATA BASES

Scott Spanbauer

The information you need is probably only a handshake away. Welcome to PC World's sampler of on-line services, data base vendors, and data bases.

The amount and variety of information available through your modem is staggering; just about anything you ever wanted to know is at your fingertips, and experts in a wide variety of fields stand ready to answer your questions. But extracting valuable data from the mountain of on-line business intelligence, statistics, publications, and reports can be time-consuming and costly.

The trick is to find the on-line source that offers the information you need at the lowest price, and to avoid paying for services you won't use. By acquainting you with the quantity, quality, and cost of information available on line, this Buyers' Guide can help you become a smarter on-line shopper.

The guide is divided into separate listings: on-line services, data base vendors, and data bases themselves. On-line services, like CompuServe and The Source, are multifeatured electronic supermarkets that offer not only stored data on many hundreds of topics but also direct access to knowledgeable people through electronic mail, special interest groups (SIGs), topical conferences, and bulletin boards. Access to some data bases is usually included in the price of the subscription, and hundreds of public-domain and shareware programs are ready for downloading. On-line services tend to be relatively inexpensive, but most lack the specialized resources needed by hard-core researchers.

Professional researchers will probably gravitate toward dedicated data base vendors like Dialog Information Services, Dow Jones News/Retrieval, and BRS Information Technologies. These data base department stores often contain hundreds of full-text data bases, allowing the user to download complete articles from newspapers, magazines, newsletters, and professional journals. Other data bases provide only bibliographic citations and/or summaries.

Some on-line services and data base vendors offer amiable, menu-driven interfaces that can mean the difference between success and failure to a novice searcher. These services tend to charge higher rates. Others have command-driven interfaces that take a while to learn but reduce the time spent on line by experienced searchers. Obviously, on-line help, toll-free phone support, user manuals, and even training classes are desirable, especially with hard-to-use data bases.

Costs range widely and include one-time sign-up fees, monthly or annual fees, and connect-time charges that vary according to the time of day, the day of the week, and the bps rate. Data bases sometimes charge by the search, with a surcharge for hard copy. Some services offer local telephone-access numbers; others require the use of access services like Tymnet or Telenet, at an additional on-line charge.

Many on-line services also offer gateways to one or more other services, usually at a slight premium over the usual cost of the service accessed. For occasional use, this can be more economical than subscribing to multiple services.

Because on-line services and data bases are so numerous, this directory is limited to the biggest U.S. general-interest services plus a selection of useful data bases for a range of topics. For more information about the more than 3500 data bases not included in this guide, get a copy of the *Directory of Online Databases* (sometimes called the Cuadra directory), published quarterly by Cuadra/Elsevier, New York. (You may want to look for it at the library, since an annual subscription exceeds $200.) Other excellent resources include *The Complete Handbook of Personal Computer Communications* and *How to Look It Up Online*, both by Alfred Glossbrenner and published by St. Martin's Press, New York.

ON-LINE SERVICES

CompuServe

This 18-year-old information service offers electronic mail and holds more than 400 data bases covering education, entertainment, finance, games, home, health and family, news, personal computing, shopping, travel, and weather. More than 140 SIGs offer on-line conferencing, bulletin boards, and thousands of shareware and public-domain programs for downloading. SIG topics include automobile racing, computer graphics, entrepreneurship, games, health, law, marketing, medicine, music, public relations, religion, and even tropical fish.

CompuServe offers gateways to EAASY Sabre (American Airlines' flight schedule and reservation service), Travel Shopper, OAG (Official Airline Guide), Iquest, and MCI Mail. The service has on-line help and a user manual but doesn't offer training seminars. Access is via local phone numbers in more than 300 U.S. cities or through Telenet, Tymnet, or DataPac at 300, 1200, 2400, 4800, or 9600 bps.

The $39.95 one-time sign-up fee includes a $25 usage credit. On-line charges are $6 per hour at 300 bps and $12.50 per hour at 1200 and 2400 bps, 24 hours a day. Charges for 4800-bps access are $32.50 and $29 per hour for prime- and non-prime-time use, respectively. At 9600 bps the charges are $47.50 and $44 per hour for prime and non-prime time. Access to approximately 10 percent of CompuServe's data bases requires an additional fee. CompuServe's prime time is 8 a.m. to 6 p.m., Monday through Friday.

CompuServe
5000 Arlington Center Blvd.
Columbus, OH 43220
800/848-8199

Delphi

Delphi, aimed at both individual and corporate users, offers electronic mail, stock and commodity quotes, and over 150 data bases covering business and finance, entertainment, magazines and books, merchandise, news, weather, sports, and travel. Delphi has over 30 SIGs that offer downloadable software, bulletin boards, and on-line conferencing. SIG topics include antiques and collectibles, aviation, computer art, games, hobbies, IBM PC and compatible computers, music, theology, and writing.

Delphi offers gateways to OAG, EAASY Sabre, Dialog, CAIN (Computerized AIDS Information Network), and HealthNet. The service has on-line help and a user manual but doesn't offer training seminars. Access is via Telenet or Tymnet at 300, 1200, or 2400 bps.

Delphi charges a one-time subscription fee of $49.95. On-line charges are $17.40 per hour during prime time (7 a.m. to 6 p.m. Monday through Friday) and $7.20 an hour during non-prime time. There is a $24-per-month minimum billing "advantage plan" for frequent users, who pay $16.20 and $5.40 per hour for prime- and non-prime-time use, respectively.

General Videotex
3 Blackstone St.
Cambridge, MA 02139
800/544-4005, 617/491-3393

Dialcom Services

Dialcom's electronic mail network spans 17 countries and is geared toward corporate users; it does not host any public SIGs, bulletin boards, or conferences. Among its 15 data bases are the Associated Press, Business Wire, Government News, United Press International, stock reports, and an optional clipping service. Dialcom offers gateways to Dow Jones News/Retrieval, EAASY Sabre, Fedwire, and OAG.

Dialcom has both on-line and phone help, a user manual, and an on-line tutorial. Training seminars are held frequently in Boston, Chicago, Dallas, Houston, New York City, San Diego, San Francisco, Washington, D.C., and Rockville, Maryland, at a cost of $50 per hour. Access is via Telenet, Tymnet, ConnNet, or WATS at 300, 1200, or 2400 bps.

There is a $25 registration fee and a $25 minimum monthly billing for individuals; corporations pay no registration fee and receive discounted rates but must pay minimum monthly billings of $500 or more, plus an additional $100 per month account fee. On-line charges for individuals are $14 and $6.50 per hour for prime- and non-prime-time use, respectively. Corporate accounts are charged $11.90 and $5.55 per hour for prime- and non-prime-time use. Dialcom's prime-time hours are 8 a.m. to 6 p.m., Monday through Friday.

Dialcom
6120 Executive Blvd.
Rockville, MD 20852
800/435-7342, 301/881-9020

EasyLink Service

Essentially an electronic mail service with extensive paper delivery options, EasyLink also incorporates InfoMaster, a costly but easy-to-use menu-driven

search interface, for use with over 900 data bases, including all those supplied by BRS, Dialog, Orbit, NewsNet, Vu/Text, and Wilsonline.

EasyLink has on-line help and a user manual, and corporations can request training seminars. The service offers a gateway to FYI, which includes EasyNet, OAG, and Dow Jones News/Retrieval. Access is via local access numbers, Tymnet, and WATS at 300, 1200, 2400, or 9600 bps.

InfoMaster costs 15 cents per minute plus $8 for each successful search. Electronic mail charges are by the character; a one-page business letter costs about 40 cents. Minimum monthly billing is $25.

Western Union Telegraph Co.
One Lake St.
Upper Saddle River, NJ 07458
800/527-5184

GEnie

Home user–oriented GEnie offers electronic mail and 80 data bases encompassing finance, games, on-line magazines, news, shopping, and travel. Over 40 SIGs offer bulletin boards, on-line conferencing, and public-domain software libraries. Topics include desktop publishing, genealogy, law, music, photography, science fiction, and writing, as well as some manufacturer-supported user groups providing on-line product support.

GEnie has on-line and phone help and both on-line and printed user manuals, but doesn't give training seminars. The service features gateways to EAASY Sabre, Dow Jones News/Retrieval, American Express Advance, Vestor, and Comp-U-Store. Access is via local access numbers in 550 U.S. cities at 300, 1200, or 2400 bps.

A one-time $29 subscription fee includes 2 hours of free non-prime-time use. Charges at 300 or 1200 bps are $35 and $5 per hour for prime and non-prime time, respectively. At 2400 bps, access costs $45 and $12 per hour for prime- and non-prime-time use, respectively. Prime time is 8 a.m. to 6 p.m., Monday through Friday.

General Electric Information Services Co.
401 N. Washington St.
Rockville, MD 20850
800/638-9636

The Source

Targeted at business and financial researchers, The Source's more than 200 data bases cover business, communications, education, investing, news, sports, travel, and weather. General interest SIG topics include cooking, games, music, and science fiction; professional SIGs cover education, investing, law, and medicine. There are also user groups for Ashton-Tate, IBM, and Microsoft products, among others, and more than 2000 public-domain programs available for downloading. The Source's electronic mail service offers paper delivery options as well.

The Source has gateways to Grolier's Encyclopedia, Investext (brokerage research reports), OAG, Profiteer (stock analysis), Real-Time Stock Quotes, and Stockvue (a financial analysis data base). Subscribers get on-line or voice help, a user manual, and an on-line tutorial, but no instructional seminars. Access is via Telenet at 300, 1200, or 2400 bps.

The Source charges a one-time $29.95 fee to join and a monthly minimum billing of $10. On-line charges vary, depending on the data base used. During prime time (7 a.m. to 6 p.m., Monday through Friday), charges are 36 cents to 75 cents per minute at 300 bps, 43 cents to $1.50 per minute at 1200 bps, and 46 cents to $1.50 per minute at 2400 bps. Non-prime-time costs are 14 cents to 70 cents per minute at 300 bps, 18 cents to $1.35 per minute at 1200 bps, and 20 cents to $1.35 per minute at 2400 bps.

The Source's SIGs are available at substantially discounted rates.

Source Telecomputing
1616 Anderson Rd.
McLean, VA 22102
800/336-3366

DATA BASE VENDORS

BRS Search, BRS Colleague, BRS After Dark

BRS Search is a command-driven data base service available from 6 a.m. to 4 a.m.; BRS Colleague, a menu-driven version of Search, is available during the same hours at a substantially higher rate. BRS After Dark, a less expensive, menu-driven service aimed at the home market, contains a subset of the Search and Colleague data bases and is available from 6 p.m. to 6 a.m. Search and Colleague share 150 data bases that contain the full text of and bibliographic references to hundreds of books and journals covering business and finance, education, energy and environment, medicine, science, social science, and the humanities. After Dark offers about 80 of these data bases.

All three services offer electronic mail, and Colleague offers the only SIG for physicians. Search has on-line help, a practice library, and a user manual, and training seminars are held weekly throughout the United States at a cost of $55 for a half day and $95 for a full day. Access is via Telenet, Tymnet, or WATS at 300, 1200, or 2400 bps.

Search charges a $75 annual fee with no monthly minimum, a $25 per hour connect fee, plus telecommunications, data base royalty, and citation charges. Colleague charges a one-time $95 subscription fee and requires a $20 minimum monthly billing. On-line charges range from $6 to $156 per hour, depending on the data base being searched, with most charges falling between $20 and $79 per hour. After Dark has a one-time $75 subscription fee and a $12 minimum monthly billing. On-line charges vary from $5 to $35, averaging between $10 and $15.

BRS Information Technologies
1200 Route 7
Latham, NY 12110
800/468-0908

Dialog

Dialog's more than 300 data bases cover public and private companies, agriculture, bioscience, chemicals, computer science, current affairs, education, energy, the environment, industry, law and government, medicine, patents, and science and technology. Three companion data base services, Dialog Business Connection, Dialog Medical Connection, and Knowledge Index, offer subsets of Dialog's data bases that are geared toward business, medical, and home users, respectively.

Dialog has electronic mail and gateways to OAG and Trade-Plus (a stock quote service) and offers a user manual but no on-line help. A one-day basic training seminar is available for $125; ten advanced seminars on specific subject areas cost $125 each for a full day or $55 for a half day. Access is via Telenet, Tymnet, or Dialnet, Dialog's own local access network, at 300, 1200, or 2400 bps.

A $150 starter package includes a user manual, a full day of training, and $100 of connect time. Thereafter there is a $25 annual fee. On-line charges vary with the data base accessed, averaging $90 per hour; Knowledge Index is considerably cheaper, averaging $24 per hour.

Dialog Information Services
3460 Hillview Ave.
Palo Alto, CA 94304
800/334-2564, 415/858-3785

Dow Jones News/Retrieval

Dow Jones News/Retrieval's 42 data bases offer full text of the *Wall Street Journal* and the *Washington Post* from January 1984 to the present, full text of articles from more than 140 regional business journals, as well as government and private business and industry information. Dow Jones News/Retrieval's news wire provides stock market quotes and up-to-the-minute reports on companies, markets, industries, and investments.

Dow Jones News/Retrieval has gateways to MCI Mail and DataTimes. On-line and telephone support and a user manual are available, and training seminars are given each week throughout the United States at $80 per day. Access is via Telenet, Tymnet, or gateways from other services at 300, 1200, or 2400 bps.

Personal accounts incur a $29.95 one-time start-up fee and a $12 annual service fee beginning with the second year. For corporate accounts, the start-up fee is $49.95. On-line charges depend on the data base used. At 300 bps, charges range from 60 cents to $1.20 per minute during prime time and from 10 cents to 80 cents per minute during non-prime time. At 1200 and 2400 bps, prime-time charges range from $1.32 to $2.64 per minute, and non-prime-time rates range from 10 cents to $1.76 per minute. Prime time is 6 a.m. to 6 p.m., Monday through Friday.

Dow Jones and Co.
P.O. Box 300
Princeton, NJ 08543
800/522-3567

EasyNet

EasyNet provides a menu-driven interface to over 900 data bases from 13 different vendors including BRS, Dialog, and Vu/Text. Subject areas include the arts and humanities, business and industry, computers, economics and finance, entertainment, engineering, government, international news, investment, magazines and newspapers, medicine, and science. EasyNet translates the user's search query into the particular vendor's language and can search multiple data bases.

EasyNet offers only on-line help, although a user manual and training seminars reportedly are in development. There are no SIGs or gateways. EasyNet charges $10 per successful search, plus per-document data base royalties that vary according to the data base searched. Access is via Telenet and Tymnet at 300 or 1200 bps.

Telebase Systems
763 W. Lancaster Ave.
Bryn Mawr, PA 19010
800/327-9638

NewsNet

NewsNet data bases include full-text articles drawn from over 320 business and government newsletters and news wires covering aerospace, computers, defense, electronics, domestic and international finance, international business news, and telecommunications.

Although it lacks SIGs, NewsNet does offer gateways to Vu/Quote, OAG, Computer Multiple Listing Service, and TRW. On-line and voice help and a user manual are available. Training seminars are held in New York, Philadelphia, and Washington, D.C., for $60 per 3-hour session.

NewsNet charges an annual fee of $120, plus $60 per hour at 300 and 1200 bps or $90 per hour at 2400 bps. There may be additional data base royalties. Access is via Telenet and Tymnet at 300, 1200, or 2400 bps.

NewsNet Inc.
945 Haverford Rd.
Bryn Mawr, PA 19010
800/345-1301, 215/527-8030

Lexis

Lexis is a legal research service containing approximately 300 data bases that cover federal and state court decisions; state statutes, codes, regulations, and administrative agency rulings; and legal analyses of banking, bankruptcy, corporate, health, insurance, international trade, labor, public contract, public utility, securities, and tax laws.

Lexis offers no SIGs and only one gateway to its sister service, Nexis. Lexis has on-line help and a user manual. Free 2-hour classes are held frequently in major U.S. cities. Lexis charges $32 per hour plus $10 to $23 per search, depending on the data base. There is a $125 minimum monthly billing. Access is via Telenet, Tymnet, and WATS at 1200 or 2400 bps.

Mead Data Central, Inc.
P.O. Box 933
Dayton, OH 45401
800/543-6862

Nexis

Nexis is a collection of over 300 full-text data bases from both domestic and international sources covering biography, business intel-

ligence, current events, industry, politics, and science. Nexis offers no SIGs or gateways and provides the same help, documentation, and training as Lexis.

Nexis charges $32 per hour plus $7 to $30 per search, depending on the data base. There is a $50 minimum monthly billing.

Mead Data Central, Inc.

Westlaw

Westlaw has over 1000 data bases that contain federal and state cases and statutes; federal bankruptcy, labor, securities, and tax forms and regulations; law review articles (dating from 1982); Insta-Cite; and *Shepard's Citations*.

Westlaw has gateways to Dialog, Dow Jones News/Retrieval, Information America, PHINet, and Vu/Text. On-line and voice help and a user manual are available. Westlaw classes are held daily in 20 cities throughout the United States and run $70 per person. Access is via local nodes, IBM InfoNet, Telenet, and Tymnet at 1200, 2400, 4800, or 9600 bps.

Westlaw offers two subscription plans. One, for higher volume subscribers, has a $125 monthly flat fee with connect charges of $130 per hour. The other plan has an $80 monthly minimum billing, and connect charges of $240 per hour. Both subscription plans have additional telecommunications and access charges of $10 to $20 per hour.

West Publishing Co.
50 W. Kellogg Blvd.
P.O. Box 64526
St. Paul, MN 55164
800/328-0109, 612/228-2737

DATA BASES

The following data bases are available through on-line services, through data base vendors, directly from the listed producer, or through a combination of the three. Prices are given for data bases that are available directly from the producer; see on-line service and data base vendor listings for vendor prices.

Aviation and Defense

Aviation Safety Institute

This full-text monthly newsletter that started in January 1982 offers tips for operating all types of aircraft, a regularly updated listing of general mechanical difficulties as reported by mechanics and pilots, safety tips, and a take-off simulator. Access: CompuServe (300, 1200, 2400 bps).

Aviation Safety Institute
P.O. Box 304
Worthington, OH 43085-0304
614/885-4242

Defense Daily

This 8-page daily newsletter covers the Pentagon, congressional appropriations bills, policies affecting space and defense, defense contract awards, foreign military sales, key personnel changes in the defense industry, and Soviet space and defense programs. Access: NewsNet (300, 1200, 2400 bps).

Phillips Publishing
7811 Montrose Rd.
Potomac, MD 20854
301/340-2100

Business Directories

Dun's Market Identifiers

A directory of 2 million mostly privately held U.S. businesses that have more than ten employees or $100,000 in sales, Dun's listings include name, address, phone number, description of business, amount of sales at each main location, and number of employees. Access: Dialog (300, 1200, 2400 bps).

Dun's Marketing Services
49 Old Bloomfield Ave.
Mountain Lakes, NJ 07046
800/223-1026, 201/299-0181

Forbes 500 Annual Directory

The directory ranks the 800 largest U.S.–based, publicly owned companies by sales, assets, profits, and stock market value. It also contains extensive stock market information on the 500 top-ranked companies. Access: Nexis (1200, 2400 bps).

Forbes
60 Fifth Ave.
New York, NY 10011
212/206-5505

Business Planning

Business Periodicals Index

The index covers corporate law, labor relations, taxation, real estate law, estate planning, and criminal law; it also offers full text of statutes, case notes, and book reviews. It provides an index to articles from 476 legal periodicals published in the United States, Canada, Great Britain, Ireland, Australia, and New Zealand. Access: Wilsonline (300, 1200, 2400 bps); $43 to $65 per hour, depending on volume.

The H.W. Wilson Co.
950 University Ave.
Bronx, NY 10452
800/367-6770, 800/462-6060
New York

CENDATA

CENDATA contains economic and demographic data for the United States and demographic data for more than 200 other countries. Monthly economic indicators, such as trade balance, retail sales, and housing-start figures are available minutes after release by the Commerce Department. Access: CompuServe, Dialog (300, 1200, 2400 bps).

U.S. Census Bureau
Washington, DC 20233
301/763-2074

Daily Report For Executives

Updated daily, this newsletter covers trends in tax policy, economics, export and import controls, antitrust and trade regulation, banking, agriculture, federal expenditure, international finance, product liability, securities regulation, energy developments, and environmental policy. Access: Dialcom (300, 1200, 2400 bps); Nexis, Westlaw (1200, 2400 bps).

Bureau of National Affairs
1231 25th St. NW
Washington, DC 20037
800/862-4636

Harvard Business Review/On Line

The on-line version of the bimonthly journal gives citations, abstracts, and full text of *Harvard Business Review* articles covering accounting, organizational behavior, industrial analysis, international trade, business ethics, marketing, computers, personnel relations, finance, time management, and advertising. Updated bimonthly. Access: BRS, Dialog, EasyNet (300, 1200, 2400 bps); Nexis (1200, 2400 bps).

John Wiley & Sons
605 Third Ave.
New York, NY 10158
212/850-6189

Careers

Career Placement Registry

According to the producer, 80,000 companies search this on-line résumé file and data base for prospective employees. Two hundred occupations are represented, and 80 percent of the people listed are college graduates. Access: Dialog (300, 1200, 2400 bps).

Career Placement Registry
302 Swann Ave.
Alexandria, VA 22301
800/368-3093

United States Employment Opportunities—The Computer Field

This directory shows career announcements at every level in the hardware and software industries nationwide. Trends and technological developments affecting employment opportunities in the computer field are also covered. Access: Delphi, NewsNet (300, 1200, 2400 bps).

Washington Research Associates
2103 N. Lincoln St.
Arlington, VA 22207
703/276-8260

Computer Industry

Andrew Seybold's Outlook on Professional Computing

Seybold's monthly, full-text publication of technical evaluations and reviews of hardware and software is geared for the nontechnical business person. The editorial slant is toward the application of personal computers in a corporate environment. Access: direct (300, 1200 bps); $30 per month; NewsNet (300, 1200, 2400 bps).

Infotechnology Publishing Corp.
3235 Kifer Rd. #110
Santa Clara, CA 95051
408/746-2555

Business Software Database

A directory of more than 10,000 micro, mini, and mainframe computer software packages, this data base lists program title, vendor name and address, company contact, and a detailed description of features. Access: BRS, Dialog, EasyLink (300, 1200, 2400 bps).

Information Sources
1173 Colusa Ave.
P.O. Box 7848
Berkeley, CA 94707
415/525-6220

Microcomputer Index

Abstracts of and index to 70 microcomputer periodicals can be searched by article title, author, keyword, subject heading, product name, or company name. Access: Dialog (300, 1200, 2400 bps).

Database Services
2685 Marine Way #1305
Mountain View, CA 94043
415/961-2880

Newsbytes

This award-winning weekly news wire provides microcomputer industry news, editorials, and trade show coverage from bureaus in Atlanta, New York, San Francisco, Washington, DC, Brussels, London, Tokyo, Toronto, and other sources worldwide. Access: The Source (300, 1200, 2400 bps).

Newsbytes News Service
822 Arkansas St.
San Francisco, CA 94107
415/550-7334

Finance

Bizdate

This on-line source provides business and investment news summaries, stock market and currency reports, investment tips, and newsletters on the oil industry, banking, and real estate. Market reports include a weekly summary of mergers and acquisitions. Access: The Source (300, 1200, 2400 bps).

Source Telecomputing

Citibank Global Report

Citibank's international data base reports corporate and industry information on every major market worldwide, such as money markets, foreign exchange, stocks, bonds, futures, options, and mutual funds. News and rates are reported in real time. Access: direct (300, 1200, 2400 bps); $90 per hour, with volume discounts available.

Citicorp
One Citicorp Center
153 E. 53rd St., 3rd floor, Zone 2
New York, NY 10043
800/842-8405

SEC Online

This data base contains the full text of corporate annual reports, forms 10K and 10Q, proxy statements, SIC codes, investor contacts, and corporate legal counsel and stock agents for all companies on file with the Securities and Exchange Commission. Access: Nexis, Lexis, Westlaw (300, 1200, 2400 bps).

SEC Online
400 Oser Ave.
Hauppauge, NY 11788
516/434-9000

Standard & Poor's News On Line

This on-line edition of a basic business source contains financial news and statistics on approximately 12,000 publicly held corporations, including all of the companies listed on the New York Stock Exchange, American Stock Exchange, and NASDAQ, plus all initial public offerings. Access: Citibank Global Report (described in this section), Dialog (300, 1200, 2400 bps).

Standard & Poor's Corp.
25 Broadway
New York, NY 10004
212/208-8622 (accepts collect calls)

General Reference

Books In Print

Contains 1 million bibliographic references (indexed by Library of Congress classifications) to forthcoming books, and books both in and out of print since 1979, from 16,000 English language publishers. Access: BRS, Dialog (300, 1200, 2400 bps).

R.R. Bowker Co.
245 W. 17th St.
New York, NY 10011
800/323-3288, 212/337-6989

Encyclopaedia Britannica

The oldest and most comprehensive encyclopedia in the English language, it's over 44 million words long. Approximately one-third of the material consists of short articles; the remaining two-thirds contains long, general articles that are theoretical and comparative in nature. Access: Nexis (1200, 2400 bps).

Encyclopaedia Britannica
310 S. Michigan Ave.
Chicago, IL 60604
312/347-7000

The Readers' Guide to Periodical Literature

The basic library source on popular periodicals indexes articles in 182 popular publications from 1983 to the present, covering current events, business, fashion, politics, crafts, food, education, sports, history, and science. It is organized by subject and periodical. Access: Wilsonline (300, 1200, 2400 bps).

The H.W. Wilson Co.

Insurance

Insurance Databases

Covering federal and state case law and statutes pertaining to insurance for 21 states and Guam, this on-line source also contains law reviews, texts, and bar association journals relating to insurance. Access: Westlaw (1200, 2400 bps).

West Publishing Co.

Insurance Periodicals Index

Targeted at brokerage houses and insurance company managers, this data base indexes and abstracts 38 insurance business journals and adds 13,000 new records each year. Access: Nexis, Lexis (1200, 2400 bps).

NILS Publishing Company
P.O. Box 2507
Chatsworth, CA 91311
800/423-5910, 818/998-8830

Law

American Bar Association (AMBAR)

AMBAR is a collection of abstracts from eight American Bar Association journals, covering a wide range of law topics, as well as abstracts of articles, monographs, and pamphlets on the activities, programs, and research of the American Bar Association. Access: direct (300, 1200, 2400 bps); $16 per hour 8 a.m. to 5 p.m., $11 per hour at other times, plus $19 per hour data base royalty fee, one-time fee of $50 to join, and annual fee of $50 to ABA members ($150 to nonmembers).

American Bar Association Information Services
750 North Lakeshore Dr.
Chicago, IL 60611
800/621-6159, 312/988-5158

News

AP Online

The Associated Press's on-line news wire covers the top stories in national and international news, and provides headline updates, news briefs, stock market news, and sporting event scores hourly, and Dow Jones updates every 30 minutes. Access: CompuServe, Delphi, Dialcom, The Source (300, 1200, 2400 bps).

The Associated Press
50 Rockefeller Plaza
New York, NY 10020
212/621-1500

The New York Times

This on-line news service includes every article published in the *New York Times* since June 1980, covering local, national, and international news; business; real estate; computers; the stock market; fine arts and the performing arts; and reviews. Access: Nexis (1200, 2400 bps).

The New York Times
229 W. 43rd St.
New York, NY 10036
800/543-6862, 212/556-1234

Taxation

PHINet

Targeted at accounting firms, law firms specializing in taxation, and the IRS (its biggest customer), PHINet offers daily tax news, analysis, and commentary, as well as more than 30 tax-related data bases. Access: direct (1200, 2400 bps) $100 per hour, $50 monthly fee, $1200 one-time sign-up fee.

Prentice Hall Information Network
One Gulf & Western Plaza
New York, NY 10023-7774
212/373-8600

The Tax Directory

This source lists the names, addresses, and phone numbers of federal and state taxation agencies and officials, courts and judges, as well as journalists, special interest groups, and private individuals associated with taxation. Access: Lexis, Westlaw (1200, 2400 bps); NewsNet (300, 1200, 2400 bps).

Tax Analysts
6830 N. Fairfax Dr.
Arlington, VA 22213
800/336-0439, 703/532-1850

Trade

International Trade Reporter

This weekly report covers domestic and foreign trade policy and U.S. legislative, regulatory, and judicial actions affecting the international trade and foreign commerce communities. Access: Lexis, Westlaw (1200, 2400 bps).

Bureau of National Affairs
1231 25th St. NW
Washington, DC 20037
800/862-4636

Trade and Industry Index

This general trade index contains profiles of prominent businesspeople and corporate intelligence on companies, products, consumer and industry trends, investments, and mergers and acquisitions, as well as pertinent citations to more than 600 trade and management journals. Access: Dialog (300, 1200, 2400 bps).

Information Access Corp.
357 Lakeside Dr.
Foster City, CA 94404
800/227-8431

Scott Spanbauer is an assistant editor for PC World. *Abigail Sheiner performed the research for this article.* ●

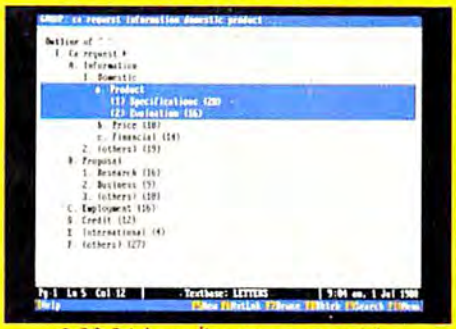
SPEND 200 SECONDS WITH AN IZE® USER.

When a new kind of software is released, some explaining needs to be done. In the case of IZE, a quick demonstration is the best explanation.

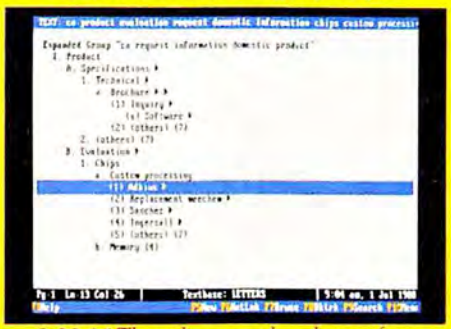
Picture an executive opening her IZE and requesting an outline of letters responding to inquiries for information written to contacts in California. Based on the request, her complete collection of letters is searched. IZE finds 190 information response letters to addressees in California.

0:00:05 With IZE open, a request is made.

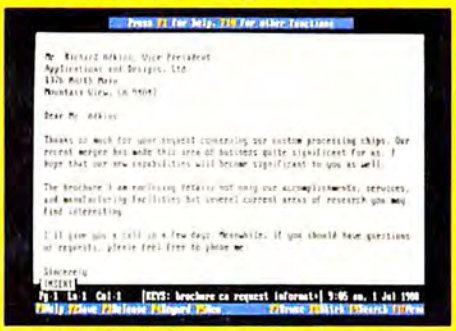
0:00:17 In seconds, IZE organizes the facts.



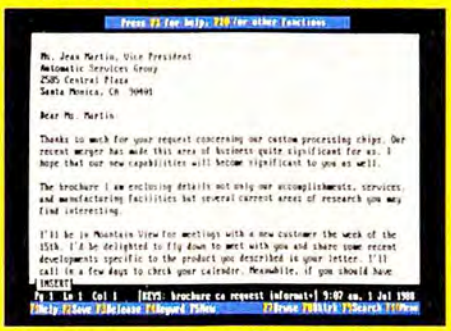
0:00:24 An outline appears to scrutinize.



0:00:35 The outline expands to sharpen focus.



0:01:01 The facts are found ready to revise.



0:03:20 A new, customized letter is ready to print.

From the IZE outline, our executive can quickly find what she needs. An in-depth outline guides her to precisely what she is looking for. One keystroke presents the letter she was seeking. It's now simple, using IZE word processing features, to customize the letter she found for the current task.

A call brings a request for some sales projections. IZE will find them fast even in other applications.

The executive simply hot links directly from IZE to a spreadsheet document. The figures are found and the question answered. Returning to the customized letter, the executive gives it a final look, prints it, and moves on.

If these 3 minutes and 20 seconds of productivity are something you'd like to see more of, don't waste time before taking the next step.

Visit a dealer for a longer demonstration or phone us at 608-273-6000 and realize the power of IZE.

IZE MAKES INFORMATION MANAGEABLE.

persoft®

© 1988 Persoft, Inc. All Rights Reserved IZE and Persoft are registered trademarks of Persoft, Inc. 465 Science Drive, Madison, WI 53711 U.S.A. Specifications subject to change without notice. Patents Pending.

Circle 256 on reader service card

Discounting Price,

4.77/10 MHz 8088 BASED SYSTEM

STANDARD FEATURES:

- ☐Intel 8088 Processor
- ☐256K Dram (120 NS) Standard
- ☐4.77/10MHz Motherboard
- ☐Enamel beige case
- ☐150 watt power supply
- ☐One 360K 5.25 floppy drive
- ☐Mono graphics adapter
- ☐CGA adapter
- ☐1 floppy controller for two drives
- ☐1 game port
- ☐1 serial port
- ☐1 parallel port
- ☐Switchable AT/XT keyboard
- ☐Samsung amber monochrome monitor
- ☐Hardware reset switch
- ☐8087 co-processor ready
- ☐Hardware turbo switch
- ☐Audio speaker
- ☐8 expansion slots
- ☐48 hour hardware burn-in and diagnostic testing period
- ☐Comprehensive 1 year parts and labor warranty

OPTIONS	*TOTAL*
30 MB Hard Drive Kit Add: $298	$921
40 MB Hard Drive Kit Add: $373	$996

DISCOUNT MICRO BASE SYSTEM $623

12 MHz WITH ZERO WAIT STATE. 286 BASED SYSTEM

STANDARD FEATURES:

- ☐Intel 80286 Processor
- ☐512K RAM
- ☐12 MHz with zero/one wait state motherboard. Motherboard accommodates up to 4MB onboard RAM using 80NS 1 MB dram's
- ☐Hard drive and floppy drive controller
- ☐Samsung amber monochrome monitor
- ☐200 watt power supply
- ☐1.2MB high density floppy drive
- ☐Hercules compatible monochrome adapter card
- ☐1 parallel port
- ☐1 serial port
- ☐Clock calendar with battery back-up
- ☐Enhanced 101 key keyboard
- ☐Full size or desk-saver case
- ☐80287 co-processor ready
- ☐48 hour burn-in and diagnostic testing period
- ☐Comprehensive 1 year parts and labor warranty

EGA SYSTEMS:

NEC Multisync II monitor & Paradise EGA Card Add:	$684
Basic EGA System including Monitor and Card Add:	$399

HARD DRIVE OPTIONS	*TOTAL*
40 MB, 65 MS Hard Drive Kit Add: $325	$1,496
60 MB RLL, 65 MS Hard Drive Kit Add: $383	$1,553
40 MB, 40 MS Hard Drive Kit Add: $373	$1,544
70 MB, 29 MS Hard Drive Kit Add: $612	$1,783

DISCOUNT MICRO BASE SYSTEM $1171

AT and XT are registered trademarks of IBM Corp.

Discount Micro Products also carries a complete line of name brand components and peripherals such as disk drives, tape back-up units, monitors, and modems to customize your system. Call us for product information on components and peripherals.

1-800-727-8646

not service. . .

20 MHz WITH ZERO WAIT STATE.
386/20 SYSTEM

STANDARD FEATURES:

- ☐1 MB RAM
- ☐16/20 MHz W/ zero wait state. Motherboard accommodates up to 4MB onboard RAM
- ☐200 watt power supply
- ☐Enhanced 101 key keyboard
- ☐AT style case with LED's for hard drive, power, and turbo setting
- ☐1.2MB high density floppy drive
- ☐Samsung amber monochrome monitor
- ☐1 Parallel port
- ☐1 Serial port
- ☐1 Game port
- ☐Hercules compatible monochrome adapter card
- ☐HD/FD controller
- ☐OS/2 compatible
- ☐Comprehensive 1 year parts and labor warranty

EGA SYSTEMS:
NEC Multisync II Monitor and Paradise EGA card Add: $684
Basic EGA System including Monitor and EGA card Add:$399

HARD DRIVE OPTIONS	*TOTAL*
40 MB, 25 MS Hard Drive Kit Add: $515	$3,135
80 MB, 28 MS Hard Drive Kit Add: $740	$3,360
150 MB SCSI Drive Kit Add: $1,671	$4,291

DISCOUNT MICRO BASE SYSTEM $2620

Other inquiries 313-422-1200. For returns please call 313-422-1286.
Hours: Mon.-Fri. 9:00 am to 7:00 pm & Sat. 10:00 am to 3:00 pm
E.S.T. VISA, Mastercard, Approved Company Cheques and P.O.s accepted. 286 and 386 systems shown with NEC Multisync II Monitor.
Prices reflect 3% cash discount.

Circle 249 on reader service card

Discount Micro Products, Inc. knows whether you're purchasing your first system or buying a hundred systems for a departmental upgrade, your purchase decision rests on more than price. Every detail and every question you have must be fully answered. And we intend to do just that. Ask us about. . .

COMPATIBILITY:
Every Discount Micro 8088, 80286, and 80386 based system is fully IBM compatible. You can purchase your system with either industry standard Phoenix or Award BIOS.

COMPONENTS:
Every Discount Micro 8088, 80286, and 80386 based system is packed with the name brand components you expect—Fujitsu, Magnavox, Micropolis, Miniscribe, Mitsumi, NEC, Samsung, Seagate, and Western Digital to name a few.

SERVICE, WARRANTY & SUPPORT:
Every system or component, including all hard disk drives, floppy drives, monitors, and motherboards, comes with a Limited One Full Year Warranty. You can upgrade the warranty on your hardware investment to a Two Full Year Warranty package at marginal cost: there is no sliding scale or declining component coverage for this extra year either. Our technical support professionals have years of experience dealing with microcomputers. Call them at 313-422-1286 between 9:00 am to 12:00 noon, 1 pm to 5:00 pm E.S.T., Monday - Friday.

Our satisfied customers include. . .

- •Black & Decker
- •Chevron Oil
- •Coca Cola
- •General Foods
- •Honeywell
- •ITT
- •Maybelline
- •Merrill Lynch
- •NCR
- •Parke-Davis
- •Proctor & Gamble
- •3M Corporation
- •TRW
- •US Government

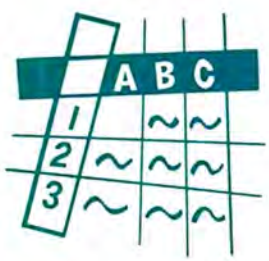
All in stock orders shipped same day via UPS Ground Service.

DISCOUNT MICRO PRODUCTS INC.

34360 GLENDALE AVE., LIVONIA, MI 48150

1-2-3 Menu Maker

Want to give a jump start to the people who use your worksheets? With macros you can design menus that make complex worksheets easy to use.



Spreadsheets

Richard Scoville

Good design is logical, orderly, and effective. Most software that rises to the position of industry standard does so, in part, because its menu design is hierarchical, lucid, and efficient. *1-2-3*, for example, is renowned for its coherent menu system, which simplifies navigation and reduces the learning curve.

If you've already cut your teeth on *1-2-3*, you can take its built-in ease of use a step further. *1-2-3*'s macro-programming language enables you to create custom menus for your own applications. By automating worksheets, custom menus can save time and ease frustration, particularly for new *1-2-3* users and those who find themselves plowing through the same worksheets over and over.

Menu Design 101

Three principles are basic to creating well-designed menus. First, menus must maintain control of the application. Users should be restricted to just the input and analysis routines you have planned, while novices should receive clear on-screen guidance. Every necessary worksheet function should be governed by the macro; no inadvertent action should derail it.

Second, custom menus should look and "feel" like regular *1-2-3* menus: They should allow users to select options either by pointing or by pressing first letters (like *P* for Print), and to back up to previous menus using the <Esc> key.

Finally, like all good computer programs, your menu macros should also be easy to read and change. The techniques presented here allow you to alter

menus by inserting or deleting simple modular elements, with little or no adjustment required.

Basic Menu Commands

You can set up a menu using one of two menu commands: {menubranch} or {menucall}. At first glance the two commands appear similar: Each allows your custom menu to be displayed in the control panel, pauses while the user selects a menu option, then executes the macro commands that option requires.

But there's an important difference. With {menubranch}, *1-2-3* processes the macro and then ends it after the last macro command unless you add {branch} commands that provide further processing instructions. With {menucall}, *1-2-3* processes the last macro command, then returns control to the command in the cell under {menucall} so the macro remains active. You can create similar menus with either command, but {menucall} is much more convenient when you need to build complex multilevel menus (like *1-2-3*'s own), where a menu option can lead to a series of submenus.

The syntax for the menu commands is {menubranch *location*} and {menucall *location*}; *location* refers to the name of the range in which the menu macro begins. The range name identifies only the upper left corner cell of the macro. Therefore, you can conveniently edit a menu macro without adjusting its range name.

Unlike *1-2-3*'s own menus, your custom menu may only contain up to eight options (with a maximum of 66 characters). You should begin each menu option with a different character so users can make first-letter selections. Otherwise, if two options begin with the same letter, pressing that letter selects only the first option.

```
IBM  HP-Laser
Select printer
        A              B                C        D        E
1
2   \M          {menubranch M_MENU}                ; Display menu
3
4
5   M_MENU      IBM              HP-Laser          ; Menu options
6               Select printer Select printer      ; Menu prompts
7               /wgdpn1qq        /wgdpn2qq         ; Commands
8
9   M_MENU      B5
10  \M          B2
```

FIGURE 1: Here's the simplest menu you can create. The command {menubranch} displays the two menu options, IBM and HP-Laser, in the control panel; when you make your selection, the Worksheet Global Default Printer command executes. The menu will not redisplay unless you press <Alt>-M.

Creating a Simple Menu

Figure 1 illustrates the simplest possible menu. When you press <Alt>-M, the menu appears in the control panel as shown, prompting you to select either an IBM or HP printer. If you select 'IBM', the macro executes the command in cell B7 (/Worksheet Global Default Printer Name 1 Quit Quit), which selects an installed printer. Selecting 'HP-Laser' directs the macro to a similar command in cell C7. After the printer command executes, the macro stops—that is, the menu does not reappear—and *1-2-3* returns to READY mode.

Note that the format used in Figure 1 is similar for all menus, no matter how complex. The {menubranch} command in cell B2 tells *1-2-3* to display the menu located at the range M_MENU, which begins in cell B5, the upper left corner of the menu. The menu options 'IBM' and 'HP-

```
Input  Print  Exit
Enter loan data
        A                B                C                D        E        F
1         Principal:     $100,000
2     Interest rate:           9%
3      Years to pay:           25
4
5   Monthly payment:      $839.20
6    Total payments:     $251,759
7    Total interest:     $151,759
8   ------------------------------------------------------------------------------
9
10  \M                  {menubranch M_MENU}                                    ; Display menu
11                      {branch \M}                                            ; Trap <Esc> key
12
13  M_MENU              Input            Print                 Exit            ; Menu options
14                      Enter loan data  Print report          Leave macros    ; Menu prompts
15                      /riLOAN_IN~      {calc}/ppcarLOAN_PRN~agpq {quit}       ; Option commands
16                      {branch \M}      {branch \M}                            ; Loop to main menu
17
18  LOAN_IN             A1..B3
19  LOAN_PRN            A1..B7
20  M_MENU              B13
21  \0                  B10
22  \M                  B10
```

FIGURE 2: This menu is more controlled. After you select either Input or Print and 1-2-3 executes the macro commands, the {branch} commands in cells B16 and C16 pass control to {menubranch}, which restarts the macro.

Laser' appear in cells B5 and C5. Finally, just below the options are the menu option descriptions that tell the user what each menu option does (in this case, 'Select printer'). The macro commands that will be executed once the user chooses a menu option must begin in the cell below that option's explanation; in this example, cells B7 and C7. A range table in cells A9..B10 documents the macro, and brief descriptions of what the commands do appear in column E. Column D is intentionally left blank so that the descriptions do not display as part of the menu options.

SETTING UP THE MACRO IN FIGURE 1

1. Enter the labels.
Type in the labels exactly as shown in Figure 1. (Macros are always stored in the worksheet as labels.) Because the macro keystrokes in cells B7 and C7 begin with the slash character, you'll need to type a label prefix (') first.

2. Name the ranges.
Place the cell pointer on cell B2, which contains the starting macro command {menubranch M_MENU}, select */Range Name Create*, and enter the macro range name **\M**. Follow the same procedure to give the range name M_MENU to cell B5.

3. Execute the macro.
Use <Alt>-M to put the macro to work. Of course, you must have the appropriate printer drivers installed for this macro to work properly.

Getting a Menu Under Control

Although the menu in Figure 1 works smoothly, it lacks control: The macro ends once the user has selected an option. For a macro that guides the user more closely, you can use the looping technique shown in the worksheet in Figure 2, which uses {branch} commands to loop the macro back onto itself. As a result, the menu redisplays after every selection (except for Exit).

The worksheet is a simple loan calculator that could be used in a real estate office to answer the question every potential home buyer asks: "How much will my monthly payments be?" The worksheet allows a real estate agent to enter the loan assumptions, calculate the monthly payment and total interest, and print a simple report.

In Figure 2, cells B1, B2, and B3 are data entry cells containing the principal amount, the yearly interest rate, and the term of the loan (in years), respectively. The formula in cell B5 figures the monthly payment, cell B6 calculates the total amount paid over the term of the loan, and cell B7 subtracts the principal from cell B6 to find the total interest paid.

What distinguishes this macro from the one in Figure 1 is that it's a closed loop: All worksheet functions are controlled by menu options. The menu reappears after each Input or Print operation, ready for the next. As long as the macro is active, the user's actions are limited to entering new loan assumptions or printing a report.

Here's how it works. The {menubranch} command in cell B10 displays the menu options lo-

JUST PRESS <ESC>

The 1-2-3 menu system is tree-structured, with many options leading to submenus and sub-submenus. Pressing <Esc> usually gets you back to the last menu you visited in the tree. This seems natural to experienced 1-2-3 users, but engineering it into an application macro takes a bit of doing.

Figure A presents a general model for multilevel menus that behave just like regular 1-2-3 menus. Its modular structure makes it easy to build and change. Since the model is organized with {menucall}, processing flow is controlled by its subroutine structure, and adding or even moving a menu option from one menu to another is simple and routine. You can expand this model up to 31 menus deep.

The trick is to replace any menu option's subroutine call with a {menucall} command. Each option should also end with a {return} command, so after the user makes a menu selection or presses <Esc>, macro processing can "climb" back through the menu levels toward the main menu. With subroutines, you can insert a {menucall} in any menu option and the macro will still work properly.

Figure A illustrates several types of submenu options; each behaves slightly differently. The Advance options in column B call submenus using {menucall} commands. The Execute & Remain options in columns B and C are set up to execute a subroutine and then redisplay the current menu. Finally, the Execute & Return options in columns C and D call a subroutine and then return to the previous menu.

Here's how the menus work. When you select Main-1 from the first menu, the {menucall} in cell B6 displays the submenu at M_SUB1 (beginning in cell B9). Then if you press <Esc>, the {return} in cell B7 executes, and processing passes back to the {branch} in cell B2 and then on to the original main menu via {menucall} in cell B1.

Now examine the submenu at M_SUB1. The {menucall} under option Sub1-1 (cell B11) presents the next nested menu, M_SUB2. The next {menucall} (cell B12) functions like the {branch} command in cell B2; it redisplays M_SUB1 when you press <Esc> from M_SUB2. This second {menucall} also executes whenever processing returns to M_SUB1 from the menu below.

The second menu option, Sub1-2 (which will Execute & Remain), is similar to the first; but instead of displaying a submenu, it processes a subroutine (represented here by the dummy subroutine {CODE}, which sounds a high tone on the PC's speaker). After {CODE} executes, its {return} command passes processing to the {menucall} in cell C12, which redisplays M_SUB1.

Next, Sub1-3 (which will Execute & Return) eliminates the {menucall}; when its dummy subroutine is processed, the {return} in cell D12 passes control back to cell B1 via the {return} in cell B7 and the {branch} in cell B2. Finally, the Quit option in cell E9 simply executes a {return} to move back up the subroutine ladder.

Further submenus follow the same pattern, as shown in M_SUB2 and M_SUB3. Because of the modular structure possible with {menucall}, these menus are relatively easy to create and edit. —*R. S.*

```
Main-1  Main-2  Exit
Advance
```

	A	B	C	D	E
1	\M	{menucall M_MAIN}			
2		{branch \M}			
3					
4	M_MAIN	Main-1	Main-2	Exit	
5		Advance	Execute & Remain	Exit Macros	
6		{menucall M_SUB1}	{CODE}	{quit}	
7		{return}	{return}		
8					
9	M_SUB1	Sub1-1	Sub1-2	Sub1-3	Quit
10		Advance	Execute & Remain	Execute & Return	Retreat
11		{menucall M_SUB2}	{CODE}	{CODE}	{return}
12		{menucall M_SUB1}	{menucall M_SUB1}	{return}	
13		{return}	{return}		
14					
15	M_SUB2	Sub2-1	Sub2-2	Sub2-3	Quit
16		Advance	Execute & Remain	Execute & Return	Retreat
17		{menucall M_SUB3}	{CODE}	{CODE}	{return}
18		{menucall M_SUB2}	{menucall M_SUB2}	{return}	
19		{return}	{return}		
20					
21	M_SUB3	Sub3-1	Sub3-2	Quit	
22		Execute & Remain	Execute & Return	Retreat	
23		{CODE}	{CODE}	{return}	
24		{menucall M_SUB3}	{return}		
25		{return}			
26					
27	CODE	{beep 3}			
28		{return}			
29					
30	\M	B1			
31	M_MAIN	B4			
32	M_SUB1	B9			
33	M_SUB2	B15			
34	M_SUB3	B21			
35	CODE	B27			

FIGURE A: This multilevel menu system lets you back up to previous menus by pressing <Esc>.

cated in cells B13..D13. Under the Input option, cell B15 controls data entry with the command Range Input. Range Input makes the macro pause for data entry only in the cells within the range LOAN_IN that have been "marked" for data entry with Range Unprotect (cells B1..B3). (Note that after making the entries, you must press <Enter> or <Esc> to redisplay the menu.) The Print option executes cell C15, which recalculates the worksheet and then prints a report using /Print Printer Clear All Range LOAN_PRN <Enter> Align Go Page Quit.

Notice that the macros for both menu options (cells B16 and C16) end with the command {branch \M}, which returns the macro to cell B10 (\M) to restart the menu and thus close the loop. An Exit option has been added to the menu (cells D13..D14) as an "escape hatch"; selecting Exit stops the macro with the command {quit} in cell D15.

This macro illustrates two additional control structures that help guide the user. First, the macro is self-starting: It begins running automatically when the worksheet is retrieved. Naming the starting cell—here cell B10—with the special range name \0 (zero) creates a self-starting macro. Actually, cell B10 has two range names, \M and \0; since you can't execute a macro by pressing <Alt>-0, you must give the macro another, executable range name to use during construction and debugging—hence \M.

Second, the worksheet in Figure 2 traps the <Esc> key. If you press <Esc> instead of making a menu selection while {menubranch} is displaying the menu, the macro "drops" to the {branch} instruction under the

```
Input  Print  Exit
Enter loan data
          A                  B                  C          D          E          F
1          Principal:        $100,000
2      Interest rate:              9%
3       Years to pay:             25
4
5    Monthly payment:         $839.20
6     Total payments:        $251,759
7     Total interest:        $151,759
8   ------------------------------------------------------------------------------
9
10  \M                 {menucall M_MENU}                                  ; Display menu
11                     {branch \M}                                        ; Trap <Esc>, restart
12
13  M_MENU             Input              Print          Exit             ; Menu options
14                     Enter loan data    Print report   Leave macros     ; Menu prompts
15                     {INPUT}            {PRINT}        {quit}           ; Subroutine calls
16                     {return}           {return}                        ; Return to main menu
17
18  INPUT              /riLOAN_IN-                                        ; Input data
19                     {return}                                           ; Return to menu
20
21  PRINT              {calc}                                             ; Recalc worksheet
22                     /ppcarLOAN_PRN-agpq                                ; Print report
23                     {return}                                           ; Return to menu
24
25  INPUT              B18
26  LOAN_IN            A1..B3
27  LOAN_PRN           A1..B7
28  M_MENU             B13
29  PRINT              B21
30  \0                 B10
31  \M                 B10
```

FIGURE 3: This menu works like the one in Figure 2, but subroutines make it easier to read and edit. For example, {PRINT} (cell C15) calls a subroutine that begins in cell B21, which recalculates the worksheet, prints a report, and then redisplays the menu.

{menubranch} command. In Figure 1, there is no instruction under {menubranch}, only an empty cell, so pressing <Esc> terminates that macro. In Figure 2, the {branch} command in cell B11 "traps" the <Esc> key and returns processing to the macro. Thus, the only way out (short of pressing <Ctrl>-<Break>) is through the Exit menu option. The macro maintains control.

SETTING UP THE MACRO IN FIGURE 2

1. Enter the labels and formulas.

Type in the labels as shown in Figure 2. Then, in cell B5, type **@PMT(B1,B2/12,B3*12)**; in cell B6, use **+B5*B3*12**; in cell B7 enter **+B6−B1**.

2. Create the named ranges.

The ranges are documented beginning in cell A18. To name the range LOAN_IN, for example, put the cursor on cell A1, use */Range Name Create*, enter the range name **LOAN_IN**, highlight the range A1..B3, and press <**Enter**>. (Note that the /Range Input command in cell B15 will align LOAN_IN—the input range—at the leftmost corner of the screen. So that the labels in cells A1..A3 are displayed during data entry—and to avoid a disconcerting movement of the screen—the range LOAN_IN includes cells A1..A3, not just the data entry cells B1..B3.) Repeat the naming process for the remaining ranges.

3. Mark cells for data entry.

Simply place the cell pointer on cell B1 and, using */Range Unprotect*, highlight range B1..B3 to mark those cells as data entry

cells. (Range Input will limit cursor input to unprotected cells in that range.)

4. Document the macro.
Leave column E blank, but add the descriptions in column F to document the macro.

5. Run the macro.
Use <Alt>-M, or simply save and retrieve the worksheet to start the macro automatically.

How to Use Subroutines

The menu structure in Figure 2 works well with {menubranch} and {branch}, provided that each command option is short and simple, like those in cells B15 and C15. In a more realistic worksheet, however, each option may have a long, complex sequence of commands. Reading, editing, and annotating such a macro is awkward. For example, when the commands lie in adjacent columns, you can't use */Worksheet Insert Row* or */Worksheet Delete Row* to edit the macro.

A simple solution to this problem is illustrated in Figure 3. Although the macro in Figure 3 works just like the one in Figure 2, it is organized into subroutines, which are easier to read and edit. A subroutine is a sequence of macro commands, set apart from the main flow of the macro, that can be called (i.e., executed) whenever it is needed. The command that calls a subroutine is simply the range name of the subroutine's starting cell, placed in braces to form a macro command: for example, {INPUT}.

A subroutine call acts much like a {branch}; it transfers macro processing to another cell. The difference is that a subroutine call ends with a {return} command that automatically takes macro execution back to the cell directly under the subroutine call—that is, back into the main flow of macro control.

In Figure 3, the Input and Print menu options and their prompts in cells B13..C14 are followed by subroutine calls in cells B15 and C15. The commands in those cells are the range names of the cells that begin the instructions for data input (cell B18) and printing (cell B21). If the user selects Print, for example, the macro executes the {PRINT} subroutine call in cell C15; processing then passes to cell B21, which begins the range named PRINT, and the report is printed.

The subroutine structure in Figure 3 extends to the menu command itself. Figure 2's <menubranch> has been replaced with <menucall> (cell B10), a command that works much like the subroutine call. It treats the menu itself as a subroutine. For instance, notice that the Input option terminates with a <return> in cell B16. When the subroutine <INPUT> is complete, <return> in cell B19 sends the macro back to the <return> in cell B16, which in turn sends the macro to the <branch> command in cell B11, which returns to the original <menucall> in cell B10, thus closing the menu loop. Here the <branch> serves two functions: It traps the <Esc$> key and restarts the macro after each menu selection.

SETTING UP THE MACRO IN FIGURE 3

1. Enter the labels and formulas.
Type in the labels as shown in Figure 3; the formulas in cells B5, B6, and B7 are the same as those in Figure 2.

2. Create the named ranges.
Name the ranges listed in the range table beginning at cell A25.

3. Mark cells for data entry.
Select */Range Unprotect* and highlight the range B1..B3 to mark those data entry cells.

4. Document the macro.
Type in the descriptions shown in column F, leaving column E blank.

5. Use the macro.
Simply press <Alt>-M.

How to Nest Menus

With simple menus you can stop there. These menuing techniques—loops, subroutines, auto-execution with \0, <Esc> trapping, and escape hatches—will make your menus easier to set up and use. However, you can also go a step further and create nested menus like those in *1-2-3*. The sidebar "Just Press <Esc>" shows you how to make menus that users can back out of by doing just that: pressing <Esc>. For complex worksheets in particular, custom menus provide helpful guidance, allowing users to accomplish routine tasks more easily. ●

Richard Scoville is director of training for the Computer Gallery in Research Triangle Park, North Carolina.

BUYING THE RIGHT PRODUCT AT

AMDEK $79.99
VIDEO 210 AMBER

MONITORS

Amdek
Video 410 12" A/G/W (ea.)....135.00
Video 432 PS/2 A/W VGA....169.00
Color 722 Dual Mode RGB...449.00
Color 732 12" PS/2 VGA.....499.00
Magnavox
7BM623 12" TTL Amber.....85.99
CM8762 14" Comp/RGB.....279.00
9CM053 14" Hi-Res EGA.....379.00
9CM082 14" VGA Display....469.00
7BM749 14" Flat VGA White..159.00
NEC
1402 Multisync.....599.00
1501 Multisync-Plus.....999.00
2001 Multisync-XL 20" VGA.2099.00
Packard Bell
PB-1418F 14" Flat TTL A/G/W.129.00
PB-1422EG 14" Hi-Res EGA..359.00
Polariod
Palette EGA Plus.....2499.00
Princeton Graphics
Max-12 12" TTL Amber.....149.00
HX-12E 12" EGA.....479.00
Ultrasync 12" VGA.....579.00
Seiko
CM-1430 14" VGA.....639.00
Zenith
ZMM-149 4" PS/2 Amber.....209.00
ZCM-1490 14" VGA Ang.....699.00

MULTIFUNCTION CARDS

AST
Six Pak Plus 576.....149.00
Advantage/2 PS/2 Board.....309.00
Hot Shot 286 Board.....399.00

Boca Research
Top Hat 128K Expansion.....99.00
Boca Multi-EGA.....169.00
Bocaram/AT O-4MB Card.....149.00
DCA
Irma 2.2 3728 I/O.....749.00
Everex
EV-159 Ram 3000.....99.99
EV-657 Micro Enhancer II....149.00
EV-673 Everex Evga Adapter..279.00
5th Generation
Logical Connection 256K.....399.00
Hercules
Color Card.....169.00
In-Color Card.....239.00
Graphics Card Plus.....199.00
IDEAssociates
IDE-5251 Emulation Board....579.00
Intel
Inboard 386/AT & 386/PC.....Call
4020 286 Board w/512K.....369.00
8087 Co-Processor.....119.00
80387-16 Co-Processor.....529.00
NSI
Smart EGA Plus.....219.00
Quadram
Quad 386-XT PC Upgrade....799.00
Model-30 Quadboard PS/2....319.00
The Complete PC
Complete Answ. Machine.....299.00
Complete Hand Scanner.....219.00
Tseng Labs
EVA 480 EGA Adapter.....219.00
Video-7
VEGA EGA Deluxe Adapter...229.00
VEGA VGA Video Adapter....299.00
Zuckerboard
Monochrome Graphics Card...79.99
AT-Primary Memory Board.....99.99

STORAGE DEVICES

ATD
Tandy 20MB Hard Card.....499.00
Everex
Stream 40 Teak Tape.....529.00
Stream 60-8 Ext. Tape-Backup739.00
Stream 60 PS/2 Tape-Backup1299.00
Iomega
5¼" Bernoulli Box II.....899.00
Irwin
110D 10MB XT Tape-Backup..219.00
Miniscribe
8425 20MB 3½" 40msec.....349.00
3650 40MB 5¼" 61msec.....379.00
3053 44MB 5¼" 25msec.....669.00
6085 70MB 5¼" 28msec.....889.00
Mountain
TD-4440 40MB Ext. PS/2 AT..599.00
60 MB Mountain Tape.....999.00
Dual 5¼" Beta Bernoulli....1899.00
PC-TOO
TD4000 40MB Tape-Backup..349.00
Plus Development
20MB Hard Card.....599.00
40MB Hard Card.....779.00
Racore
Jr. Expansion Chassis.....299.00
Seagate
ST-225 20MB ½ Height.....249.00
ST-238 30MB ½ Height.....279.00
ST-251 40MB ½ Height.....449.00
ST-251-1 40MB 28ms.....549.00
Sony
3½" 720K Floppy Drive.....89.99
Sysgen
Bridge-File PS/2 Drive.....249.00
Bridge-Tape 40MB Backup...499.00
Durapak Single 15MB.....999.00
Smart Image 60MB Tape.....479.00
QIC-File 60MB Tape.....599.00

SYSGEN
Smart Image 60
External Tape $589

WE SHIP 90% OF ALL ORDERS WITHIN 24 HOURS

SELECT FROM OVER 3000 PRODUCTS

COMPUTER MAIL ORDER

THE RIGHT PRICE . . . EVERYTIME!

COMPUTERS

AST
Premium 286 Model-140 . . . . . Call
Compaq
386 Deskpro's & Portables . . . . . Call
IBM
PS/2 Model 30, 50, 60, 80 . . . . . Call
NEC
Multispeed EL-2 . . . . . 1499.00
PC-TOO
512K 8 MHz 1.2MB 80286 . . . . 899.00
Toshiba
1000, 1100+, 1200, 3120 Laps . . . Call
WYSE
Model 50, 60 Terminals . . . . . Call
Zenith
8088/286 Lap Tops . . . . . Call

INTEL
PS/2 2400B
INTERNAL
$299

MODEMS

Anchor
Lightning 2400 F/I 189.00
2400 Band External 169.00
ATD-Zuckerboard
1200 Baud Nude ½-Card 79.99
Best Products
Smart 2400 ½-Card w/Soft . . . 149.00
Everex
Evercom 920 1200 Baud Int. . . . 79.99
Evercom 940 2400 Baud Int. . . 179.00
Hayes
Smartmodem 1200 Ext. 289.00
Smartmodem 2400 Ext. 439.00
Practical Peripherals
1200 Baud Int. 79.99
2400 Baud Stand Alone 189.00
MacIntosh 2400SA 239.00
U.S. Robotics
2400 Baud Direct Int. 179.00
2400 Baud Direct Ext. 199.00

BROTHER
M-1109
Dot Matrix
$149

PRINTERS

Brother
M-1509 180cps, 132 col. 389.00
HR-40 40cps, Daisywheel 669.00
FAX-100 Fascimile Machine . . . 979.00
Canon
PC-25 Personal Copier 949.00
Citizen
Premier-35 35cps, Daisywhl . . . 549.00
Epson
LX-800 150cps, 80 col. 189.00
FX-850 264cps, 80 col. . . . . Call
FX-1050 264cps, 132 col. . . . . Call
LQ-500 180cps, 24-Wire . . . . . Call
LQ-850 330cps, 80 col. . . . . Call
LQ-1050 330cps, 24-Pin . . . . . Call
Hewlett-Packard
2225 Think Jet 369.00
NEC
P2200 Pinwriter 24-Wire 379.00
P5200 24-Pin 265cps. 599.00
P5300 24-Pin 132 column 799.00
LC-890 Postscript Laser 3595.00
Okidata
ML-320 80 col. 300cps 379.00
ML-292 80 col. 240cps 389.00
ML-390 24-Wire 270cps 519.00
ML-293 132 col. 240cps 529.00
ML-393 24-Wire 450cps 999.00
Panasonic
KX-P1091i 194cps, 80 col. 209.00
KX-P1595 240cps, 132 col. 479.00
KX-P1524 24 wire, 132 col. . . . 599.00
Sharp
FO-300 Facsimile Machine . . . 1349.00
Star Micronics
NX-1000 140cps, 80 col. 179.00
NX-15 120cps, 132 col. 329.00
Toshiba
P321-SL 216cps, 24-Wire 499.00
P351-SX 300cps, 24-Wire 999.00

SOFTWARE

Aldus
Pagemaker Ver. 3.0 . . . . . 569.00
Ashton Tate
d-base III+ 389.00
Multimate Advantage II 279.00
Central Point
Copy II PC 24.99
PC Option Board Deluxe 129.00
Computer Associates
Accpac Easy Accounting 79.99

BORLAND
QUATTRO
$159.00

Fox Software
Fox Base+ Development 219.00
5th Generation
Fastback Plus 89.99
IMSI
Page Perfect Desktop 339.00
Optimouse w/Dr. Halo 79.99
Logitech
Hi-Res Buss Mouse 99.99
Lotus Development
Lotus 1-2-3 . . . . . 299.00
Meca
Managing Your Money 119.00
Microrim
R:Base For DOS 499.00
Microsoft
Microsoft Mouse Bus/Ser 109.00
Peachtree
Complete Accounting 169.00
PFS
First Choice 2.0 . . . . . 99.99
Professional Write 129.00
Word Perfect Corp.
Word Perfect 5.0 . . . . . NEW
Xerox
Ventura Publisher 1.1 . . . . . 519.00

In the U.S.A. and in Canada

Call toll-free: 1-800-233-8950.

Outside the U.S.A. call 717-327-9575, Fax 717-327-1217
Educational, Governmental and Corporate Organizations call toll-free 1-800-221-4283
CMO. 101 Reighard Ave., Dept. B2, Williamsport, PA 17701

MMC MICROCOMPUTER MARKETING COUNCIL

Over 350,000 SATISFIED CUSTOMERS • ALL MAJOR CREDIT CARDS ACEPTED • CREDIT CARDS ARE NOT CHARGED UNTIL WE SHIP .

POLICY: Add 3% (minimum $7.00) shipping and handling. Larger shipments may require additonal charges. Personal and company checks require 3 weeks to clear. For faster delivery, use your credit card or send cashier's check or bank money order. Credit cards are not charged until we ship. Pennsylvania residents add 6% sales tax. All prices are U.S.A. prices and are subject to change, and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be replaced or repaired at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee. We are not responsible for typographic or photographic errors.

Circle 116 on reader service card

B210

Power. Speed. Performance.

PC-Write 3.0 is bigger and better. We listened to you and added hundreds of features.

Larger Files — Break the 60K file limit! Use all available DOS memory to edit large documents.

More Formats — Edit multiple columns on-screen, even columns from other programs. Or mark text as a rectangular box, then position and format it. Create tables, scripts, or numbered paragraphs faster.

Easier To Use — Stay on track with on-screen "reminder" lines. Use new menus to select page layout and fonts. Fix common typing mistakes with our improved spelling checker.

Extra File Control — Rapidly search and switch between chapters or other related files. Lock files on a network automatically, even view locked files in read-only mode.

New catalog adds value.

We offer and support dozens of popular products that work well with PC-Write 3.0.

PC-Write 3.0 — Working on a whole new scale.

New Capabilities — Choose from products such as WordFinder™ and InSet.™ Pop up a thesaurus or check your grammar. Select and edit soft fonts. Insert graphics and preview them. Simplify your foreign language, scientific, and bibliographic work.

Special Discounts — Registered PC-Write users get telephone support and reduced prices for all catalog products — more value to you.

Still only $89.

The $89 registration fee gives you the new software, user's guide with tutorial, phone support, two free updates, and a quarterly newsletter. And because PC-Write 3.0 is still shareware, you can give copies to others to try, free!

☐ **YES!** I want to work on a whole new scale — send me PC-Write 3.0. I've enclosed $89 for Full Registration.

☐ I want to try PC-Write 3.0 before I register. I've enclosed $16 for Shareware Diskettes.

☐ Send me your catalog of additional products.

Quicksoft, Inc.
219 First Ave N #224-PWOX
Seattle, WA 98109
206-282-0452

WA state add 8.1% sales tax

NAME _____

COMPANY _____

ADDRESS _____

CITY, STATE, ZIP _____

DAY PHONE _____ ☐ 5¼" Diskettes ☐ 3½" Diskettes

SIGNATURE _____

VISA/MASTERCARD NUMBER _____ EXP. DATE

Order PC-Write 3.0 today. Return the coupon or call 1-800-888-8088 PWOX

90-day money-back guarantee

Quicksoft

PC-Write is not shareware outside the U.S. and Canada. PC-Write™ Quicksoft. WordFinder™ Microlytics. InSet™ InSet Systems.

Circle 265 on reader service card

CONSUMER WATCH

Advice and information for the computer consumer

Need some PC-related advice? User groups can provide information and solve problems for users of all stripes.

Edited by
Anita Amirrezvani

Is your word processor saving files in Greek? Does your hard disk sound like a B-17 taking off? And is your friendly vendor or local dealer less than helpful?

Stop gnashing your teeth and join a user group. These federations of dedicated expert users can often unravel a knotty software or hardware riddle in short order—and they do it simply for the love of computing. Steve Rowan, president of the Southwest PC Users Group in Louisville, Texas, recalls how members rallied around a neophyte who couldn't get a brand-new machine to boot up. The club's question-and-answer session uncovered the problem: The dealer sold the man the wrong version of DOS for his machine. "When a dealer doesn't know what he's doing," Rowan says, "who's a beginner going to turn to?"

User groups exist solely to share information and lend a helping hand to PC voyagers. Consumer-oriented services include not only on-the-spot assistance but monthly newsletters, telephone technical support, training, and education. Club newsletters are chock-full of hints and tricks and product reviews that don't pull punches. (In fact, when major manufacturers such as IBM want to solicit opinions on new products, they often call on user groups first.) Some groups have PC gurus dedicated to application- and system-specific problems. Training and education usually take the form of instructional seminars and vendor presentations at monthly meetings.

Sometimes, it isn't even necessary to be a group member to get emergency help. After a major fire in downtown Los Angeles burned a small company's hard disk to a crisp, the owner called the Pasadena IBM Users Group for help. A group member put the user in touch with a firm that specializes in restoring fire-damaged hard disks. "We get frantic phone calls at all hours from all over the country," says Steve Bass, club president, "and we'll help any nonmember."

How can you find a user group? A good place to start is with the list of user groups that follows. National and local computer magazines are another source, and dealers and vendors may also steer their customers to local groups. IBM, for example, has a service that catalogs PC user groups by ZIP code or telephone area code. Just call 404/988-2782, tap in the proper code, and the computerized voice-messaging system provides all the details you'll need.
—Wes Nihei

Wes Nihei is an assistant editor for PC World.

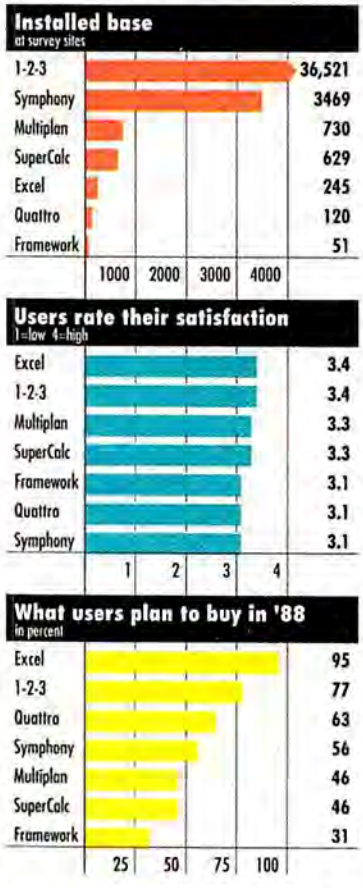
To send correspondence or to submit material for publication in this column, please see How to Contact PC World, *page 4.*
(continues)

ANTHONY RUSSO

RATE YOUR SATISFACTION: Spreadsheets

Want to find out what users really think about PC products? Starting this month, *Consumer Watch* presents user satisfaction ratings from an ongoing survey by International Data Corporation.

This month's graphs on spreadsheets tell an interesting tale. Although *1-2-3* continues to dominate the market, a strong new contender has joined the fray: *Excel*. Its installed base among surveyed organizations is low, but current users rate it as highly as *1-2-3*. The upshot? Of those surveyed, 95 percent plan to buy *Excel* this year, compared to 77 percent for *1-2-3*.



Source: International Data Corporation. From a survey conducted in February 1988 of 185 sites, each with at least 50 PCs.

User group information code:

NL: Newsletter
SIG: Special Interest Group
TS: Technical Support
TE: Training and Education
BBS: Bulletin Board System

(User groups are listed in alphabetical order by state and city.)

ALASKA

Alaska Computer Society
2042 E. Third Ave.
Anchorage, AK 99501
907/277-2406
$25/yr., NL, 1 SIG, TS, TE

Polar PC User Group
c/o Glen Wilcox
P.O. Box 72934
Fairbanks, AK 99707
907/456-2500
$10/yr., NL

ALABAMA

Birmingham IBM PC User Group
c/o Fred Hilbers
P.O. Box 19248
Birmingham, AL 35219-9248
205/871-1939
$20/yr., NL, 15 SIGs, TS, TE

Huntsville IBM PC User Group
P.O. Box 16013
Huntsville, AL 35802
205/539-5940
$15/yr., NL, 1 SIG, TS, TE

Montgomery PC Users Club
c/o Tony Drake
3505 McGehee Rd.
Montgomery, AL 36111
205/281-6100
$25/yr., NL, 1 SIG, TS, TE, BBS

ARIZONA

Phoenix PC Users Group
P.O. Box 44150
Phoenix, AZ 85064
602/954-7519,
602/275-5558 (BBS)
$40/yr., NL, 2 SIGs, TS, TE, BBS

Tucson IBM PC Users Group
P.O. Box 1489
Tucson, AZ 85702
602/795-9437
$30/yr., NL, 2 SIGs, BBS

ARKANSAS

NW Arkansas Microcomputer Users Group
c/o Kermit Baker
2568 Sweet Briar
Fayetteville, AR 72703
501/521-2292
$15/yr., NL, TS, TE

Razorback PC Club
c/o Mark Penny
P.O. Box 2095
Little Rock, AR 72203
501/225-8288
$20/yr., NL, TE, BBS

CALIFORNIA

Gold Country PC Users Group
1980 Canal St.
Auburn, CA 95603
916/885-8022
$25/yr., NL, 1 SIG, TS, TE, BBS

Berkeley PC/Compatibles User Group
c/o Mel Mann
1145 Walnut St.
Berkeley, CA 94707
415/526-4033
No fee, TS, TE, BBS

South County IBM PC Users Group
c/o Bob McCloud
17982 Walnut Rd.
Castro Valley, CA 94546
415/537-9899
$30/yr., NL, TS, TE

Sacramento IBM PC Users Group
c/o Rick Hellewell
P.O. Box 685
Citrus Heights, CA 95611-0685
916/395-3153 (BBS)
$25/yr., NL, 2 SIGs, TS, TE, BBS

FOG
P.O. Box 3474
Daly City, CA 94015
415/755-2000
$25/yr., NL, 4 SIGs, TS, TE, BBS

Davis PC Users Group
c/o Tony Barcellos
P.O. Box 2249
Davis, CA 95617
916/756-4866
$25/yr., NL, 1 SIG, TS, TE

UCLA PC Users Group
c/o Richard Katz
11674 Gateway Blvd.
#C-100
Los Angeles, CA 90064
213/473-6668
$20/yr., NL, 15 SIGs, TS, TE, BBS

Modesto PC User Group
P.O. Box 5122
Modesto, CA 95352-5122
209/869-3153
$24/yr., NL, 6 SIGs

North Orange County Computer Club
c/o Bill Mead
P.O. Box 3616
Orange, CA 92665
714/549-3227,
714/730-5643 (BBS)
$25/yr., NL, 25 SIGs, TS, TE, BBS

Pasadena IBM Users Group
c/o Steven Bass
711 E. Walnut St. #306
Pasadena, CA 91101
818/795-2300
$36/yr., NL, 5 SIGs, TS, TE

Riverside IBM Computer Club
c/o James Heidecke
7860 Live Oak Dr.
Riverside, CA 92509-5339
714/685-5407
$25/yr., NL, TS, TE, BBS

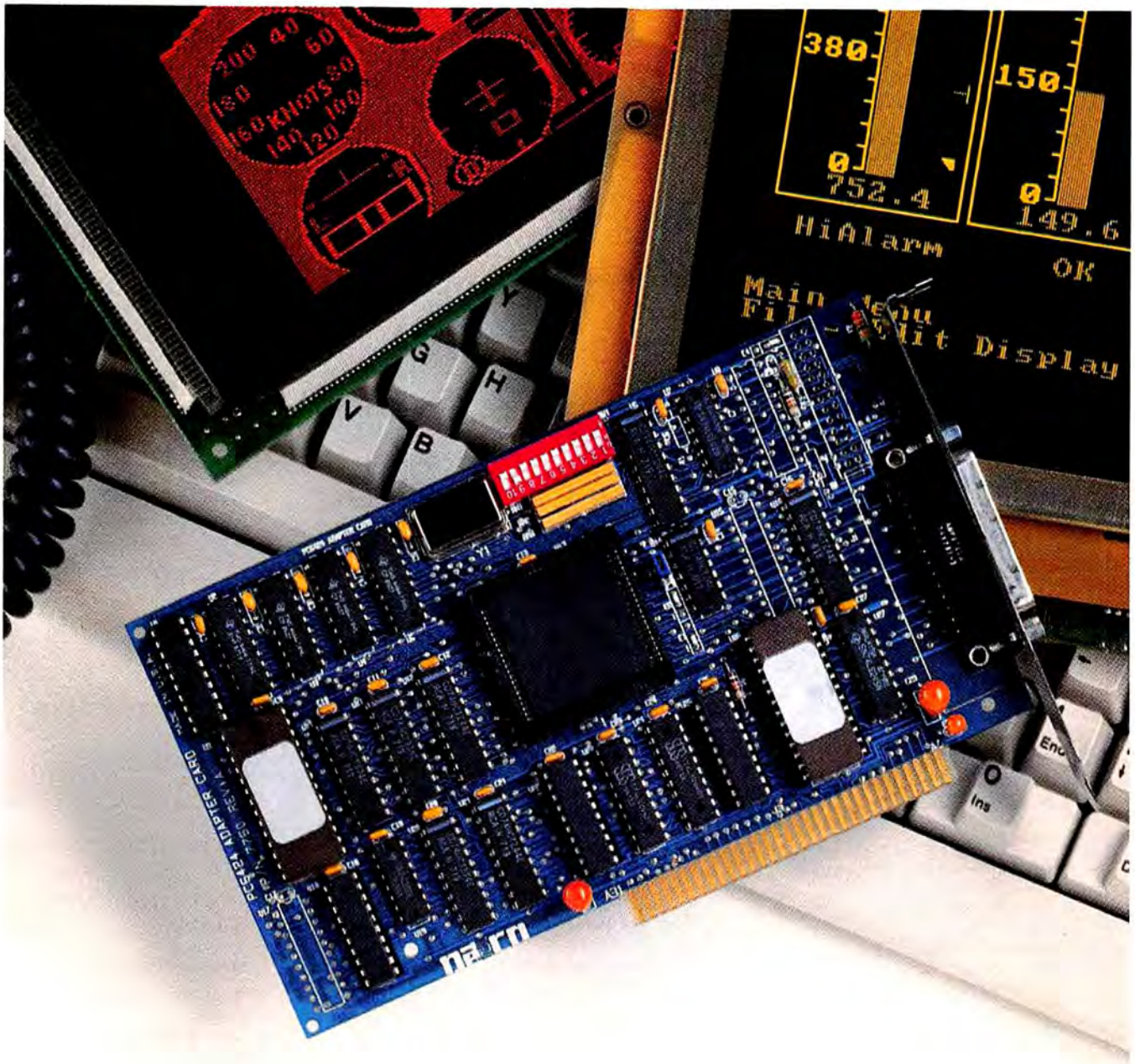
San Diego Computer Society
P.O. Box 87770
San Diego, CA 92138
619/284-7802
$22/yr., NL, TS, TE

IBM AT/XT Clone User Group
P.O. Box 15000-324
San Francisco, CA 94115
415/861-9321
$25/yr., NL, BBS

San Francisco Computer Society
P.O. Box 783
San Francisco, CA 94101
415/929-0252
$10/yr., TS, TE

San Francisco PC Users Group
3145 Geary Blvd. #155
San Francisco, CA 94118-3316
415/221-9166
$30/yr., NL, 10 SIGs, TS, TE, BBS

(continues)



DEECO PC ADAPTER CARD. THE QUICKEST WAY TO INTERFACE A FLAT-PANEL DISPLAY.

When it comes to driving a flat-panel display with your PC, only DeeCO offers you an easy-to-use, off-the-shelf solution.

Simply plug our PC 6424 adapter card into your PC XT, or AT. That's all there is to it. No software, no hardware, no modifications.

What's more, our PC adapter card can drive electro-luminescent, AC plasma and split-screen LCD display technologies with standard software. And it's completely compatible with 640x200, 640x400 and 720x350 resolution display matrices.

The PC adapter card also features onboard BIOS firmware. And it operates in CGA, DSCGA, MDA, HGC, and DeeCO's full 400-line resolution modes, and can coexist with other monitor adapter cards.

To find out more about how the PC 6424 adapter card can slash your design time, call or write DeeCO today. We'll show you the fastest way to drive a flat-panel display.

deeco®

Digital Electronics Corporation, 31047 Genstar Road, Hayward, CA 94544-7831 (415) 471-4700

DeeCO is a registered trademark of Digital Electronics Corporation. PC, XT, and AT are trademarks of International Business Machines.

Circle 5 on reader service card

Santa Barbara PC Users Group
c/o Gerry Ching
281 Oak Rd.
Santa Barbara, CA 93108
805/969-9961
$15/yr., NL, 4 SIGs, TS, TE

Silicon Valley Computer Society
2464 El Camino Real #190
Santa Clara, CA 95051
408/286-2969
$30/yr., NL, 14 SIGs, TS, TE, BBS

Stanford/Palo Alto User Group
P.O. Box 3738
Stanford, CA 94309
415/322-3850
$25/yr., NL, 4 SIGs, TS, TE, BBS

Stockton PC Users Group
P.O. Box 99052
Stockton, CA 95209
209/478-9697
$25/yr., NL, 4 SIGs, TS, TE, BBS

COLORADO

PC Users Group of Colorado
c/o Larry Hayden
P.O. Box 944
Boulder, CO 80306
303/442-4815
$18/yr., NL, 2 SIGs, TE, BBS

Colorado Springs PC Users Group
c/o George Wing
P.O. Box 1028
Colorado Springs, CO 80901
719/531-9674 (BBS)
$20/yr., NL, 1 SIG, TS, TE, BBS

CONNECTICUT

Connecticut IBM PC User's Group
P.O. Box 291
New Canaan, CT 06840
203/762-0229
$20/yr., NL, 6 SIGs, TS, TE, BBS

Southeast Connecticut PC Users Group
c/o Catherine Winslow
P.O. Box 180
West Mystic, CT 06388
203/889-2540
$12/yr., NL, 3 SIGs, TS, TE, BBS

DELAWARE

PC Professional Users Group
P.O. Box 2350
Wilmington, DE 19899
302/764-4723
$30/yr., NL, 4 SIGs, TS, TE

FLORIDA

South Polk PC Users Group
c/o Bill Goddard
815 N. Lake Reedy Blvd.
Frostproof, FL 33843
813/635-3381
No fee, TE

Manasota IBM PC Users' Group
c/o Jack Winberg
4500 Gulf of Mexico Dr.
Longboat Key, FL 34228
813/383-2670
$12/yr., NL, 3 SIGs, TS, TE, BBS

Space Coast PC Users Group
c/o John Key
1540 Monte Carlo Ct.
Merritt Island, FL 32952
305/452-1465
$12/yr., NL, 3 SIGs, TS, TE

Pinellas IBM PC Users Group
c/o Dick Shutt
1331 Seagull Dr. S
St. Petersburg, FL 33707
813/347-5444
$20/yr., NL, 35 SIGs, TS, TE, BBS

University of South Florida PC/PS Users Group
University of South Florida
SVC 409
c/o U.C.S. Infocenter
Tampa, FL 33620-7250
813/974-3190
No fee, NL, 4 SIGs, TS, TE, BBS

GEORGIA

Athens IBM PC User Group
P.O. Box 6652
Athens, GA 30604
404/354-0817 (BBS)
$20/yr., NL, TS, TE, BBS

Atlanta IBM PC User's Group
P.O. Box 28788
Atlanta, GA 30358
404/446-6611
$30/yr., NL, 5 SIGs, TS, TE, BBS

HAWAII

Maui PC Users
771 Alua St. #101
Wailuku, Maui, HI 96793
808/244-7116
$25/yr., TS, TE

IDAHO

Idaho PC Users Group
P.O. Box 9136
Boise, ID 83707
208/939-9120
$20/yr., NL, 5 SIGs, TS, TE, BBS

ILLINOIS

The Chicago Computer Society
P.O. Box 8681
Chicago, IL 60680-8681
312/794-7737,
312/492-0706 (BBS)
$40/yr., 5 SIGs, TS, TE, BBS

Central Illinois PC Users' Group
c/o Dean Austin
P.O. Box 4162
Springfield, IL 62708
217/529-2808
$20/yr., NL, TS, TE

INDIANA

The Northeastern Indiana PC Club
c/o Gordon Samra
4422 Bridgetown Run
Fort Wayne, IN 46804
219/436-7827
$20/yr., NL, 6 SIGs, TS, TE, BBS

IBM PC Users Group, Inc.
P.O. Box 2532
Indianapolis, IN 46206
317/897-5166
$25/yr., NL, 8 SIGs, TS, TE, BBS

North Indiana PC Users Group
316 N. Ironwood Dr.
South Bend, IN 46615
$15/yr., NL, TS, TE

IOWA

Hawkeye PC Users Group
P.O. Box 2966
Cedar Rapids, IA 52401
319/393-5416
$15/yr., NL, 1 SIG, TS, TE, BBS

Northeast PC Users Club
c/o Barbara Blow
320 Oak Park Circle
Waterloo, IA 50701
319/234-0654
$15/yr., 3 SIGs, NL, TS, TE

Des Moines Area IBM PC Users Group
c/o Ralph Gandy
1804 Hillside St.
West Des Moines, IA 50365
515/223-0328 (BBS)
$20/yr., NL, 1 SIG, TS, TE, BBS

KANSAS

Topeka PC Users Club
P.O. Box 1279
Topeka, KS 66601
$12/yr., 3 SIGs, NL, TS, TE, BBS

Wichita IBM PC Users Group
P.O. Box 781200
Wichita, KS 67278-1200
316/689-8732 (BBS)
$20/yr., NL, 6 SIGs, TS, BBS

KENTUCKY

Powell County PC Users Group
c/o Compserve
Rt. #3, Box 144F
Stanton, KY 40380
606/663-2472
$10/yr., NL, 2 SIGs, TS, TE, BBS

LOUISIANA

IBM Serious Users of Baton Rouge
c/o Computer Electronics
1955 Dallas Dr.
Baton Rouge, LA 70806-1430
504/924-8066
No fee, NL, TS, TE, BBS

New Orleans Personal Computer Club
P.O. Box 8364
Metairie, LA 70011
504/488-1392,
504/488-1393 (BBS)
$25/yr., NL, 8 SIGs, TS, TE, BBS

Northwest Louisiana PC User Group
945 Dudley Dr.
Shreveport, LA 71104
318/868-5950
$25/yr., NL, TS, TE

MAINE

Portsmouth PC Users Group
c/o Jeff Wade
5 Thornton Ln.
Eliot, ME 03903
207/439-0363
$35/yr., NL, 10 SIGs, TS, TE, BBS

Portland Maine IBM User Group
c/o Don Ludgin
446 Indian Point Rd.
Georgetown, ME 04548
207/371-2221
No fee, NL, 20 SIGs, TS, TE, BBS

MARYLAND

Chesapeake PC Users Group
2315B Forest Dr. #31
Annapolis, MD 21401
301/647-7139,
301/647-0093 (BBS)
$24/yr., NL, 6 SIGs, TS, TE, BBS

Columbia-Baltimore Users Group
P.O. Box 125
Columbia, MD 21045
301/461-7822
$20/yr., NL, 1 SIG, TS, TE, BBS

Capital PC User Group, Inc.
51 Monroe St. Plaza E #2
Rockville, MD 20850
301/656-8372,
703/750-7809 (BBS)
$25/yr., NL, 25 SIGs, TS, TE, BBS

MASSACHUSETTS

The Boston Computer Society
One Center Plaza
Boston, MA 02108
617/367-8080,
617/227-7986 (BBS)
$35/yr., NL, 50 SIGs, TS, TE, BBS

MICHIGAN

Washtenaw IBM PC User Society
P.O. Box 7508
Ann Arbor, MI 48107
$18/yr., NL

Southeast Michigan Computer Organization
c/o Darrell Frappier
P.O. Box 02426
Detroit, MI 48202
313/284-2816
$15/yr., 3 SIGs, NL, TS, TE, BBS

The Cursors IBM PC Users Group
Gogebic Community

(continues)

DESKTOP PUBLISHING

Hands On Solutions in Publish!

Each month in *Publish!* you'll find features, reviews and departments providing:

- Tips on the fundamentals of graphic design, typography and publishing.
- Professional designers offering creative ideas to enhance layout with page makeover suggestions.
- Information and reviews on the industry's latest hardware and software along with innovative applications.
- Shortcuts and tips on technical matters to cut costs while enhancing quality of communication.
- Techniques to build networks and share files electronically.

All this and more when you subscribe to *Publish!* Now!

SUBSCRIBE NOW AND

SAVE 25%

YES! Send me one year (12 monthly issues) of *Publish!* at the Special Subscription rate of $29.95. That's almost $10.00 off the regular subscription rate.

☐ Bill me later ☐ Payment enclosed

Name

Street

City

State Zip

Mail to:
Publish! Subscription Dept.
P.O. Box 51966
Boulder, CO 80321-1966

Offer valid in the U.S. only. Please allow 6-8 weeks for delivery of your first issue.

Publish! regular subscription rate $39.90 for 12 issues.

5CKQ0

DESKTOP PUBLISHING

Publish!

The How-to Magazine

Produced by desktop publishers, for desktop publishers. Publish! serves as a laboratory for the industry—employing techniques and applications on the cutting edge of computer communications. Don't limit your desktop publishing potential—expand it with Publish!

College
E. 4946 Jackson Rd.
Ironwood, MI 49938
906/932-4231
$12/yr., NL, TS, TE

MINNESOTA

Twin Cities PC User Group
c/o Scott Young
P.O. Box 10360
Minneapolis, MN 55458-3360
612/888-0557
$24/yr., NL, 10 SIGs, TS, TE, BBS

MISSISSIPPI

HUB Computer Users Group
c/o Sam Wells
530 Buschman St.
Hattiesburg, MS 39401
$15/yr., TS, TE

MISSOURI

Kansas City IBM PC Users Group
c/o Bill Meeker
221 E. 63rd St.
Kansas City, MO 64113
816/444-8709
$15/yr., NL, 4 SIGs, TS, TE, BBS

NEW HAMPSHIRE

Manchester PC Users' Group
P.O. Box 4302
Manchester, NH 03103
603/644-6197
$35/yr., NL, 20 SIGs, TS, TE, BBS

NEW JERSEY

New Jersey PC Users Group
c/o Neil Stewart
P.O. Box 411
Carlstadt, NJ 07072
201/664-3311
$25/yr., 2 SIGs, TS, TE, BBS

PC Club of South Jersey
c/o Pat Murphy
P.O. Box 427
Cherry Hill, NJ 08003
609/751-0050,
609/983-9643 (BBS)
$20/yr., NL, TS, TE, BBS

Philadelphia Area IBM PC Club
c/o Bennett Landsman
2041 Harbour Dr.
Palmyra, NJ 08065
215/951-1255,
215/635-5227 (BBS)
$30/yr., NL, 60 SIGs, TS, TE, BBS

Amateur Computer Group of New Jersey
P.O. Box 135
Scotch Plains, NJ 07076
201/264-8242,
201/753-9758 (BBS)
$15/yr., NL, 3 SIGs, TS, BBS

Computer Connection
c/o Ted Hare
P.O. Box 382
Voorhees, NJ 08043
609/783-7444,
609/784-9404 (BBS)
$15/yr., TS, TE, BBS

NEW YORK

Long Island Computer Associates Inc.
P.O. Box 71
Hicksville, NY 11802
516/293-8368
$12/yr., NL, 22 SIGs, TS, TE, BBS

New York PC Users Group
40 Wall St. #2124
New York, NY 10005-1301
212/533-6972,
212/637-1870 (BBS)
$25/yr., NL, 40 SIGs, TS, TE, BBS

Central New York PC Users' Group
c/o Ted Williamson
P.O. Box 6411
Teall Station
Syracuse, NY 13217-6411
315/455-2833,
315/458-6812 (BBS)
$15/yr., NL, TS, TE, BBS

Westchester PC User's Group
P.O. Box 349
White Plains, NY 10602-0349
$20/yr., NL, 3 SIGs, TS, TE, BBS

NORTH CAROLINA

IBM PC Users Club of Asheville
P.O. Box 2942
Asheville, NC 28802
704/252-7529
$15/yr., 3 SIGs

PC Club of Charlotte
c/o Jerald Malin
709 Madras Ln.
Charlotte, NC 28211
704/364-1635
$10/yr., NL, TS, TE, BBS

NORTH DAKOTA

Fargo IBM PC Users' Group
c/o Jim Grettum
P.O. Box 9121
Fargo, ND 58109
701/232-3332
$12/yr., NL, TS, TE, BBS

OHIO

ACORN: Greater Cincinnati PC Users Group
c/o Mark Ginter
P.O. Box 3097
Cincinnati, OH 45201
513/671-2339
$20/yr., NL, 6 SIGs, TS, TE, BBS

Lake Ashtabula IBM PC Users Group
5920 Shore Dr.
Madison, OH 44057
216/428-4512
$12/yr., NL, 3 SIGs, TS, TE

Toledo PC Users Group
P.O. Box 13085
Toledo, OH 43613
419/245-3701
$18/yr., NL, 3 SIGs, TE, TS, BBS

OREGON

Portland PC Users Club
P.O. Box 2068
Beaverton, OR 97075
503/623-3353
$20/yr., NL, 2 SIGs, TE, BBS

Eugene PC Users Group
P.O. Box 11436
Eugene, OR 97440
503/726-2221
$25/yr., NL, 3 SIGs, TS, TE

PENNSYLVANIA

Harrisburg PC Users Group
c/o Jack Stahl
1195 Fairmont Dr.
Harrisburg, PA 17112
717/652-9097
$15/yr., NL, 2 SIGs, TS, TE, BBS

Pittsburgh Area Computer Club
c/o Phil Cutrara
P.O. Box 6440
Pittsburgh, PA 15212
412/321-3181
$20/yr., NL, 6 SIGs, TS, TE, BBS

RHODE ISLAND

Greater Rhode Island IBM Satellite Group
c/o Hilde Gesch
University of Rhode Island
Academic Computer Ctr., Tyler Hall #48
Kingston, RI 02881
401/792-2301
$35/yr., NL, 20 SIGs, TS, TE

SOUTH CAROLINA

IBM PC Users Group of the Charleston Computer Club
c/o Michael Finefrock
P.O. Box 520
Charleston, SC 29402-0520
803/722-7445
$19/yr., NL, 5 SIGs, TS, TE, BBS

TENNESSEE

Music City IBM PC Users Group
3133 Goodwin Dr.
Nashville, TN 37217
$10/yr., NL, TE

TEXAS

North Texas PC Users Group
P.O. Box 780066
Dallas, TX 75378-0066
214/746-4699
$24/yr., NL, 5 SIGs, TS, TE, BBS

Houston Area League PC Users, Inc.
P.O. Box 61266
Houston, TX 77208-1266
713/524-2572
$25/yr., NL, 45 SIGs, TS, TE, BBS

Dallas–Fort Worth Users Group
c/o Samuel Cook
309 Lincolnshire
Irving, TX 75061
214/986-9228
$30/yr., NL, TS, TE, BBS

Southwest PC Users Group
c/o Leo Henderson
1402 Cedar Keys Dr.
Louisville, TX 75067
214/456-5291,
214/790-8960 (BBS)
$30/yr., NL, 3 SIGs, TS, TE, BBS

Golden Triangle PC Club
c/o William Cox
Rt. 3, Box 502
Orange, TX 77630
409/745-3081
$10/yr., NL, TS, TE, BBS

Tyler Computer Club
c/o Marionetta Smith
4928 Richmond Rd.
Tyler, TX 75703
214/561-6136
$20/yr., NL, 4 SIGs, TE

UTAH

Utah Blue Chips
P.O. Box 510811
Salt Lake City, UT 84151
801/521-7830
$15/yr., NL, 5 SIGs, TS, TE, BBS

VIRGINIA

Central Virginia IBM PC Users Group
P.O. Box 34446
Richmond, VA 23234
$15/yr., NL, 4 SIGs, TE

WASHINGTON

Borderline PC User Group
c/o Franklin Miyazaki
1232 Grant St.
Bellingham, WA 98225
$10/yr., NL, 2 SIGs, TS, TE

Lower Columbia IBM PC Users Group
c/o Fred Mattfield
P.O. Box 978
Long Beach, WA 98631
206/642-4786
$10/yr., NL, TS, TE

WEST VIRGINIA

Huntington PC Users Group
c/o Levi Lauvray
PC HUG
P.O. Box 1958
Huntington, WV 25720
304/526-5189
$12/yr., NL, 4 SIGs, TS, TE, BBS

WISCONSIN

Eau Claire Area PC Users Group
P.O. Box 1369
Eau Claire, WI 54702
715/839-4793
$15/yr., NL, TS, TE, BBS

Madison IBM PC User's Group
c/o Philip J. Niechoff
P.O. Box 2598
Madison, WI 53701-2598
$20/yr., NL, 4 SIGs, BBS

WYOMING

Central Wyoming Users Group
P.O. Box 1428
Riverton, WY 82501
$20/yr., NL, 2 SIGs, TS, TE ●

"Successful entrepreneurs don't have all the answers. But they do ask the right questions."

"For entrepreneurs and other owners of small businesses, financial projections aren't a luxury, they're an absolute necessity."

"The true heroes of the new economy will be those who master the principles of entrepreneurial finance."

Take control of your financial decision making with Ronstadt's Financials.™

No one has the secret to success. But there's one thing nearly every successful business has in common. And that's a comprehensive set of financial projections.

But try creating them on a spreadsheet program and you'll spend days programming, formatting and checking for errors before you get any results at all.

Now, Dr. Robert Ronstadt, one of the nation's most widely-published authorities on entrepreneurship, has developed Ronstadt's Financials,™ the only software specifically designed to prepare complete financial projections faster, more accurately, and more flexibly than any other way.

Just enter the operating assumptions for your business on a single, on-screen form and you'll automatically generate income statements, balance sheets, cash flow projections, and more. All the reports you need to plan, finance and operate any enterprise.

Tailor the program to your needs by customizing one of the eight industry models that come with the program. Or create your own from scratch. Then explore alternative financial strategies in a matter of minutes.

Dr. Ronstadt will even guide you through the principles of sound financial planning in his newest book, *Entrepreneurial Finance*, also included with your program.

Get the confidence you need to proceed with your venture—and the financial information you'll need to succeed. Get Ronstadt's Financials today.

Call us for information about Ronstadt's Financials, and to request the Trial Pack at $9.95, or to order the complete package. Also available at leading software dealers nationwide.

For more information, simply complete and return this coupon to Lord Publishing. Or call today.

Name _____ Telephone _____

Company _____

Address _____

City _____ State _____ Zip _____

Requires an IBM® PC, XT, AT, PS/2™ or compatible, 512K RAM, DOS 2.0 or higher; CGA, EGA, MGA, or VGA for graphics. Visa and MasterCard accepted.

Ronstadt's Financials

The Entrepreneur's Professional Guide to Sound Financial Decisions.

Call 1-800-525-5673

(Inside MA call 1-508-651-9955.)

Ronstadt's Financials is a trademark of Lord Publishing, Inc. One Apple Hill, Natick, MA 01760. © 1988 Lord Publishing, Inc.

Circle 247 on reader service card

Now there's a less complicated way to make a lasting impression with your documents.

Legend® gives you word processing, graphics and desktop publishing in one comprehensive program.

The old way of creating valuable business documents took an eternity.

Moving in and out of different programs for different functions was as slow as cutting stone. And the results were often difficult to decipher.

A more civilized approach. Now, with Legend from NBI, you can produce compound documents with ease. Because Legend gives you and your IBM® 286/386 Personal Computer or compatible the power to process words, create graphics and lay out pages. All within the comforts of one extremely comprehensive software program. And all without paying a king's ransom.

The Microsoft® Windows environment's common set of commands coupled with Legend's WYSIWYG format make document processing less of a process. And if you still want more, it's yours. Because Legend can import practically everything from scanned images and spreadsheets to Micrografx files.

Words and pictures. All in good form. Blending the right symbols with the right words can help a document stand the test of time. That's not a new idea. But once you compare Legend to word processing and desktop publishing, you'll realize it's an idea whose time has come. Again.

Call 1-800-922-8828 (in Canada 1-800-668-8640), ext. 525 for more information or a $9.95 evaluation disk of Legend.

Because the system you use to create your documents shouldn't be a relic of the past.

LEGEND
NBI®

*REG. U.S. PAT. & TM. OFF. Microsoft is a registered trademark of Microsoft Corporation. The NBI stylized logo is a registered trademark of NBI, Inc. ©NBI, Inc., 1988.

Circle 113 on reader service card

THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

The Tandy 1000 transformation, 1.44MB drives for the PC and AT, and more

Edited by Robert Luhn

The Tandy 1000 Express

Sooner or later, almost everyone who uses an 8088 machine wonders if an 80286 turbo board could give the old box a new lease on life. But if you owned a member of the popular Tandy 1000 clan, you were out of luck. Although the Tandy 1000 is largely software compatible with the IBM PC, it isn't hardware compatible. The Tandy 1000 can't hold full-length (13-inch) expansion boards, and key internal circuitry doesn't conform to the PC standard.

Fortunately, your luck just got better. Tandy Corporation now offers the 286 Express board, specially designed by PC Technologies for the Tandy 1000, 1000 A, and 1000 SX. The board sports an 8-MHz 80286 processor, a socket for the 80287, and a place for the system's aged 8088, so you can downshift to 4.77-MHz processing for old, finicky programs. For an extra performance boost, the board's equipped with a high-speed 8K RAM cache.

Installation is relatively painless, thanks largely to PC Technologies' well-written and copiously illustrated manual. You relocate the Tandy's 8088 to a special daughterboard that snaps into the 286 Express, pop a plug attached to the daughterboard into the 8088's socket, and slip the 286 Express into a free slot. If you've never upgraded your system before, read the Tandy 1000 and 286 Express manuals completely before you start. As with most turbo board upgrades, you'll need a small flat-blade screwdriver and a Phillips screwdriver, a chip puller (for removing the 8088), and needle-nose pliers in case you have to straighten the 8088's pins. Note: If you're upgrading an original Tandy 1000 (not a model 1000 A), you must obtain a different daughterboard from Tandy.

Before you pull the 286 Express out its wrapper, copy the supplied EXPRESS.SYS device driver to the system's boot disk. To activate the cache and the ability to switch between the 80286 and 8088, add DEVICE = EXPRESS.SYS CPU CACHE to the Tandy's CONFIG.SYS file. Later, when the Tandy is up and running, you can turn the cache on and off by pressing <Alt>-<Right Shift> and switch processors using <Alt>-> and <Alt>-<.

Next, ground yourself, place the 286 Express on top of its antistatic wrapper, and locate the DIP switch block in the upper left corner. Follow the manual's instructions and indicate whether the board holds a 6-MHz or 8-MHz 80287 and whether a Tandy 1000 SX is the machine to be

(continues)

ANTHONY RUSSO

upgraded. Finally, turn off the computer, unplug all external cables, and remove the two screws at the front of the unit so you can slide the cover off. If you're upgrading a 1000 SX, you must also remove a brace that obstructs the slots.

To extract the 8088, remove any expansion boards that are in the way and locate the 8088 next to the slots by the backplane. Ground yourself again and hook the chip puller around each end of the chip, *not* around the socket base. Place two fingers on top of the chip and gently rock the puller back and forth as you pull up. Once you've confirmed that the 8088's pins are straight, pull the daughterboard out of its antistatic bag and plug the chip into the provided horizontal socket, with the 8088's notch pointing to the right. To add a 6-MHz or 8-MHz 80287, locate the vertical socket on the 286 Express board and plug in the 80287, with the chip's notch pointing up.

Once the chips have fallen where they may, plug the daughterboard's ribbon cable into the 8088 socket on the motherboard. This is easier than plugging in a chip but must still be done with care. Finally, snap the daughterboard into the 286 Express and place the assembly in a free slot. (On a 1000 or 1000 A, using the leftmost slot minimizes cable contortions; on a 1000 SX, the rightmost slot is best.)

And that *should* be it. Reassemble the system (but leave the hood off), slip the boot disk into drive A:, and turn on the machine. If the computer doesn't boot up, turn it off and make sure the 286 Express is firmly seated in its slot; if an error message appears, chances are the 286 Express conflicts with another board in the system—which means you'll have to pull the 286 Express out and change some DIP switch settings.

Given all the effort and expense, you might ask how much speed the 286 Express buys. Plenty. Most applications will run 4 to 5 times faster, but informal tests show the board can speed up calculation-intensive tasks (such as recalculating a *1-2-3* worksheet) by as much as 90 times. Add an 80287 to the mix, and some tasks are completed 440 times faster. That's turboprocessing and then some.

Although the 286 Express is compatible with most software, the board's built-in cache conflicts with some compiled BASIC sort programs. Switching from the 8088 to the 80286 in the middle of a task can also cause programs such as *1-2-3* to make calculation errors. Otherwise, the 286 Express is a Tandy owner's dream. It makes the Tandy 1000 as responsive as an AT—at a fraction of the cost. *—Dennis Dykstra*

WHERE TO BUY

286 Express
Tandy Corp./Radio Shack
One Tandy Center
Fort Worth, TX 76102
817/390-3011
List price: $399.95, daughterboard for original Tandy 1000 $39.95 (part number AXX-7130)
Requirements: DOS 2.10 or later version; Tandy 1000, 1000 A, or 1000 SX computer
Warranty: two years parts and labor from PC Technologies
Extended warranty: none
Technical support: unlimited toll-free phone support from PC Technologies, M–F 8–5, or from any Radio Shack computer store
Other support services: Regional Tandy Training and Support Centers offer the 6/60 plan—six problems solved for $60, with no time limit and no limit on the number of calls per problem. Workshops and on-site training available.
For more information, see Products Featured in This Issue.

Quadruple Floppy Storage

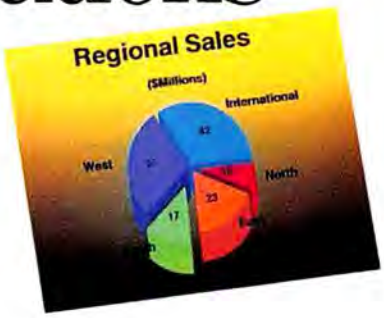
In their quest for ever-greater floppy disk storage, PC users have turned to a number of solutions—most of them aimed at getting 5¼-inch 1.2MB floppy drives to work in PCs. Using PS/2-style 3½-inch drives wasn't an attractive option, because the PC's BIOS ROM limited such drives to 720K disks.

However, with a CompatiCard disk controller from MicroSolutions (see "Treble Storage, Part II," *The Upgrade Path, PCW,* September 1988) and Mitsubishi's $79 half-height 3½-inch MS 355B floppy drive, 1.44MB floppy storage can be yours. Now you can back up your PC's hard disk faster, use disks designed for the PS/2 without hassle, and of course easily swap data with laptop computers. The only limitations: The unit is treated as drive C:, and you can't boot the system from it.

Physically installing the Mitsubishi drive is simple work—and a good thing, too, since the supplied user manual doesn't discuss such details. Turn off the PC, unplug all external cables, remove the system cover, and ground yourself before touching the drive. Slide the drive into an empty bay (it comes with the appropriate mounting brackets and a half-height faceplate), and secure it to the right side of the chassis with two small screws.

(continues)

At last there's a way to make better looking presentations with less work.



Introducing Pinstripe Presenter.™

In the past you had two choices: you spent days with a graphic designer or you struggled with cumbersome presentation software. Now there's Pinstripe Presenter.

With its many pre-formatted graphic styles you can produce compelling, professional looking slides, overheads and handouts.

Everything you need.

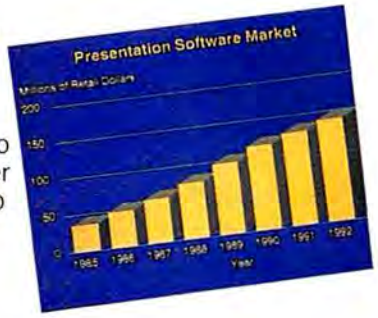
You can create word charts, business graphs or freehand drawings, one at a time or combined on a single slide. Choose from among 8 chart types including text, pie, line, area, table, stacked bar, and horizontal bar. Both 2D and 3D types are included. And use the draw program and clip art library to add snap to any slide.

Professional looking results every time.

When it comes to making visuals—relax. The automatic layout feature does all the work for you. Each type of chart has 13 pre-formatted styles to choose from. Graphic designers have fine tuned each style including fonts, margins, spacing, justification, text sizing, and color schemes.

No experience necessary.

On-screen prompts, obvious menus, and context sensitive on-line help make it easy to learn Pinstripe Presenter in record time. The quick start guide will take you through your first presentation in under 1 hour.



Rush jobs welcome.

Save time by selecting the menu option to transmit your presentation via modem to a MAGICorp slide center for 24-hour delivery. Pay less than half the typical price per slide charged by commercial slide making services. And you can use your printer to create overheads and paper copies in minutes.

Price: $199.95

Available at software dealers everywhere, or call 1-800-826-0706 to order.

Better looking presentations with less work

Pinstripe Presenter

"Stunning is the best way to describe the speed and efficiency in which (Pinstripe Presenter) performs its tasks."

Infoworld

Circle 69 on reader service card

SPINNAKER®

© 1988, Spinnaker Software Corporation
One Kendall Square, Cambridge, MA 02139
All rights reserved. Spinnaker is a registered trademark

Plug a free power supply connector into the back of the drive, and attach the unit's metal edge connector to the CompatiCard with the PC's floppy drive controller cable. Reassemble the system, and you're ready to go.

CompatiCard installation was detailed in last month's *Upgrade Path*. But keep a couple of details in mind: You must create or modify the boot disk's CONFIG.SYS file to reference MicroSolution's CCDRIVER.SYS device driver, and you must add several switches to the DEVICE = CCDRIVER.SYS statement. MicroSolutions classifies the Mitsubishi unit as a type 7 drive; if you attached the drive to the CompatiCard's P1 edge connector, CONFIG.SYS would thus hold the statement DEVICE = CCDRIVER.SYS /1,7. Once these files are in place, reboot the system, and the Mitsubishi is immediately available. To format 1.44MB and 720K disks, you must use MicroSolution's CCFORMAT.COM utility.

Of course, if you add the Mitsubishi drive to an AT, Compaq 386, or compatible computer, you won't need the CompatiCard at all because the floppy/hard disk controllers in these systems recognize high-capacity 3½-inch drives. Installation, however, is still complicated, and you must use the company's FORMAT35 utility to format disks.

Follow the steps described earlier to physically install the drive, but in this case, slip the plug for the B: drive at the end of the disk controller ribbon cable over the Mitsubishi's edge connector. Next, run the computer's setup program and declare that drive B: is a 3½-inch, high-capacity drive. (If your IBM-supplied diagnostic/setup utility lists only the '3.5 (720KB)' option, go ahead and pick it—the Mitsubishi drive should still successfully format 1.44MB disks.)

Once SETUP finishes, slip Mitsubishi's utility disk into drive A: and type **SETUP35**. As you answer the simple prompts, the program automatically copies the necessary drivers and utilities to the system's hard disk and creates or modifies the system's AUTOEXEC.BAT and CONFIG.SYS files. Reboot the system, and the drive is ready to roll.

One important caveat: The Mitsubishi drive will not properly format 1.44MB disks when installed in an IBM PC AT Model 339. According to Mitsubishi, this model's BIOS ROM doesn't support the 3½-inch high-density format, and there is no software workaround. So buyers beware.

Buyers should also be aware that not all 3½-inch disks are alike. Double-sided, double-density disks can be formatted to 720K; only high-density disks (which have an additional window opposite the write-protect window) should be used to hold 1.44MB of data. —*R. L.*

WHERE TO BUY

MS 355B
Peripherals Division
Mitsubishi Electronics America
991 Knox St.
Torrance, CA 90502
213/515-3993
List price: $79
Warranty: one year parts and labor
Extended warranty: none
Technical support: unlimited, toll-free number
Other support services: none
For more information, see Products Featured in This Issue.

Upgrade Update

If you've transformed your PC or AT into an 80386 powerhouse with a Hauppauge 386 Motherboard (see "The Ultimate Turbo Board," *The Upgrade Path, PCW*, November 1987), get out your checkbook. Hauppauge Computer Works has finally released 32-bit RAM boards for its XT and AT motherboards. The unpopulated 2MB board costs $295; an unpopulated daughterboard capable of holding another 2MB can be had for an additional $195. Both boards require 64K-by-4-bit (*not* 256K-by-1-bit) 100ns RAM chips. Contact Hauppauge Computers Works, 175 Commerce Dr., Hauppauge, NY 11788.

Dennis Dykstra is a contributing editor for PC World *and a professor at Northern Arizona University in Flagstaff.*

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

POWER TIP NO. 15

See More Files in 1-2-3

1-2-3 worksheet files can build up quickly, but /File Retrieve will display only five file names at once. To display a full screen of files, use /File Retrieve <F3>. You can then select a file as you normally would.

Bruno Terkaly
Corte Madera, California

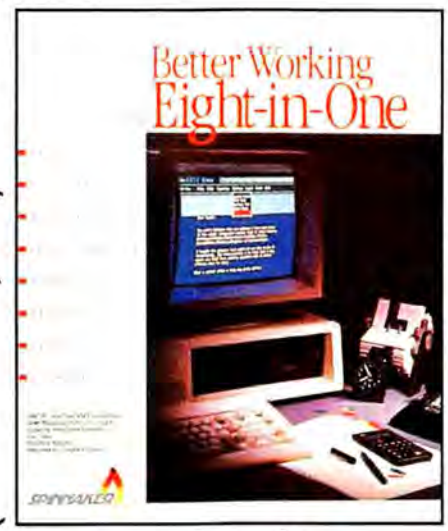
Here's What People Are Saying about EIGHT-IN-ONE™ . . .

". . .a really powerful product. . .as good as $300 to $500. . .products."
— Soft • letter

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

". . . works as promised."
— PC Week

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



"*****. . .the best integrated package I've ever seen. . . ."
— Home Office Computing

". . .very easy to learn and use. . . quite intuitive."
— PC Week

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

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

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

Price: $59.95

- IBM® PC and True IBM Compatibles
- Requires: 384K/DOS 2.1 or higher
- Supports hard drive systems
- Graphics adaptor required for graphics output

Available at fine software dealers,
Or: For orders only call 1-800-826-0706

SPINNAKER®

©1988, Spinnaker Software Corp., One Kendall Square, Cambridge, MA. 02139
All rights reserved. Spinnaker is a registered trademark of Spinnaker Software Corp.

Circle 25 on reader service card

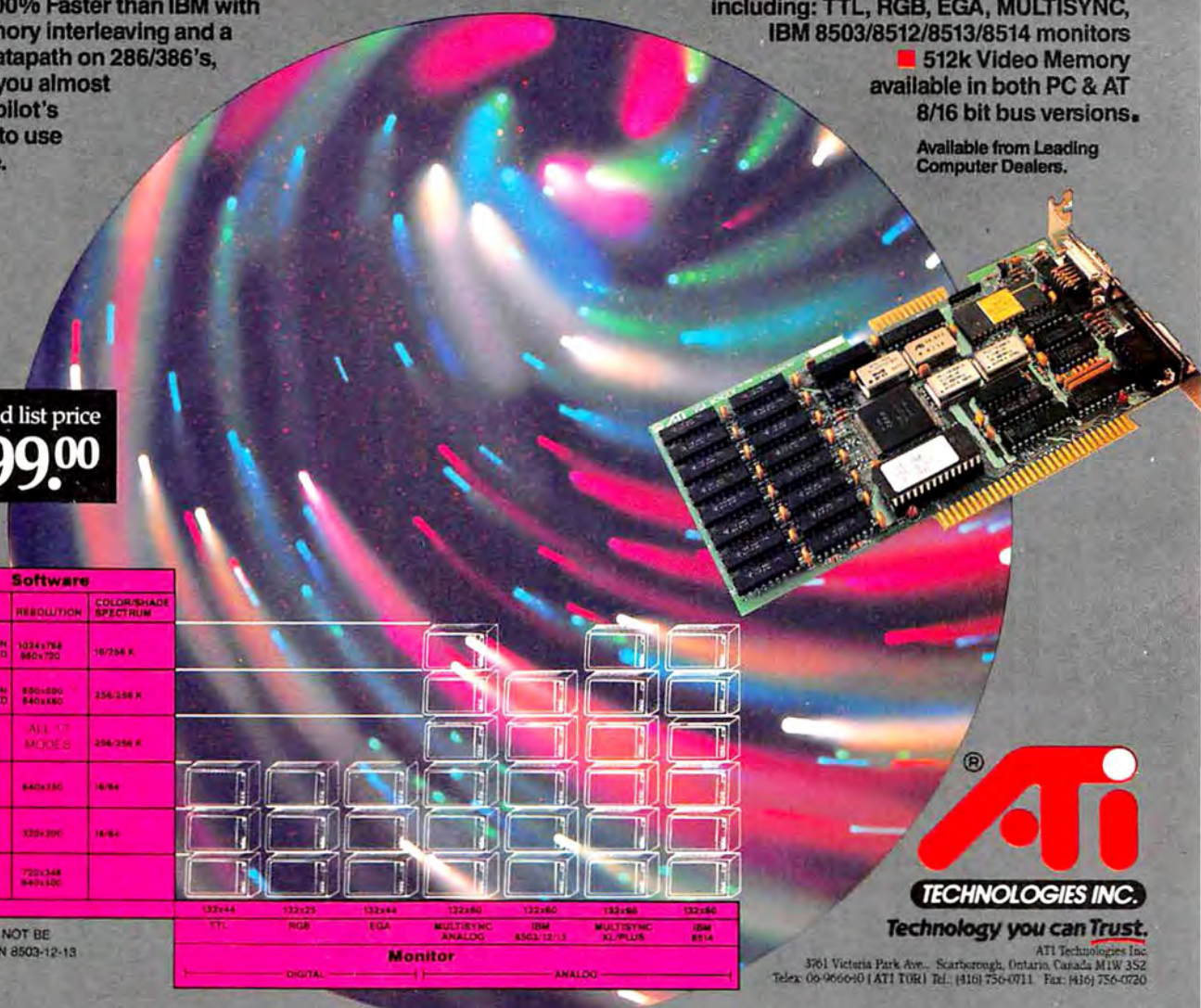
First the EGAWONDER™ NOW...

VGAWONDER™

The Second Wonder of the World

- Exclusive "Plug & Go" with automatic self-configuration. Switchless Parameter memory retention, means easy installation.
- 100% Hardware & BIOS compatible with IBM at VGA, EGA, CGA, MDA & Hercules means no surprises, all IBM PC-compatible software runs.
- Up to 800% Faster than IBM with 1:1 memory interleaving and a 16 bit datapath on 286/386's, means you almost need a pilot's license to use this one.
- Supports 1024x768 Hi-resolution on standard Multisync type monitors.
- More colors at higher resolutions with ATI custom software drivers for popular desktop & CAD applications.
- Displays 132 Columns software on *any monitor*, including: TTL, RGB, EGA, MULTISYNC, IBM 8503/8512/8513/8514 monitors
- 512k Video Memory available in both PC & AT 8/16 bit bus versions.

Available from Leading Computer Dealers.



suggested list price
$699.00

Software		
	RESOLUTION	COLOR/SHADE SPECTRUM
ATI HI-RESOLUTION DRIVERS SUPPLIED	1024x768 960x720	16/256 K
ATI HI-RESOLUTION DRIVERS SUPPLIED	800x600 640x480	256/256 K
VGA	ALL 17 MODES	256/256 K
EGA	640x350	16/64
CGA	320x200	16/64
MDA	720x348 640x400	

LINES OF TEXT	132x44	132x25	132x44	132x60	132x60	132x60	132x60
	TTL	RGB	EGA	MULTISYNC ANALOG	IBM 8503/12/13	MULTISYNC XL/PLUS	IBM 8514
Monitor							
	DIGITAL			ANALOG			

* 800 X 60 CAN NOT BE DISPLAYED ON 8503-12-13

ATI®
TECHNOLOGIES INC.
Technology you can Trust.

ATI Technologies Inc.
3761 Victoria Park Ave., Scarborough, Ontario, Canada M1W 3S2
Telex: 06-966640 (ATI TOR) Tel.: (416) 756-0711 Fax: (416) 756-0720

Trademarks: ATI, VGA WONDER, EGA WONDER – ATI Technologies Inc.; Multisync – NEC Home Electronics Inc.; AUTOCAD – Autodesk Inc.; WINDOWS – Microsoft Inc.; GEM – Digital Research Inc.; VENTURA – Xerox Corp.; AUTOSHADE – Autodesk Inc.; IBM, VGA, EGA, CGA – International Business Machines Corp.

Circle 302 on reader service card

THE HELP SCREEN

PC World offers answers and advice at every level

Meet the Chargecard solution to 80286 memory expansion, switch from serial to parallel with a batch file, put a hard disk in the PS/2 Model 30, give old files a new date, mate a monochrome monitor with an EGA, and untangle a twisted definition.

Karl Koessel

Adding Memory to the PS/2 Model 50

Q. *What's the best, most economical way for me to augment the memory of my IBM PS/2 Model 50? Although I've read—and to some extent understood—a few articles regarding expanded or extended memory, I'm still unclear about what would suit my needs.*

I'd like to be able to run Microsoft Windows *or perhaps Quarterdeck Office Systems'* Desqview *multitasking environment, together with my word processor and data base. I don't intend to connect to a network or run OS/2.*

Ted van Ravenswaay
Tiburon, California

A. First, remember that some memory boards provide only extended memory, others only expanded memory, and still others can be configured either way. If you aren't going to run OS/2, you don't need extended memory, but having a board that can be set up as either expanded or extended memory is clearly the best way to keep all your options open. Note also that most older expanded memory boards support only the Lotus/Intel/Microsoft Expanded Memory Specification 3.2 (LIM 3.2). They are not capable of fully supporting LIM 4.0, which manages 32MB (versus LIM 3.2's 8MB) and makes it possible to run programs in expanded memory. (Version 3.2 boards can't run programs bigger than 64K in expanded memory.)

Entry-level Model 50s and Model 60s come with 1MB of memory, of which the first 640K is conventional (user) and the remaining 384K is extended. If you add the IBM PS/2 80286 Expanded Memory Adapter (or a third-party Micro Channel extended/expanded memory adapter) and a memory-management driver such as Quarterdeck's QEMM-50/60, you'll have expanded memory available for those programs that can use it. But for the best performance when using LIM 4.0–compatible expanded memory to multitask applications with *Desqview*, you have to disable the 1MB of motherboard RAM that comes installed in your Model 50.

Older versions of *Microsoft Windows* can use up to 640K but can't exploit extended memory. Even the new version, *Microsoft Windows/286*, lets you use only 50K of your PS/2's 384K of extended memory.

One solution to all the confusion about conventional, extended, and expanded memory is ALL Computer's Chargecard. Once it's installed in your 80286 system, you needn't worry about the difference between extended and expanded memory; nor must you disable the motherboard's conventional or extended memory.

(continues)

ANTHONY RUSSO

This deft memory-management module gives LIM 4.0 capability to as much as 16MB of the memory—conventional, extended, and expanded—installed in your system. This means you can get optimum use out of *Desqview* without losing your PS/2's 1MB of motherboard RAM. When running *Windows*, you have over 530K of free RAM for non-*Windows* applications without the slowdown of swapping *Windows* to disk.

The Chargecard also gives you up to 960K for DOS. (For those programs that write to video, an included utility does a one-time conversion before running them in a DOS space that extends beyond the beginning of the video buffer.) You can map slow ROMs into faster RAM; for example, you can make your EGA run faster.

The Chargecard is smaller than a business card. To install it, you pull out your Model 50's 80286, lay the Chargecard in the socket, and plug the 80286 into the Chargecard. Bundled with the Chargecard, you get a TSR manager that lets you tuck memory-resident programs into the free spaces above 640K that aren't occupied by the video buffer, the option ROMs, or the BIOS ROM. The TSR manager can also stow network drivers in that upper memory, freeing up RAM to let you run large programs on your network server. And if you do decide to install OS/2 (or some other protected-mode operating system, such as UNIX), you'll still be able to use all of your system's memory, without having to change a single switch.

WHERE TO BUY

ALL Chargecard
ALL Computers Inc.
21 St. Clair Ave. E #203
Toronto, Ontario
M4T 1L9 Canada
800/387-2744 for orders only,
416/960-0111
List price: $399
Requirements: pin-grid array 80286 or either an adapter for a leadless chip carrier or an adapter for a plastic, leaded chip carrier (adapters $100 each)
Warranty: five years
Extended warranty: none
Technical support: unlimited phone support, no toll-free number
Other support services: user BBS 416/960-5426, M–F 6 p.m.–8 a.m., 24 hours on weekends

IBM PS/2 80286 Expanded Memory Adapter
IBM
5201 S. Congress Ave.
Boca Raton, FL 33431
305/998-2000
List price: $1460
Requirements: IBM PS/2 Model 50 or 60 or compatible
Warranty: one year
Extended warranty: possibly free if your PS/2 has a service contract; ask your IBM sales representative
Technical support: ask your IBM sales representative
Other support services: ask your IBM sales representative

QEMM-50/60
Quarterdeck Office Systems
150 Pico Blvd.
Santa Monica, CA 90405
213/392-9851
List price: $59.95
Requirements: IBM PS/2 Model 50 or 60 or a compatible
Technical support: unlimited phone support (no-wait priority service $30), operates M–F 9–5, no toll-free number
Other support services: fax (preferred), user BBS, CompuServe, BIX, MCI Mail

For more information, see Products Featured in This Issue.

Switch From COM1: to LPT1

Q. *I've written a pair of batch files for switching between the parallel and serial printers attached to the office PC. COM_PRT.BAT, which contains the command MODE LPT1:=COM1:, selects the serial printer, and works properly. However, if the parallel printer is off or disconnected, the command MODE LPT1:80,6 in PRL_PRT.BAT causes the batch file to hang, necessitating a reboot. Is there any way to get PRL_PRT.BAT to select the parallel printer even when that printer is turned off?*

Fred Sohiel
Washington, DC

A. Just remove the 80,6 from PRL_PRT.BAT's MODE command and everything should work just fine. Those numbers represent the desired number of columns (80) and lines per inch (6). When the printer is off or disconnected, it can't acknowledge the printer control codes that the MODE command sends to set those parameters. However, there's no need for your batch file to set them: Your parallel printer uses those values by default, and your applications set up the printer appropriately before printing. So just use the command MODE LPT1: to tell DOS that printer output should be directed to the parallel port. MODE LPT1:,,P does the same and also sets infinite retry on printer time-out.

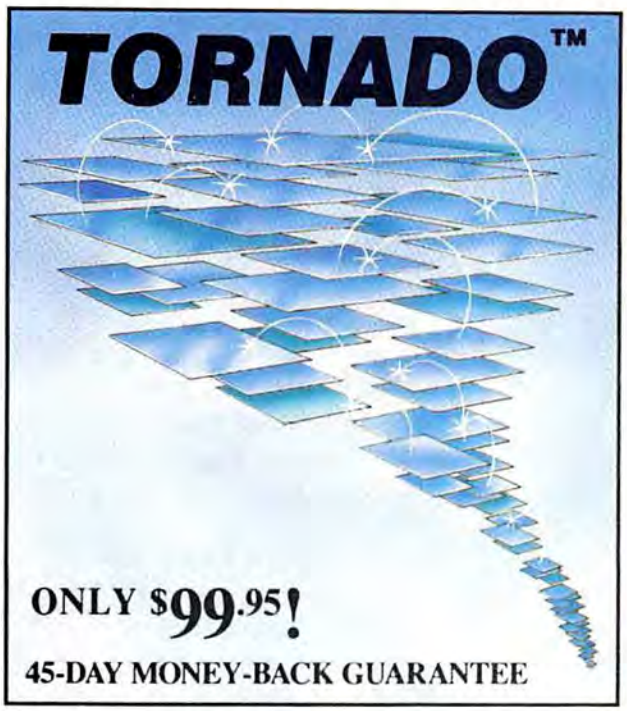
A more elegant alternative would be for you to use one batch file instead of two. Using GETKEYD.COM from this month's

(continues)

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

Instead of one window or ten, imagine up to 25,000! It's like extra memory...for your brain! The uses are endless. If you can "type" it—you can "Tornado" it. And because it's memory resident (if you choose) you can quickly jump in from other programs—even move information between them. All this power, yet reviewers agree you can start "Tornado-ing" in 15 minutes—not 15 days.

"Excellent Excellent Excellent Excellent"
PC World, Patrick Marshall

"one of the niftiest ... programs I've ever seen."
BYTE, Jerry Pournelle

"Excellent value"
InfoWorld, Review Board

"Editor's Choice"
PC Magazine

■ Productivity Tool

To reach your goals, you need tools that maximize your productivity and help you make your best decisions. Tornado fits the bill perfectly. In fact user surveys show you may well use Tornado more than any other software package! Order today risk-free.

To order call:

(800) 342-5930

Technical questions & NJ: (201) 342-6518
Fax: (201) 342-0370

MICRO LOGIC CORP.

Dept. T99 , **100 2nd St., POB 70**
Hackensack, N.J. 07602

☐ YES . . . I accept your offer. Send my copy of Tornado under the terms of your no-risk 45 day guarantee. (Tornado is not copy protected.)

____ Tornado $99.95
☐ 5¼" disk ☐ 3½" disk

(Please add $3.50 to help cover postage and handling. $10 outside USA & Canada. NJ residents add 6% tax. No purchase orders.)

Name _____
Address _____
City _____
State _____ **Zip** _____
Phone _____
Payment: VISA MC CHECK
Credit Card Expiration _____
Card # _____

For even faster service, credit card holders may call this number: 800-342-5930.

Specifications: FEATURES: free-form & predefined windows, scrolling within window, import & export to files & screens, cut & paste, auto word wrap, time & date stamp, move & join & dup windows, mono or selectable color, definable Hot-key or non-resident, unloadable, LAN support, context help, extended ASCII, smart fully adjustable windows, parrallel text processing, progressive resolution and "and-or-not" like searching without keywords, and more. **COMPATIBILITY:** IBM-PC/XT/AT/PS2 and compatibles; mono, CGA, 80 col EGA, and Hercules displays; 60K minimum RAM. **CAPACITY:** Up to 500 windows and 50K per pile - 50 piles. Not copy protected.

© 1988 Micro Logic. European marketing by Atlantex Inc. (203) 655-6980. Trademarks: IBM-PC XT/AT/PS2-IBM

```
echo off
if x==%1x goto nochoice
if S==%1 goto serial
if P==%1 goto parallel
if s==%1 goto serial
if p==%1 goto parallel
goto nochoice
:serial
mode lpt1:=com1:
goto end
:parallel
mode lpt1:,,p
goto end
:nochoice
cls
echo Please press either P or S to select
echo the parallel or the serial printer.
GETKEYD
if errorlevel 116 goto :nochoice
if errorlevel 115 goto serial
if errorlevel 113 goto :nochoice
if errorlevel 112 goto parallel
if errorlevel 84 goto :nochoice
if errorlevel 83 goto serial
if errorlevel 81 goto :nochoice
if errorlevel 80 goto parallel
goto nochoice
:end
```

LISTING 1: PRINTER.BAT uses GETKEYD.COM from this issue's Star-Dot-Star column to switch between parallel and serial printers.

Star-Dot-Star column, PRINTER.BAT in **LISTING 1** enables the user to enter PRINTER P to choose the parallel printer or PRINTER S to choose the serial printer. If the user enters just PRINTER, the batch file prompts the user to select *P* or *S*.

Model 30 Hard Disk

Q. *After several years of having others polish my handwritten reports into a presentable form in a fraction of the time it took me to handwrite them in the first place, I bought an IBM PS/2 Model 30 with two disk drives. At the time, it seemed sufficient, but now I find I need a hard disk.*

What kind should I get? Where do I get the best buy? Can I install it myself? And as long as I'm asking questions, what can be done to display Lotus 1-2-3 *graphs in color?*

Samuel J. Cullers
Sacramento, California

A. Let's take the last question first. The Model 30 (like the Model 25) uses an MCGA chip to produce video output. The Lotus drivers for *1-2-3* do not display graphs in color on PS/2s that use the MCGA but lack a video adapter. If you really must have color, you can add a VGA board from IBM or a third party.

Now for the hard disk: Although IBM sells a Model 30 that has an 80ms 20MB IBM hard disk, the company does not market a hard disk upgrade for that model. For the right price, you might be able to convince a dealer to swap one of your PS/2's floppy drives for a hard drive from one of his Model 30s. Because the Model 30's hard drive has an integrated controller, it doesn't require an expansion slot, but you do lose the second floppy. Alternatively, you can install Western Digital's PS25/20i, its hard disk upgrade kit for the Model 25. This 20MB drive also replaces the second floppy, and its controller uses one of the three expansion slots. The upgrade kit includes the WDPS30-BEZ hard drive faceplate (bezel), which replaces the floppy drive's faceplate.

If you don't want to give up that second floppy, there are other options. Any hard disk that works in an XT ought to work with your Model 30. External drives and hard disk drives mounted on an expansion card are readily available. Keep in mind that some hard disk cards are thicker than the width of one slot and may make it impossible to install an expansion card in the neighboring slot. With only three slots in the Model 30, you'll probably want to avoid such cards. Don't forget that the Model 30 has a relatively small power supply. If you have (or expect to have) other expansion cards, you'll want a hard disk that draws little power or packs its own supply.

WHERE TO BUY

PS25/20i
Western Digital
2445 McCabe Way
Irvine, Ca 92714
800/847-6181, 714/863-0102
List price: $525

(continues)

ne One Scanner That Takes our Jobs From Start To Finish.

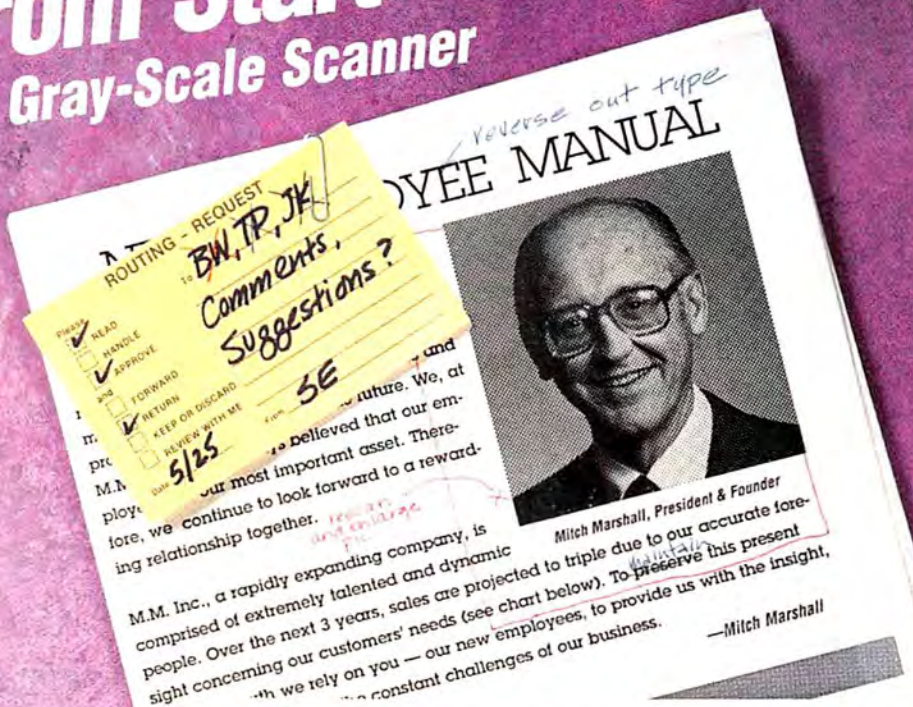
icrotek's MSF-300G Gray-Scale Scanner

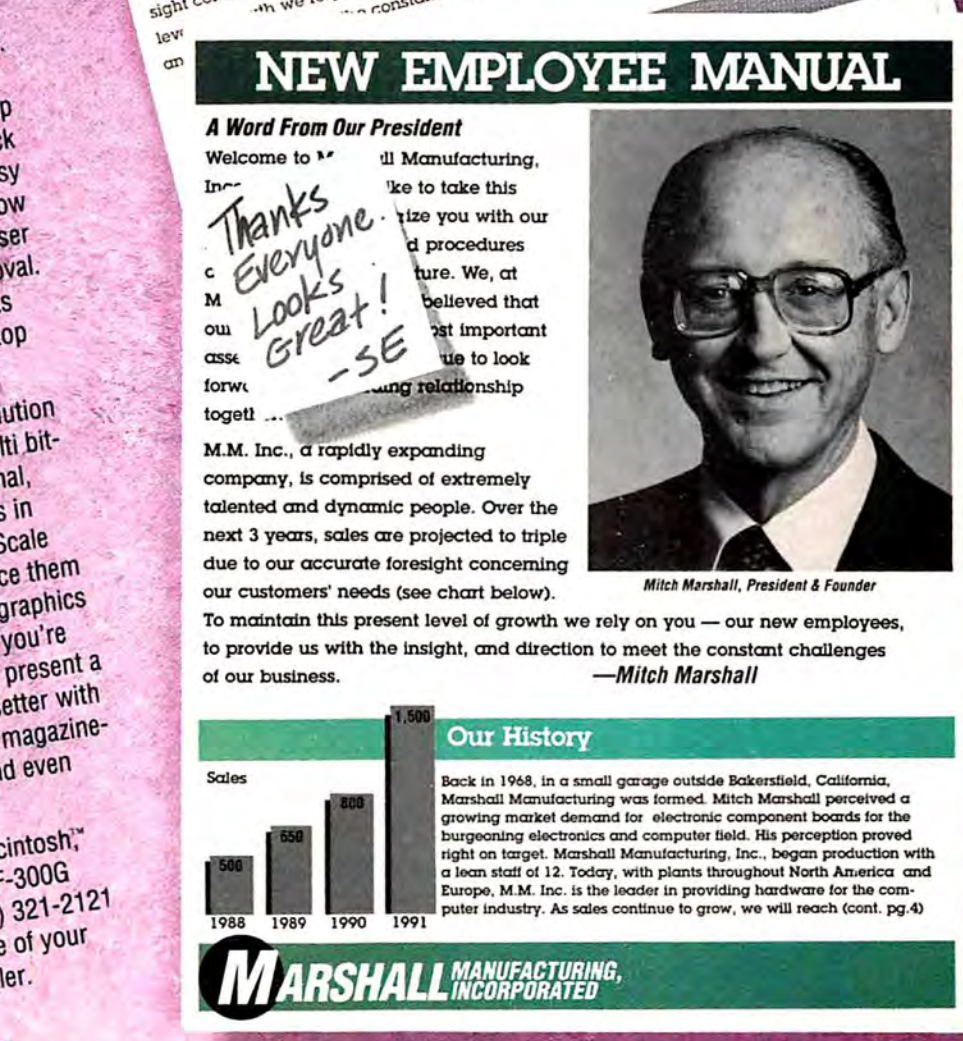
Now, instead of pasting up images or sending photos out to be halftoned, the versatile **Microtek MSF-300G Gray-Scale Scanner** lets you complete your documents right at your desk.

Because many of your jobs may require revisions, you can create proofs using the MSF-300G in its single bit-per-pixel mode. Scan charts, logos and photos quickly in up to 64 shades of gray, without taking up a lot of disk space. The MSF-300G's quick and accurate OCR capability makes it easy to add text to your document as well. Now you get clear, crisp proofs from your laser printer at 300 dpi for routing and approval. In most cases these high quality results will be perfect for your everyday desktop publications.

When you need sharper, higher-resolution images, use the MSF-300G in its multi bit-per-pixel gray-scale mode. Create final, "camera-ready" artwork with photos in place in up to 256 shades of gray. Scale your images up or down, or enhance them by using sophisticated gray-scale graphics editing software programs. When you're ready to print, the MSF-300G can present a PostScript® equipped phototypesetter with enough information to produce "magazine-quality" halftones at 150, 175 and even 200-line screens.

Find out how to equip your Macintosh,™ IBM® PC or PS/2™ with an MSF-300G Gray-Scale Scanner. Call (213) 321-2121 or 800-654-4160 for the name of your local authorized Microtek dealer.





MICROTEK

16901 South Western Avenue

Macintosh of Apple Computer, Inc. IBM, PS/2 of International Business Machines Corp

Dealers circle 111 on reader service c

DESKTOP PUBLISHING

MOVES LIKE LIGHTNING

- Are you getting early alerts on new technology?
- Will the products you invest in be worth the cost?
- Will they suit the needs of the people who ultimately work with them?
- How can you tell if you're throwing away good money on bad technology?
- Do you have time to search all the important computer publications for specific information on desktop publishing?

The constant flow of new technology in publishing platforms, software applications, printers, and page description languages continues to raise the stakes in document quality, marketplace competition, and production costs. It's easy to get zapped. ***But there is a way to protect yourself.***

DESKTOP PUBLISHING, *Bove and Rhodes' Inside Report*, is the intelligence pipeline for people who make strategic and purchasing decisions. This monthly newsletter gives you product evaluations, market analysis, and news commentary. Written in plain English, the report makes it easy to determine which technologies, both existing and emerging, will help you. Beyond straight reporting, you get candid personal observations and accurate predictions.

Editors Tony Bove and Cheryl Rhodes attend the major trade events and make on-site visits with both major and up-and-coming vendors and developers. Their quick alerts to the trends and bends in the marketplace help you formulate strategies that work.

A twelve-month subscription is $195. That's less than the price of a one-day professional consultation—and you get a year's worth of advice from the leading industry experts on desktop publishing. Remember, desktop publishing moves like lightning, so don't get zapped. Stay illuminated—and protected. Subscribe today.

DESKTOP PUBLISHING,™ *Bove and Rhodes' Inside Report*, is published by PCW Communications, Inc., publisher of *PC World, Macworld, Publish!* and *Macintosh Today*.

DESKTOP PUBLISHING™
Bove and Rhodes' Inside Report
P.O. Box 10956
Palo Alto, CA 94303-0901

GUARANTEE

At any time during your initial subscription, if for any reason you decide that you aren't getting the rapid, reliable information you need, you may cancel and we will promptly ***refund the full price you paid.***

☐ **YES!** Please enter my subscription to DESKTOP PUBLISHING for 12 monthly issues at $195.

☐ My payment is enclosed ☐ Please bill me

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Please allow 4 to 6 weeks for delivery of your first issue. International subscriptions (not U.S. or Canada): Add $25 and prepay in U.S. funds through a U.S. bank.
Offer expires December 31, 1988.

55U8A

Requirements: IBM PS/2 Model 25 or Model 30, DOS 3.30 or a later version
Warranty: one year parts and labor
Extended warranty: none
Technical support: unlimited phone support, toll-free number
Other support services: none
For more information, see Products Featured in This Issue.

Old File, New Date

Q. *According to the DOS 2.10 manual, the command COPY* x:\path1\filename.ext + ,, y:\path2 *not only copies* filename.ext *from the* \path1 *directory of drive* x: *to the* \path2 *directory of drive* y:, *it also sets the copied file's directory entry with the current date and time.*

You can also update the date and time without copying the file by making the y:\path2 *(target drive and directory) parameters the same as the* x:\path1 *(source drive and directory) parameters.*

I've tried that command with three different versions of IBM DOS, with similar results. Each time, it changed the date and time, but it also truncated the file, resulting in an incorrect, unusable copy. Why doesn't this command work as documented?

R. Hygh
Alhambra, California

A. Look again at that section of the DOS 2.10 manual. It begins with the caution: "Remember to use the /B parameter whenever you use the plus (+) sign with non-ASCII files." An ASCII file may end with an ASCII 26, the ASCII end-of-file marker (also known as the EOF or a control Z). But a non-ASCII file (such as a program, an overlay, a driver, a graphics file, and so on) does not use an end-of-file marker. It may contain ASCII 26s, but they do not represent the end of the file.

When used without a plus sign, the COPY command by default assumes that there may be non-ASCII files to be copied and therefore doesn't check for an EOF. It copies a file according to the file size as listed in the directory. When used with a plus sign, the COPY command by default assumes you are updating or concatenating *ASCII* file(s) and copies up to the first ASCII 26.

Look back at your files that were accidentally altered. They *(continues)*

Speed Up Your Use of WORDPERFECT® By Over 250%!

SAMPLE TASKS	WORDPERFECT 5.0	AVERAGE TIME IN SECONDS* WORDPERFECT 5.0 WITH COMPANION	% TIME SAVED
Bold a paragraph start cursor in middle of par.	5	2	60
Bold and Underline a sentence cursor in middle	13	2	85
Delete Bold without moving cursor	10	2	80
Center a page without moving cursor	11	2	82
Move 7 words to cursor location	13	6	54
Bring a page of text in from a file	19	6	68
Change column width without moving cursor	36	10	72
Generate a Table of Contents (10 entries)	1 min. 29 sec.	30	66
Draw two same sized boxes beside each other	44	14	68
Copy 8 non-consecutive paragraphs Doc 1 to Doc 2	1 min. 45 sec.	19	82

AVERAGE TIME SAVED 73% = INCREASE IN PRODUCTIVITY 271%
*All tests run on AT compatibles with hard disks. Individual expertise will affect productivity.

Psyborne's Companion™ for WordPerfect 5.0 organizes hundreds of useful, powerful macros into a simple, intuitive system that will help you edit or do many complex tasks in WordPerfect faster and easier.

Companion for WordPerfect 5.0 can increase your WordPerfect productivity by over 250%.

- Easy to learn.
- Do all your editing fast.
- Many complex tasks become a snap.
- Simple install routine.
- Manual written in plain English.
- Tutorials that really work.

COMPANION FOR WORDPERFECT® 5.0

WE CHALLENGE YOU TO BEAT THE COMPANION TIMES

$65.00
(Companion for WordPerfect 4.2 also available.)

To Order Direct, Call or Write:

PsyBorne Inc
PsyBorne, Inc.
10941 Badger Court
Penn Valley, CA 95946
(916) 432-3771

WordPerfect is a registered trademark of WordPerfect Corporation, Orem, Utah

Circle 149 on reader service card

are non-ASCII files. Because you used COPY with a plus sign, COPY assumed that the files were ASCII and copied them only up to the first occurrence of an ASCII 26. The /B parameter is used to override that default assumption so that COPY treats the file as non-ASCII. By using the /B parameter (COPY /B *x:\path\filename.ext* + ,, *x:\path*), you can amend the dates and times of files without cutting them short.

EGA-Driven Monochrome Monitors

Q. *There are several expensive EGA monochrome monitors, such as the Zenith ZVM-1240 and monochrome multiscan monitors. But are there any low-cost ones that can be used with a conventional EGA card?*

Do "enhanced" EGA cards deliver a decent image when displaying gray-scale substitutes for color on a monochrome monitor? Or do they produce images that suffer from flicker, partial display, blooming, or distorted aspect ratios when used with a TTL (digital) monochrome monitor?

Victor A.
Buffalo, New York

A. The EGA was designed to drive the original IBM Monochrome Display in two modes. Its text mode emulates the original Monochrome Display Adapter (MDA), delivering an 80-column, 25-row display with normal, inverse, blinking, bright, and invisible (black-on-black) characters in 9-by-14-pixel cells. The new EGA monochrome graphics mode generates 640-by-350-pixel graphics, with each pixel either on, off, blinking, or bright. This mode displays 80-column, 25-row text in 8-by-14-pixel cells. (These modes also support 80-column, 43-row text in 8-by-8-pixel cells.)

Many IBM Monochrome Display compatibles cost under $100. Chances are, if they produce an acceptably sharp display when driven by an MDA, they'll produce an equally clear display when used with an EGA. Of course, the quality of the EGA will also affect the image.

Many "enhanced" EGAs do suffer the problems you've de-

(continues)

3M Authorized Distributor Magnetic Media Division

PACKED 10/BOX (2 Box) (5 Box) (10 Box)

5¼" DOUBLE SIDE — HIGH DENSITY * 7.95 7.60 7.30 * 16.45 15.70 15.00

3½" DOUBLE SIDE (1 MB) 17.50 16.95 16.50 HIGH DENSITY (2 MB) 42.95 40.95 39.50

CALL FOR DATA CARTRIDGE PRICE QUOTES

8" SS·SD W/WP 17.95 17.15 16.45 SS·DD W/WP 20.70 19.95 19.15 DS·DD W/WP 23.40 22.55 21.65

Diskette Connection — Delaware 1-800-451-1849 PO BOX 1024?, WILMINGTON, DE 19850 — Oklahoma 1-800-654-4058 P.O. BOX 1674, BETHANY, OK. 73008 — Nevada 1-800-621-6221 PO BOX 12396, LAS VEGAS, NV 89112 — TELEX(4933362) — — — FAX(405-495-4598)

Minimum order $25.00 "No Surcharge on Visa MasterCard" COD orders add $3.00. Surface Shipping UPS add $3.00 per 100 for 3½" or 5¼", add $4.00 per 100 for 8" U.S. Mail delivery add 5%. "Prices subject to change without Notice."

Take the byte out of data loss with Verbatim A Kodak Company DataLifePlus™ & DataLife.

5¼" Double Side Double Density — DataLifePlus Teflon & PC Formatted 2 Box 7.95 5Box 7.60 10Box 7.30 — 9.50 8.95 8.65

HIGH DENSITY Preformatted for AT 14.65 13.90 13.30

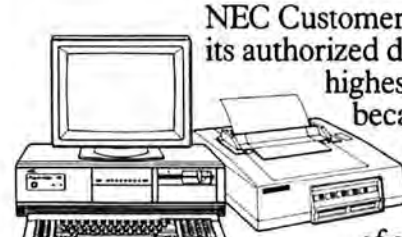
(Packed 10/Box) 2 Box 5Box 10Box

3½" Single Side 11.95 11.50 10.95 Double Side 16.50 15.95 15.50 High Density 42.95 41.95 39.95

Diskette Connection — Delaware 1-800-451-1849 PO BOX 1024?, WILMINGTON, DE 19850 — Oklahoma 1-800-654-4058 P.O. BOX 1674, BETHANY, OK. 73008 — Nevada 1-800-621-6221 PO BOX 12396, LAS VEGAS, NV 89112 — TELEX(4933362) —— FAX(405-495-4598)

Circle 60 on reader service card

WHY TRUST OUTSIDERS WITH THE INSIDE OF YOUR NEC COMPUTER OR PRINTER.



NEC Customer Engineering and its authorized dealers offer you the highest quality service because we know your NEC equipment best. NEC has a wide range of service options, high quality parts, and comprehensive maintenance contracts. Call us, and find out about the many ways NEC Information Systems takes care of its own.

Service Excellence Through People, Pride and Professionalism℠

1-800-325-5500

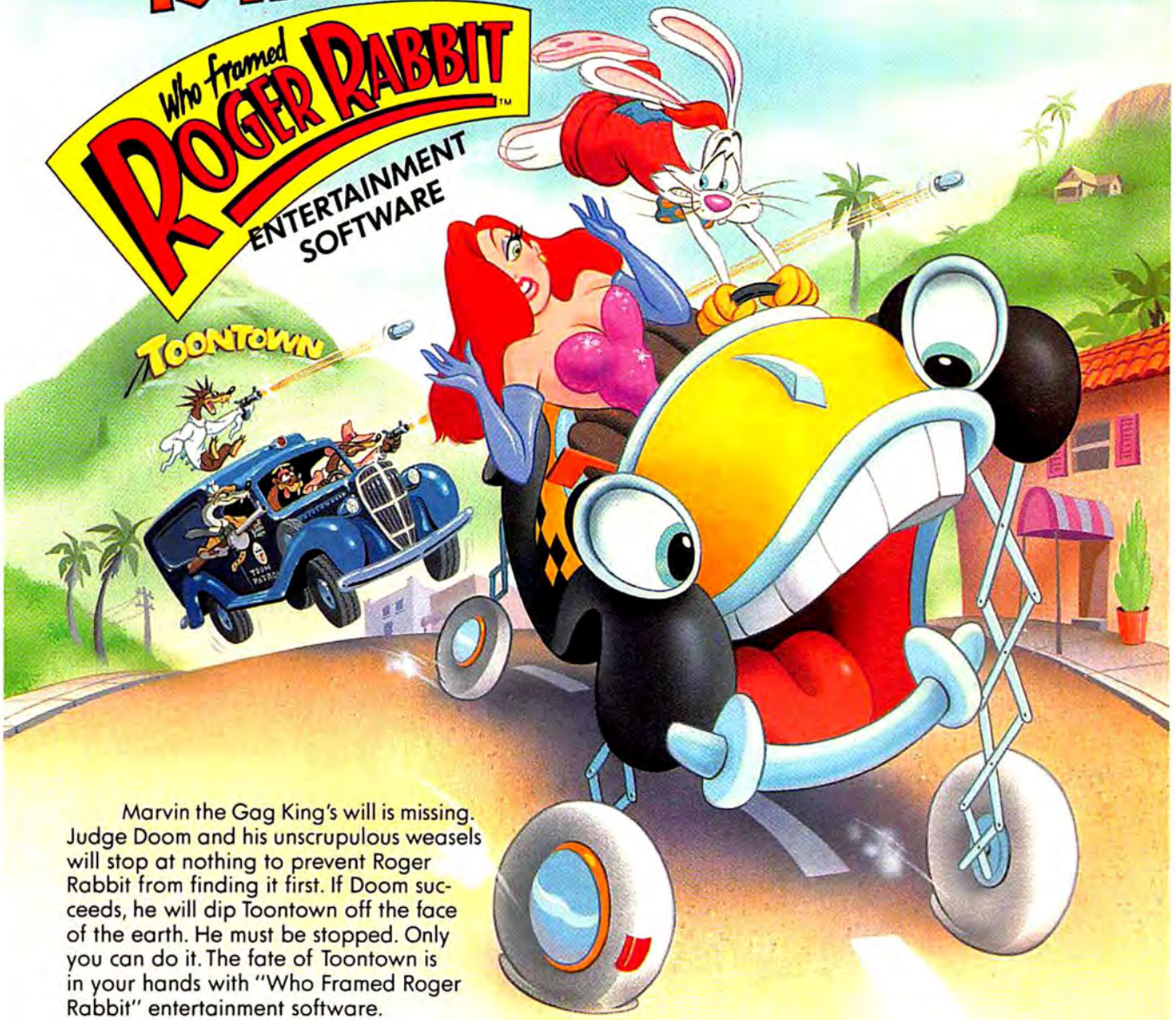
NEC

C&C

THE FATE OF TOONTOWN IS IN YOUR HANDS!

Who framed ROGER RABBIT™

ENTERTAINMENT SOFTWARE



Marvin the Gag King's will is missing. Judge Doom and his unscrupulous weasels will stop at nothing to prevent Roger Rabbit from finding it first. If Doom succeeds, he will dip Toontown off the face of the earth. He must be stopped. Only you can do it. The fate of Toontown is in your hands with "Who Framed Roger Rabbit" entertainment software.

It's a fast-paced, action-packed adventure that's **more** than an arcade game. Stunning graphics, high quality animation and sound effects put you "in Toon" with Toontown's fate.

Can you defeat Judge Doom? Are you going to let him get away with this? It's up to you. And remember, Toons are idiotic—but they're not stupid!

Ask for "Who Framed Roger Rabbit" at a software dealer near you. The future of Toontown depends on it!

Available Now:
IBM PC/XT, AT, PS/2 and 100% Compatibles, Amiga, Commodore 64/128

Actual Amiga Screen

Actual IBM Screen

Actual Commodore Screen

Coming Soon:
Apple® II Series

Amiga, Commodore 64/128, IBM PC/XT, AT, PS/2, Apple® II Series are trademarks respectively of Commodore-Amiga, Inc., Commodore Electronics, Limited, International Business Machines, and Apple Computer, Inc.

BUENA VISTA SOFTWARE

© 1988 The Walt Disney Company and Amblin Entertainment, Inc.

Circle 36 on reader service card

From the publishers of PC WORLD and MACWORLD

BRING THE EXPERTS HOME

With QUICKRESULTS Video Training Guides

How many times have you wished someone would answer all your questions about a new computer application? Just an hour or two with an expert might save days of trial and error and thumbing through the manual.

Now you can get all the answers you want—and review them as often as you want—with these unique and easy-to-follow video guides. Each tape outlines the shortest path from square one to the finished product, and clearly conveys how to apply the program to your own needs. You'll learn quickly and comfortably, and you don't need your computer—just sit back and watch. It's like having the experts in your living room providing their best insights, tips, and techniques!

Whether you're a computer novice or an experienced user, there's no better way to get up and running!

ONLY $49.95 EACH

ORDER YOURS NOW!

Visa/MasterCard/American Express orders call

800-333-0901

Ask for operator 20

QUICK RESULTS! is a trademark of PCW Communications, Inc., and The Sterling Group.
Other brand and product names are trademarks or registered trademarks of their respective holders.

QUICKRESULTS VIDEO TRAINING GUIDES

Please send me the following QUICK RESULTS! Video Training Guides at $49.95 each:

For the IBM PC, PS/2 and compatibles:

Q & A_____
Word Perfect 5_____
Microsoft Works_____

For the Apple Macintosh™:

Apple HyperCard_____

Plus $3.95 shipping and handling_____
($5.95 outside U.S. mainland)

Format: ☐VHS ☐Beta

My check for $_____ is enclosed.
(Make payable to The Sterling Group)

____ Please charge my account:
☐VISA ☐MasterCard ☐American Express

Card # _____

Expiration Date _____

Signature_____

Name _____

Company _____

Address_____

City _____ State _____ Zip _____

Mail to: The Sterling Group, Box 750, Bristol, RI 02809. Please allow 4 weeks for delivery.

scribed, even when used in monochrome mode with a monochrome monitor. It may be that, in the rush to release timely products, their designers paid too much attention to adding enhancements and not enough to supporting basic features. Remember, though, that the EGA is relatively old. Reviews of first-release EGAs may not apply to a company's current product. If possible, check out prospective purchases with all your software before you buy.

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

POWER TIP NO. 16

Smartcom III Stores Data

Smartcom III's Peruse buffer automatically stores on-line session data, which remains in memory even after you're off line. However, when you terminate a session—a separate step—the program clears the buffer without warning. To save the contents of the buffer, press <F6> to access the Peruse Buffer, then press <Ctrl>-<Page Up> to move the cursor to the top of the buffer. Now, block the contents by hitting <Alt>-S<Ctrl>-<Page Down><Alt>-S. Press <F3> to display the Peruse menu, and select either E to copy the block to the text editor or W to write it to disk.

Wes Nihei
Assistant Editor

R&R Worksheet Report Writer™

Create presentation-quality reports in any layout, quickly, directly from Lotus® database worksheets.

R&R handles the tedious and time-consuming tasks of creating and modifying reports. It is full-featured and flexible, so you can concentrate on making reports show exactly what you want to show, in exactly the way you want to show it. Monthly sales analyses, purchase orders, mailing labels, inventory cost summaries, most active accounts, employee benefit listings, even invoices and form letters.

Place fields and text in any layout. Do complex calculations. Print up to eight levels of subtotals. Report from up to 10 related databases at once. Lotus-like menus make it easy.

Use standard field formats such as currency, commas, and word-wrap, or create your own. Print in underline, **bold**, *italics*, and *different fonts*. R&R has hundreds of features for fast results with Add-in convenience.

Only $149!
Satisfaction guaranteed.*

To order, or for more information and the name of your nearest dealer, call:

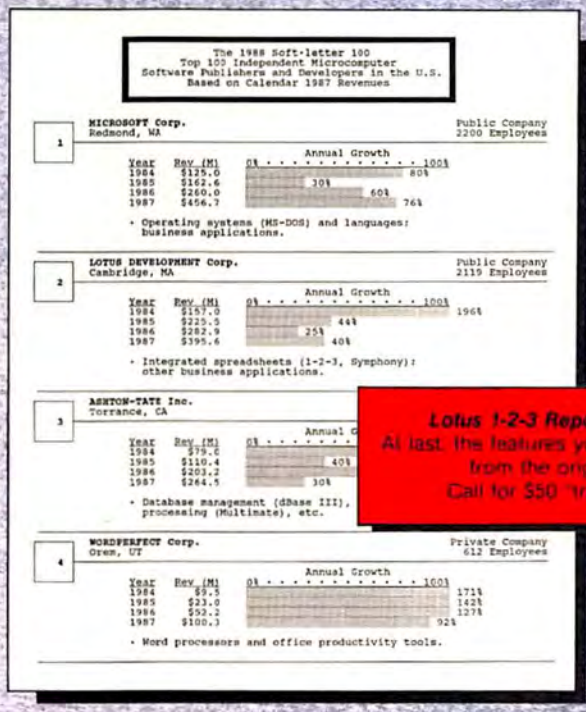
800-325-9035

In Mass., call 508-366-1122.

*If you aren't satisfied for any reason, return R&R within 30 days of purchase for a refund (if purchased directly from Concentric or an Authorized Reseller). R&R works with 1-2-3® and Symphony® on IBM® PCs and compatibles with PC-DOS 2.1 or later and a hard disk. Requires 20 KB of available memory for use as a Lotus Add-in, and 320 KB for stand-alone use. Operates on networks that support the NETBIOS standard. 3.5" media available at extra cost. R&R dBASE® version also available.

Concentric Data Systems, Inc.
18 Lyman Street
Westboro, MA 01581-4063

A Lotus database is a range or an entire worksheet having field names in the first row and records of data in rows below.



A report is any printout or screen display of data from your database. Anything beyond simple listings of data requires complex macros, or can't be done with Lotus.

Lotus 1-2-3 Report Writer™ Users:
At last, the features you've been waiting for, from the original authors.
Call for $50 "trade-up" details.

A report writer is a tool that lets you specify what data to select, what additional calculations to perform, where to place everything, and exactly how it should look.

Trademarks: Lotus, 1-2-3, Symphony, Lotus Report Writer by Lotus Development Corporation; IBM by International Business Machines Corporation; dBASE by Ashton-Tate; R&R Relational Report Writer and R&R Worksheet Report Writer by Concentric Data Systems, Inc.

Circle 181 on reader service card

HOLD EVERYTHING!™
NOW THE MAGIC OF FAST INFORMATION IS AT YOUR FINGERTIPS!

Hold Everything!™ An Amazing RAM-Resident Personal Information Manager New from Dac! Everybody needs to remember people, places, things and events. And discarding an important phone number, misplacing a folder, or losing a business card can cost you time and money. Now you can throw away those scraps of paper, rid your desk of the clutter and give your memory a rest. Hold Everything! is a remarkable personal information manager that will revolutionize the way you organize your home or business. Hold Everything! lets you store data and then magically transforms it into meaningful records in the blink of an eye.

Easy to install. Fun to use. Designed for home or office. This RAM-resident program allows you to immediately recall information in just a couple of keystrokes. Dazzle your friends and impress your colleagues and clients with "tip of the tongue" information.

'Thank you for inventing this product! It has not only made us more productive, but more profitable!" writes Alan Weinkrantz, Consultant.

Minutes after installation, you can begin to enter data by using the predefined format fields or create your own. Setting up multiple files and organizing each differently is limited only by your imagination. Be amazed with the use of hot keys for instant access to your data.

"Dynamite! It may be the best software program I have ever used. For anyone in a people oriented business or profession, it is an absolute must."
Frank J. Johns
Director, HighFlight Ltd., Inc.

Hold Everything! lets you be in control of the things that need remembering!

"Fast and convenient. It has good report capabilities, can churn out mailing lists, and easily switches between separate data bases," wrote Computer Software News.

Hold Everything! allows for custom reporting with printing and screen-viewing capability. Custom labeling and envelopes are a snap, because enhancing your professional image is at your fingertips.

Now The Magic of Hold Everything!™ and DacEasy™ Word Combined! Easily transfer any or all of your files from Hold Everything! into DacEasy Word to generate form letters with the Mail List Manager feature. Hold Everything! automatically creates the mail list file for easy mail merge processing. And, you'll find DacEasy Word the perfect partner for your business or personal use. Recognized for its simple installation and remarkable features, Word is one of the most intuitive word processors on the market today! You'll be amazed at its simplicity and fast performance featuring pull-down menus, context-sensitive help, dictionary, multiple windows, plus so much more.

"Like its number-crunching sibling (DacEasy Accounting), DacEasy Word doesn't skimp on features."
Chicago Tribune

Hold Everything! and Word — two outstanding DacEasy programs with incomparable value and quality. Together, a one-of-a-kind productivity package, that's hard to beat!

To order DacEasy™ Hold Everything! by mail send $99.95, DacEasy™ Word $69.95 to Dac Software, Inc. (address below). (Plus $7.50 shipping/Tx residents add sales tax/$17.50 shipping outside the U.S.)

DacEasy™

Call 1-800-992-7779
(In Canada, Call 519-747-9633)

Dac Software
17950 Preston Road • Suite 800 • Dallas, TX 75252

Insilco

30-Day Money Back Guarantee: Unconditional guarantee on all products bought directly from Dac Software (less shipping charges). Minimum Hardware Requirements: IBM PC/XT/AT or true compatibles. DOS 2.1 or later. Minimum 256K memory with two 360K floppies or one 720K floppy or hard disk. Monochrome, CGA or EGA display adaptor and monitor. Printer optional. *Context sensitive help not available with dual 360K floppy system. Trademarks: IBM PC/XT/AT, and EGA, CGA are registered trademarks of International Business Machines, Inc. DacEasy and Hold Everything! are trademarks 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 #205

STAR-DOT-STAR

.

A global exchange of personal computer discoveries

Cut waste with WordStar, teach your batch files to recognize keys, increase your AutoCAD comfort, simplify BASIC PRINTing, and get started with OS/2 software development.

Edited by Tom Swan

ANTHONY RUSSO

Waste Not, Want Not

Entering the same data more than once wastes computer and human resources. To reduce waste in our office, I've developed a collection of *WordStar* macros and templates that allows me to enter a name and address a single time for all my letters, labels, and envelopes.

I keep each name-and-address record on its own line in a nondocument ASCII-delimited file named ADDRESS.PAD [see sample in **FIGURE 1**]. To start a new letter, I first run INSADD-.BAT [**LISTING 1**] from the DOS command line (or after selecting Run from *WordStar*'s opening menu) by typing INSADD plus one or two names to identify a record. INSADD.BAT searches ADDRESS.PAD for the record containing those key names and copies that record to a temporary file, PADD.TXT. For example, typing *INSADD Star* locates this column's address. (If I need to modify the address before using it, I can edit PADD.TXT at this point.)

Once PADD.TXT has the record, I can use my four *WordStar* macros [**FIGURE 2**] and three templates [LTRFM, ENVELOPE, and LABEL in **FIGURES 3** through **5**]. Each macro uses the appropriate template to insert the name and address in the right place. From the opening menu, I press <Esc>-W to write the letter, creating the file LTR from the LTRFM template. Pressing <F10> saves the letter to disk and, again from the opening menu, <Esc>-P prints the letter, <Esc>-E prints an envelope, and <Esc>-L prints a label.

Paul Tempke
Doylestown, Pennsylvania

Editor's note: Create ADDRESS.PAD with WordStar's *nondocument option, or use* dBASE's *Delimited option with the COPY command to transfer names and addresses from a data base. Bring up* WordStar's *opening menu and enter the keystrokes shown in* **FIGURE 2.** *Edit the templates' dot commands to fit them to your letterhead and envelopes.*

All Keyed Up

Popular batch-file utilities that prompt for yes/no answers and return ERRORLEVEL values of 0 for no and 1 for yes can be too restrictive for many users. To handle a variety of single-key responses, I developed two simple programs. GETKEY.COM returns the ASCII code of a key press through ERRORLEVEL. GETKEYD.COM does the same and also displays characters as you type.

From the DOS prompt, create both programs with DEBUG by entering the bold text shown in

(continues)

```
Star-Dot-Star,PC World,501 Second St.,"San Francisco, CA 94107"
Customer Sales Service,MicroPro,P.O. Box 7079,"San Rafael, CA 94901-7079"
Ronald Reagan,The White House,1600 Pennsylvania Ave.,"Washington, DC 20500"
Pete Wilson,United States Senate,,"Washington, DC 20510"
Barbara Boxer,House of Representatives,,"Washington, DC 20505"
```

FIGURE 1: ADDRESS.PAD, a sample name-and-address file for use with LISTING 1

```
echo off
cls
if x==%1x goto end
if x==%2x goto next
find "%1" ADDRESS.PAD | find "%2" >PADD.TXT
echo off
cls
goto jump
:next
find "%1" ADDRESS.PAD >PADD.TXT
echo off
cls
:jump
echo Contents of File PADD.TXT
echo.
type PADD.TXT
:end
```

LISTING 1: INSADD.BAT searches ADDRESS.PAD (FIGURE 1) for one or two key names.

FIGURE 6. TESTGK.BAT [**LISTING 2**] demonstrates how to use the programs.

Matthew K. Behrens
Jenison, Michigan

Editor's note: As **LISTING 2** *shows, two tests are required to check for a specific key press. Because IF ERRORLEVEL is true for values equal to or greater than the desired value, you must first check for the ASCII code of the* next *highest character before checking for the ASCII code of any valid key press. In doing this you ensure, for example, that a* Z *does not pass for a* Y. *Also, when testing for multiple responses, always test higher ASCII values first.*

DEVELOPER'S TOOLBOX

Microsoft Leads With OS/2 Languages

Chalk one up for Microsoft—or make that six. With the introduction of the *OS/2 Programmer's Toolkit* plus upgrades for the company's five main languages—C, Pascal, Macro Assembler, BASIC, and FORTRAN—Microsoft has gotten off to a head start in the race to develop OS/2 software tools. (At press time, COBOL was added to the pack.)

Never mind that there's no competition or that few people use OS/2. If you want to dabble in OS/2 software development, Microsoft has the only game in town.

(continues)

```
<Esc>?
E
print>ENVELOPE<Enter>
MENVELOPE
<Ctrl>-P<Ctrl>-M<Ctrl>-P<Ctrl>-M
yn
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Esc>
<Enter>
L
print>LABEL<Enter>
MLABEL
<Ctrl>-P<Ctrl>-M<Ctrl>-P<Ctrl>-M
yn
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Esc>
<Enter>
P
print>LETTER<Enter>
MLTR
<Ctrl>-P<Ctrl>-M<Ctrl>-P<Ctrl>-M
yn
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Esc>
<Enter>
W
write>LETTER<Enter>
OLTRFM
<Ctrl>-P<Ctrl>-M
LTR
<Ctrl>-P<Ctrl>-M
y
<Ctrl>-P<Ctrl>-M
dLTR
<Ctrl>-P<Ctrl>-M
<Ctrl>-P<Ctrl>-QC
<Enter>
<Enter>
y
```

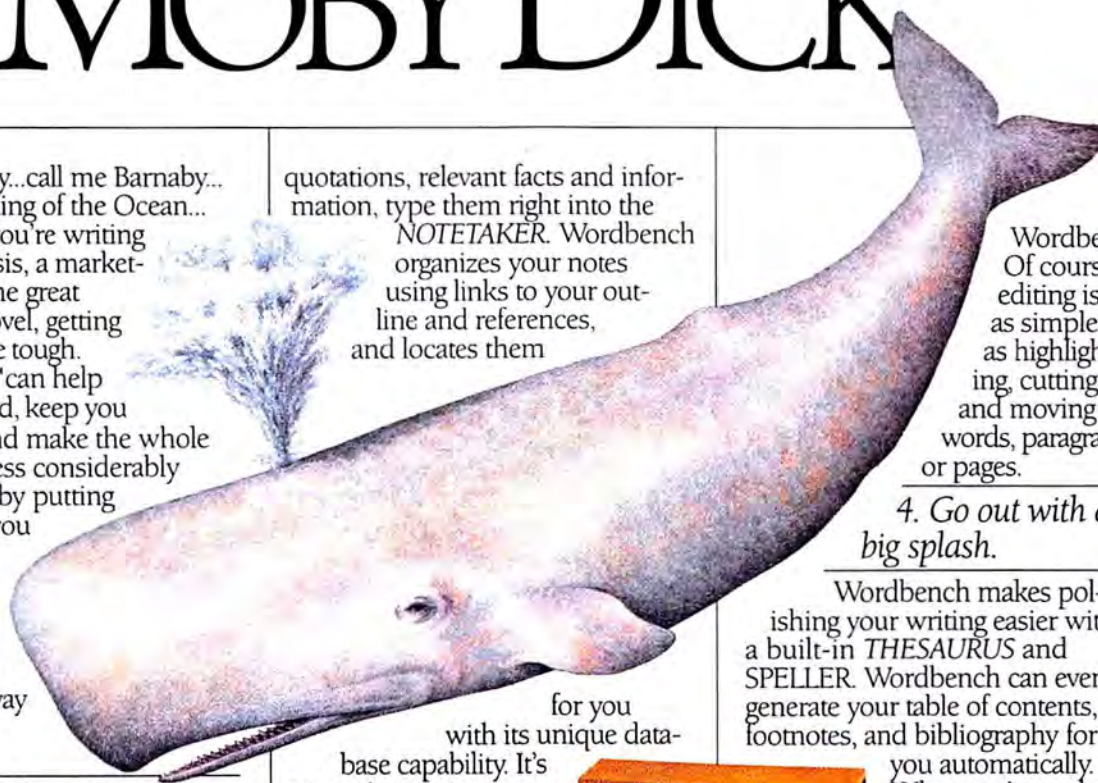
FIGURE 2: These WordStar macros print letters, envelopes, and labels using the mail merge templates in FIGURES 3 through 5.

```
.df PADD.TXT
.rv name,comp,address,city/st
.mt0
.pl56
                                    &@&

& Name/o        &
& Comp/o        &
& Address/o     &
& City/St       &
.mt8
.hm4
.pl66
.h1         & Name & -- page #
.op
```

FIGURE 3: LTRFM template

HOW TO WRITE MOBY DICK



Call me Ray...call me Barnaby... call me the King of the Ocean...

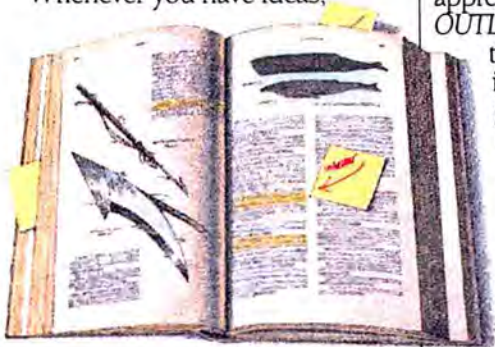
Whether you're writing a letter, a thesis, a marketing plan or the great American novel, getting started can be tough. Wordbench™ can help get you started, keep you organized, and make the whole writing process considerably less painful–by putting all the tools you need for the job within easy reach. And you don't have to change the way you work to use them.

1. Call me Ishmael.

If you loathe a blank page, Wordbench furnishes the first known cure: the *BRAINSTORMER*. It's a set of creative exercises proven to help you through writer's block.

2. Save the whales—make a note of that.

Whenever you have ideas, quotations, relevant facts and information, type them right into the *NOTETAKER*. Wordbench organizes your notes using links to your outline and references, and locates them for you with its unique database capability. It's a superior way to manage information—you'll never misplace or forget your notes again.

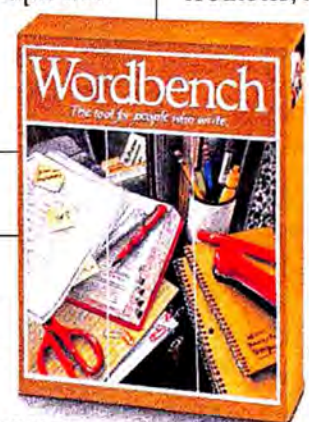


3. Thar she blows! Or maybe over thar...

If you find it helpful to organize your writing with an outline, you'll appreciate Wordbench's *OUTLINER*. You simply type in your headings once and edit or reorganize them whenever you like. No re-typing required. Then, stand back and let the WRITER pull it all together for you. The moment you see your notes and outline instantly merge into your rough draft, you realize the power of Wordbench. Of course, editing is as simple as highlighting, cutting and moving words, paragraphs or pages.

4. Go out with a big splash.

Wordbench makes polishing your writing easier with a built-in *THESAURUS* and SPELLER. Wordbench can even generate your table of contents, footnotes, and bibliography for you automatically. When you're ready to print, Wordbench's formatting features will give your work a professionally finished look. And let's face it, for most people the best part of a piece of writing is putting an end to it.



The most powerful tool for writing today is available wherever computer software is sold.

Call it Wordbench.

Wordbench™

The tool for people who write.™

ADDISON-WESLEY

Reading, MA 01867 (617) 944-3700

Available for Apple IIe/IIc/IIGS: $149
IBM PC (and 100% compatibles): $189
(Suggested retail prices.)

© 1988 Addison-Wesley Publishing Co.

Circle 150 on reader service card

MORE FREEDOM OF INFORMATION!

PC World Reader Service makes it easy to get all the free information you need to make sound PC purchase decisions.

Just look up the card in the back of this issue, find the product or company name in our product indexes, circle the right number(s) on the card, and mail it in.

We've even paid the postage. Information doesn't get any freer than that!

PC WORLD


```
.df PADD.TXT
.rv name,comp,address,city/st
.mt0
.po5
.lh16
& Name       &
& Comp       &
& Address    &
& City/St    &
```

FIGURE 4: ENVELOPE template

```
.df PADD.TXT
.rv name,comp,address,city/st
.mt0
.po35
.lh16
.pl20
.mb0
& Name       &
& Comp       &
& Address    &
& City/St    &
```

FIGURE 5: LABEL template

Even if you're not as eager as I am to get up to speed in OS/2 programming, the new Microsoft packages still have plenty to offer. Included with each language is the CodeView debugger with versions for both OS/2 and DOS. Also on disk are DOS and OS/2 versions of the Microsoft Editor, which is capable of emulating *WordStar*'s nondocument mode, as well as *Brief* and *Epsilon*. Apparently, this is the editor that Microsoft programmers use in-house. And, of course, all languages fully support DOS and OS/2 and can bind programs to run under either operating system or both.

This may come as a surprise to those who assume that OS/2 programs will not run under DOS. Of course, programs that call OS/2 functions, including those of the Presentation Manager, require OS/2. But by restricting function calls to the Family API, a DOS-compatible subset of the full OS/2 library, you can compile and bind a program to a single file that runs as a task under OS/2 or as a single application under DOS. The language manuals explain in detail how to accomplish this magic.

For those who want to write pure OS/2 applications, the *OS/2 Programmer's Toolkit* provides the necessary libraries and documentation. On disk are several sample programs, including games, a terminal emulator, and a text editor. Examining the C source code of these programs is a great way to learn OS/2 tricks and techniques.

(continues)

```
DEBUG <Enter>
-NGETKEY.COM <Enter>
-A <Enter>
xxxx:0100 MOV AL,00 <Enter>
xxxx:0102 INT 16 <Enter>
xxxx:0104 MOV AH,4C <Enter>
xxxx:0106 INT 21 <Enter>
xxxx:0108 <Enter>
-RCX <Enter>
CX 0000
:8 <Enter>
-W <Enter>
Writing 0008 bytes
-NGETKEYD.COM <Enter>
-A104 <Enter>
xxxx:0104 PUSH AX <Enter>
xxxx:0105 MOV AH,0E <Enter>
xxxx:0107 INT 10 <Enter>
xxxx:0109 POP AX <Enter>
xxxx:010A MOV AH,4C <Enter>
xxxx:010C INT 21 <Enter>
xxxx:010E <Enter>
-RCX <Enter>
CX 0008
:E <Enter>
-W <Enter>
Writing 000E bytes
-Q <Enter>
```

FIGURE 6: Enter the bold text to create GETKEY.COM and GETKEYD.COM.

You can rely on a file server for LAN communications...

All you need is patience. And faith.

You're getting the drift of this message already. File servers aren't designed to solve the PC user's communications problem. But now there's a system that is.

Now there's COMMIX™ 32.

It's a general purpose local area network for PCs and minicomputer hosts. It connects you with the host, other PCs, and peripherals such as printers, plotters, or modems through simple, pop-up menu commands.

For file transfer and E-mail as a background task. For printer spooling and sharing directly from your applications programs. For terminal emulation that's automatic. COMMIX 32 will let anyone perform common LAN tasks—without the need for expert assistance.

Install it quickly. Expand it easily.

Almost any PC user can install and connect with COMMIX. With each connection, you're saving time and money. Because each COMMIX connection costs as little as $150.

Then take advantage of expansion possibilities. With our optional Ethernet® Link Module, you can create larger LANs with thousands of users. And through our optional Wide Area Network Module, distant COMMIX LANs can appear as one network.

If you're lost at sea.

And looking for solid LAN. The COMMIX 32 is available now. Send us a message: ITRON, a Division of Infotron Systems Corporation, 130 Gaither Drive, Suite 116, Mount Laurel, NJ 08054.
TEL: (609) 722-5575 FAX: (609) 234-0451
In the United Kingdom: (01) 735-0731
In Europe: (2) 725-0770

1-800-423-8044

ITRON
An Infotron Division

COMMIX is a trademark of Infotron Corporation. Ethernet is a registered trademark of Xerox Corporation.

Circle 199 on reader service card

Of the five language upgrades, I'm most impressed with Microsoft BASIC and C, both of which come with their quick counterparts, QuickBASIC and QuickC, at no extra charge.

Not all is sweet with the Microsoft Pascal compiler, though. While much improved over previous releases, Microsoft Pascal still produces bloated .EXE files and slow code. I expected better. I won't soon be parting with my treasured Turbo Pascal, but until Borland and other language companies release their own OS/2 tools, I'll be using Microsoft Pascal to learn OS/2 concepts.

Want to get started in OS/2 development? Get any 80286 machine or, better by far, an 80386, plus an OS/2 version that runs on that system, the Macro Assembler, and the *Programmer's Toolkit*. For a high-level language, you can use BASIC, FORTRAN, or Pascal, but for serious OS/2 work, C is best.

For editing, I'll stay with *Brief*— although the new Microsoft Editor is more than adequate for most programming tasks. (An OS/2 version of *Brief* is in the works.) I'll probably use Turbo Pascal and DOS for creating prototypes, convert to Microsoft Pascal for OS/2 testing, and then rewrite in Microsoft C for the finished product.

Six months from now, I may have a different opinion. After all, this is only the first lap for OS/2 software developers, and we can expect strong competition from others now preparing OS/2 languages and tool kits. Until these products appear, however, Microsoft has this race in the bag. —*Tom Swan*

```
echo off
:ta1
echo Are you male or female? (M/F)
rem GETKEYD displays input
getkeyd
echo.
if errorlevel 110 goto err
if errorlevel 109 goto male
if errorlevel 103 goto err
if errorlevel 102 goto female
if errorlevel 78 goto err
if errorlevel 77 goto male
if errorlevel 71 goto err
if errorlevel 70 goto female
:err
echo Invalid response.
goto ta1
:female
echo You are a female.
goto ta2
:male
echo You are a male.
:ta2
echo Correct? (Y/N)
rem GETKEY does not display input.
getkey
if errorlevel 122 goto ta2
if errorlevel 121 goto end
if errorlevel 111 goto ta2
if errorlevel 110 goto uhoh
if errorlevel 90 goto ta2
if errorlevel 89 goto end
if errorlevel 79 goto ta2
:uhoh
echo Uh-oh. Either you answered incorrectly or
echo something's wrong with the GETKEY or GETKEYD files.
goto eof
:end
echo Files GETKEY and GETKEYD are probably okay.
:eof
```

LISTING 2: Batch file TESTGK.BAT tests the GETKEY and GETKEYD utilities (see FIGURE 6).

WHERE TO BUY

OS/2 Programmer's Toolkit
C Compiler 5.1
BASIC Compiler 6.0
FORTRAN Compiler 4.1
Macro Assembler 5.1
Pascal Compiler 4.0
Microsoft
16011 N.E. 36th Way
Redmond, WA 98073-9717
206/882-8080
List price: Toolkit $350, C $450, BASIC $295, FORTRAN $450, Assembler $150, Pascal $300
Requirements: 320K (448K for C); DOS 2.10, OS/2 1.0, or a later version; hard drive recommended
Not copy protected
Technical support: no toll-free number, M–F 8–5
For more information, see Products Featured in This Issue.

Softstrips

Users of Cauzin's Softstrip Reader System can obtain Softstrips of *Star-Dot-Star*'s October program listings by sending a self-addressed envelope to *PC World*, October Softstrips, at the address given on page 4 of this issue.

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

AccountMate®
Business Accounting Software. Designed for Change.

AccountMate® accounting software offers you one feature your business simply can't afford to overlook. Flexibility. AccountMate's free dBASE® source code gives you the option to customize your program to create precise solutions to your needs. Use our full-featured accounting programs as they are, or modify them to perform the specific tasks your business needs.

Put the power of AccountMate to work for you.

AccountMate grows right along with your business. AccountMate modules can integrate or stand alone. Add on modules as you need them. Modify a program to produce the exact features you need to properly and precisely track the operations of your business. AccountMate is designed especially for customization. You'll never be locked into an inflexible software choice.

Authorized AccountMate consultants throughout the U.S. and Canada will make modifications for you if you are unfamiliar with dBASE. Our Clipper™-compiled version runs without dBASE.

Find out today how productive you can be with the software solution that's designed for change.

"An easy-to-run, full-featured system with excellent documentation and performance."
PC Magazine

AccountMate Modules:
- General Ledger
- Accounts Receivable
- Sales Order
- Accounts Payable
- Purchase Order
- Payroll
- State Tax
- Job Cost
- Fund Accounting
- Time & Billing
- Consolidated Ledger
- Manufacturing Inventory Contro
- Toolbox
- Transformer
- SearchMate

Nationwide

800-877-8896

SourceMate™

We Produce Solutions.

20 Sunnyside Ave., Mill Valley, CA 94941-1928 415-381-1011
TELEX: 510 600 5270, ACCOUNTMATE FAX: 415-381-7451

dBASE III and dBASE III PLUS are trademarks of Ashton-Tate, Inc. SourceMate, AccountMate and AccountMate III Plus are trademarks of SourceMate Information Systems, Inc. PC-DOS is a trademark of International Business Machines Corp. MS-DOS is a trademark of Microsoft Corp. Clipper is a trademark of Nantucket Corp. Lotus 1-2-3 and Symphony are trademarks of Lotus Development Corp.

SMART BUSINESS PEOPLE CHANGE NAMES OFTEN.

Amazing. Salesmen get rid of "Dear Customers:" and sales skyrocket. A swimming pool tycoon pulls the plug on "Dear Investors:" and liquidity goes up. People everywhere easily personalize business form letters by changing names and other information with Q&A software. They tell us it's because customers like to be addressed that way. But we know why they do it, really.

Sales. And why not. That's plain old smart business. Because with just two keystrokes on a personal computer,* Q&A turns ordinary form letters into supersalesmen. It adds personal information to ten, hundreds, even thousands of letters at once. All so easily, you can mail monthly, weekly, or for a bigger bonus, even once a day.

The secret? Q&A is the #1 rated word processor and file manager.† It's powerful and easy. So in minutes a client list becomes a hard working customer database. And sales letters look so professional, they'll bring tears to the eyes of a typesetter.

Use Q&A for everything you type or file…tax records, proposals, reports, inventory, invoicing, expenses, and more. It even prints envelopes automatically and comes all set up for the most popular mailing labels. All you do is hit two keys. And get ready to lick the stamps.

Whether you work alone, or need multi-user databases on networks, Q&A can easily turn your sales letters into sales. Which means, while Q&A is changing names and printing letters, you'll be printing money.

FREE Demo Disk,
Call (800) 888-0886
Ext. 437 W.

The #1 File Manager and #1 Word Processor.

Merge lists and letters for personalized mailings with just two keystrokes.

Automatically address letters, envelopes, and mailing labels.

Easily add a personal touch to form letters with information taken from your Q&A customer database.

Armstrong
Pappas
Nouaux
& Greenwood

Mr. Tom Trent
Boston Mechanics
3551 AltonWay
New York, NY 10017

Dear Tom:

Just wanted to s
20th. I think you'll
quality available.

You've noticed
we put together o
Yes, thanks to Q
(ha,ha). But seri
me write letters
we can spend m
better in person.

Thanks a
fine people at

Sincerely,

Roland S
District M

P.S.

Armstrong
Pappas
Nouaux
& Greenwood

Ms. Alice Lansing
Tough-Guy Manufacturi
76543 Ralston Ave.
Keokuk, AK 99504

Dear Alice:

Just wanted to s
think you'll find the
quality available.

You've noticed
we put together o
Yes, thanks to Q
(ha,ha). But seri
me write letters
we can spend m
better in person.

Thanks ag
fine people at

Sincerely,

Roland S
District M

P.S.

Armstrong
Pappas
Nouaux
& Greenwood

Mr. Randy Tisdale
Associated Distributors
1101 Del Monte Ave.
San Pablo, CA 95432

Dear Randy:

Just wanted to say thanks for the order you placed on May 7th. I think you'll find the 35 cases of sprockets to be of the highest quality available.

You've noticed, I'm sure, that your service has improved since we put together our new customer tracking and invoicing system. Yes, thanks to Q&A software, your sprockets will always be in gea (ha,ha). But seriously Randy, Q&A is really amazing. It even help me write letters like this. Now that computers do more work for u we can spend more time with you. I'm for that. *My jokes are alway better in person.*

Thanks again, and I appreciate the opportunity to serve all the fine people at Associated Distributors.

Sincerely,

Roland Sanders
District Manager

P.S. *Our records show you could be low on Sprocket Oil #7. You can reorder now with our new 800 number (800) 123-4567.*

PC MAGAZINE
Editor's Choice

Add up to nine different fonts to give letters a typeset appearance.

Include specific information (like last product ordered), to increase repeat business.

SYMANTEC™ **Requires IBM PC/XT/AT, PS/2 or compatible personal computer. †Software Digest #1 File Manager 86,88; #1 Easy To Use Word Processor 87, #1 Integrated File Manager/Word Processor 88; InfoWorld's highest rating ever given (9.6) 87; PC Magazine Editor's Choice 87,88. Suggested list, $349. Q&A 2.0 owners call (415) 964-4440 for $69.95 upgrade instructions. Q&A is a trademark of Symantec Corporation. Other brands and products are trademarks of their respective holders. © 1988 Symantec, 10201 Torre Avenue, Cupertino, CA 95014. (408) 253-9600. **Buy Q&A between 8/1/88 and 10/31/88, get the 100,000 synonym Microlytics Thesaurus FREE. See coupon in Q&A package for complete details.*

FREE MICROLYTICS THESAURUS!!!**
(A $49 Value)

Circle 108 on reader service card

Note Card Tricks

Inspired by the humble 3-by-5 card, personal information managers have come a long way.

Leave it to Lotus to raise the standard.

FRED SIMSON

Robert M. Carr

A bit of childhood's chaos vanishes when grade school students meet index cards. My own first encounter with this marvelously flexible information management tool involved recording types of clouds on a dozen 3-by-5 cards. My head is no longer in the stratosphere, but note cards are still on my mind. Astute observers of software trends, take note: The index card is making a comeback, electronically.

For years PC software was an exclusive club, dominated by word processors, spreadsheets, data managers, and their ilk. Upstart categories, like desktop publishing and integrated software, struggled for acceptance like plebes at a hazing.

This year another category is striving to gain admission to the club. Members go by various names, including *free-format text data bases, flexible filers, ad hoc information managers*, or, as Lotus terms the whole genre, *personal information managers* (PIMs). Despite having the lowly note card as its only operative metaphor, this class may well make the grade. Because PIMs do so many things so well, they may become the first enduring new category since graphics.

Many programs that come under the PIM rubric have been around for a while, but it took Lotus and its new *Agenda* to pull together a grab bag of seemingly disparate packages in a coherent way. Still, tough questions persist. Which implementations best serve evolving demand? How can you evaluate a genre that lacks both an extensive track record and established decision criteria?

Head of the Class

Some genres of software exist because they automate previously manual tasks; others implement operations that have little precedent in the nonsilicon world. PIMs don't fit neatly into either category but instead tend to incorporate some of each. Consequently, they must work extra hard to find a legitimate niche.

The legitimacy of a new category isn't an academic concern. Innovation invites company; once a genre proves it's here to stay, other developers flock to it, and ideas cross-pollinate. The result? Better software and, for users, greater productivity.

Like graphics programs, PIMs are a diverse lot. Currently they encompass four species of program: free-format text data bases, outliners, Lotus's *Agenda*, and task-specific organizers.

Each strain is distinguished by its data structuring tech-

(continues)

nique—that is, its means of storing, loading, displaying, and manipulating data. Indeed, here structure (or its absence) is everything. PIMs all merge impressive data management–like searching capabilities with flexible filtering and reporting, but each type approaches data handling in a different way.

PIMs are to data managers what knives are to circular saws: Both cut, but you'd hardly apply them to identical jobs. PIMs perform fine, detailed work—unlike data managers, which plow through great masses of material. A data manager requires that records be uniform in format and vernacular. Such software exploits that uniformity with algorithms that efficiently manipulate data en masse and enable powerful reporting. Data volumes must be stored on disk and indexed with pointers to precise locations—hastening what would otherwise be sluggish disk searches.

Although performance is critical for PIMs, they don't place as great a premium on speed and data capacity, chiefly because personal information files tend to be relatively small. PIMs also can support indexes for large amounts of data, but the data's relative lack of structure makes it less suitable for indexing. With no need to drag indexes along, the PIM may be that rarest of applications: It doesn't sell additional hardware.

Knowing No Boundaries

Seaside Software's *askSam* is perhaps the best example of a free-format text data base. *Free-format* is no exaggeration; *askSam* imposes only the barest structure on your information. Text is grouped into screen-size chunks called cards. The size of fields on a card can vary significantly; further, cards can accommodate unstructured text at any point in the program.

askSam's power arises from its ability to infer structure when you specify a search, thanks to a supercharged word processing–like search command. Any and all text on the card may be treated as a searchable field by the program's muscular search command language. *askSam* then doggedly plows through raw text, searching exhaustively yet quickly for the string combination you specify.

askSam's flexible search logic gives the program its admirable speed by using a simple, tightly coded matching algorithm. The algorithm scans the contents of each card in search of just one target string; more complex search specifications come into play only when a partial match is made. *askSam*'s on-the-fly search scheme receives a boost from an 8088 "scan" instruction (replicated in 286 and 386 CPUs) that searches memory for a single character.

However, *askSam*, which is disk-based, can take this technology only so far; for large data bases, the program may compensate with disk caching. Also, *askSam* and similar free-format text data bases lack error checking on field entry, a second limitation that renders them inappropriate for larger data bases.

For All Indents and Purposes

Although automated outlining has been a mainstay of better word processors for some time, only recently has it entered the PIM realm—and a period of ferment.

Symantec's venerable *ThinkTank* enables you to organize text headings into an outline that can be manipulated via a series of restructuring commands. Now the company's new *GrandView* takes a few giant steps further, blending traditional outlining with word processing and the ability to attach multiple fields to each outline heading.

Outliners are ideal for *decomposition*, which is basic to project planning and document outlining. Decomposition involves breaking a heading into its subheadings and then layering subheadings with increasing precision. Because you can group assorted items under various headings and collapse headings to hide their contents, outliners are also a handy way to organize essentially random data. The outline's hierarchical nature lets you tinker with groups of headings (and their subordinates) at one time.

GrandView's search and sort commands operate on fields attached to outline headings. The program searches and sorts on outline fields in a manner similar to a nonindexed data manager; *GrandView* steps through each relevant heading. Because headings are structured into a series of fields, the program is able to examine relevant fields quickly, thereby avoiding an exhaustive search. The drawback: You must define fields, sacrificing some flexibility.

Setting an Agenda

Architecturally speaking, Lotus Development's *Agenda* is in a class by itself.

With *Agenda*, you enter information in free-format text units called *items*. Items can be as little as a few lines long, but they can piggyback several pages of

(continues)

NOW OVER 43% OFF!

Add PC World To Your Management Reading List

ACT NOW! Take advantage of these Special Savings and we'll BILL YOU LATER!

☑ YES! Bill Me Later

Rush me one year (12 monthly issues) of PC World for only $19.97. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

4CG94

☑ YES! Bill Me Later

Rush me one year (12 monthly issues) of PC World for only $19.97. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

4CG94

Give Now—We'll Bill You Later

A one year subscription (12 monthly issues for just $19.97) will be sent to the person listed below. That's over 43% off the annual cover price of $35.40 and over 33% off the regular subscription rate of $29.90.

Send Gift from:

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Send Gift to:

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Please allow 6 to 8 weeks for delivery of your first issue. Offer good in the U.S. only.

PC WORLD

2AMM4

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

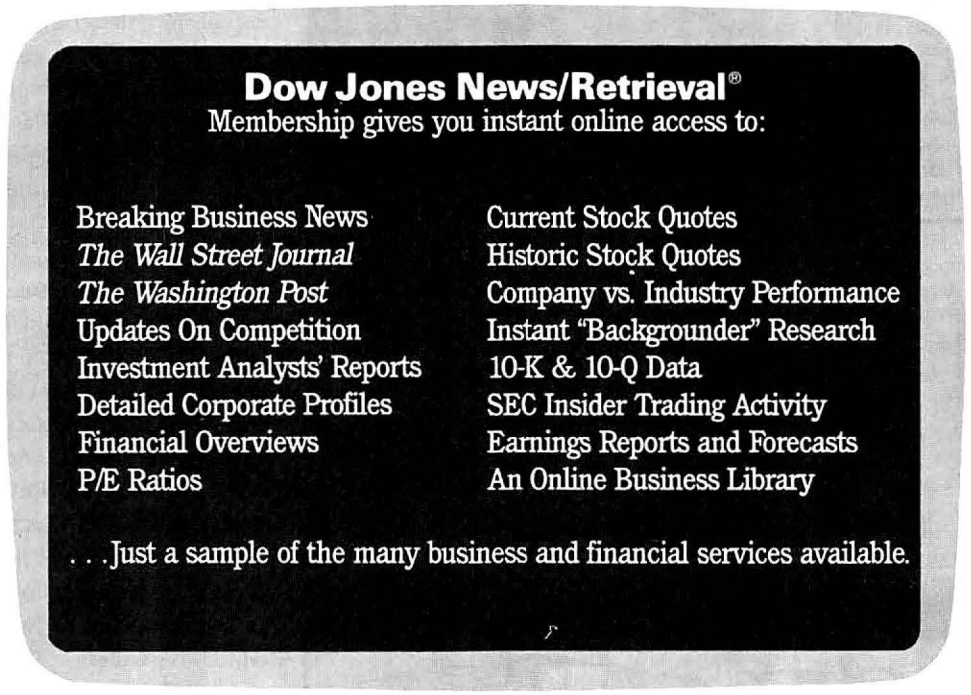
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

CAREER ASSURANCE.



How to entrench your present position and promote your future success—for only $49.95.

Can a $49.95 membership in Dow Jones News/Retrieval® —the premier online business and financial information service from Dow Jones & Company, Inc.—really help assure you a more successful career?

Judge for yourself.

Mail the Membership Enrollment Form at right. Within a few days your Membership Kit will arrive and you can go online, analyzing breaking news from a continuously updated business journal—before it hits the newsstand.

You'll also have instant access to leading investment analysts' comments on your business hunches and strategies, plus the ability to get detailed reports on nearly 10,000 companies within minutes.

And those are only three of our 40-plus services.

Look over the others when you go online.

To start your membership, fill out the Enrollment Form at right, drop it in the mail and give our service a try.

After all, making sure you have more current, more complete information is a very assuring career move.

*Per account. New domestic and Canadian subscribers only. Free time must be used within 30 days after receipt of password(s). Some additional fees apply on certain services. Offer expires October 31, 1989.

©1988 Dow Jones & Company, Inc. All rights reserved.

Membership Enrollment Form

Show me how Dow Jones News/Retrieval® can help assure my career success.

☐ Send me a Business Membership Kit, entitling me to 8 free hours* of online time, passwords for myself and my colleagues, a User's Guide, 12 months of *Dowline*™ Magazine, and waiver of my first year's $12 annual service fee—for $49.95.

☐ Send me a *Personal* Membership Kit: same as above but with 5 free hours* of online time and a single password for myself alone—for $29.95.

☐ Check enclosed

☐ Charge to my: ☐ AmEx ☐ MC ☐ VISA ☐ Bill me later

Card No._____ Exp._____

Signature (required) _____

If you pay by credit card, all future charges will be billed to that account.

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Daytime Phone _____

Computer make and model _____

☐ Please send more information.

Mail to: DJN/R Membership Kit, P.O. Box 186
Drexel Hill, PA 19026-9973

For faster service, call 1-800-221-7700, Ext. 278 J today!

DOW JONES NEWS/RETRIEVAL®
From Dow Jones & Company, Inc.
The information that powers today's business.™

278 J

FREE!

Work better with your computer! Catalog of over 2,700 support products shows how.

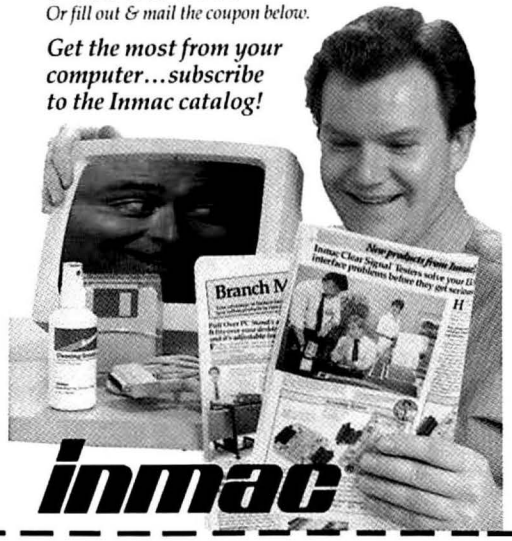
Timesavers, spacesavers, moneysavers, sanity savers! Find them all each month in the Inmac catalog.

See flexible disks to furniture, print spoolers to plotter supplies, cables to cleaning kits—over 200 pages of quality products! And each is photographed and explained so clearly, even beginners learn how to buy wisely.

You get timesaving hints, technical help by phone, same-day shipment, free trials, 1-year-to-lifetime guarantees, and Inmac's 10 years of experience.

CALL TOLL-FREE TODAY!
1-800-547-5444
Or fill out & mail the coupon below.

Get the most from your computer...subscribe to the Inmac catalog!



Inmac, 2465 Augustine Drive, Santa Clara, CA 95054

Name

Company

Mail Stop/Suite/Dept./Bldg./Apt.#

Street Address

City State Zip

Circle 59 on reader service card

BACK ISSUES

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

Simply enclose payment, specify the issues and quantity you desire and send to:

PC WORLD

Back Issue Department, 144 Townsend Street, San Francisco, CA 94107
Sorry, phone or credit card orders cannot be accepted.

notes. You can organize items by assigning them to one or more categories of your design.

Superficially, *Agenda* resembles an outliner—categories are organized in outline form. But the program's real power lies in its ability to separate the outline from the items. The items reside in their own data base, which permits access from different *views*. Views are essentially interactive reports on the item data base. One view might order items by priority, another by project.

Like hypertext, *Agenda* enables users to determine associations after the fact, almost automatically. The program relies on artificial intelligence–like inference techniques and a natural-language facility to arrange items appropriately. Entering text items in a view automatically files them under all pertinent categories. The same process applies when an item is edited, regardless of the view in which it was entered.

Agenda's hierarchy of categories thus imposes a solid framework. This structure enables the program to store data on disk but at the same time permits efficient access through proprietary indexing technology.

Task Masters

Although these three breeds of personal information manager are capable of handling just about any data you toss their way, a fourth class comes preconfigured to manage specific kinds of information.

Task-specific products, like Conductor Software's *Act* and Valor Software's *Info-XL*, offer user interfaces and capabilities crafted especially for telemarketing professionals. These

(continues)

FREE INFORMATION!

With *PC World*'s handy Reader Service Card, you can request detailed information about products you see advertised or reviewed in this magazine.

It's easy.

Just find the product's Reader Service number in the ad or our product indexes, circle the number on your Reader Service Card, and drop the card in the mail.

It's that simple.

We've even paid the postage. Your FREE information will arrive soon.

PC WORLD

FINALLY!

See us at booth R8700
COMDEX/Fall '88
November 14—18, 1988
Riviera Hotel, Las Vegas, Nevada

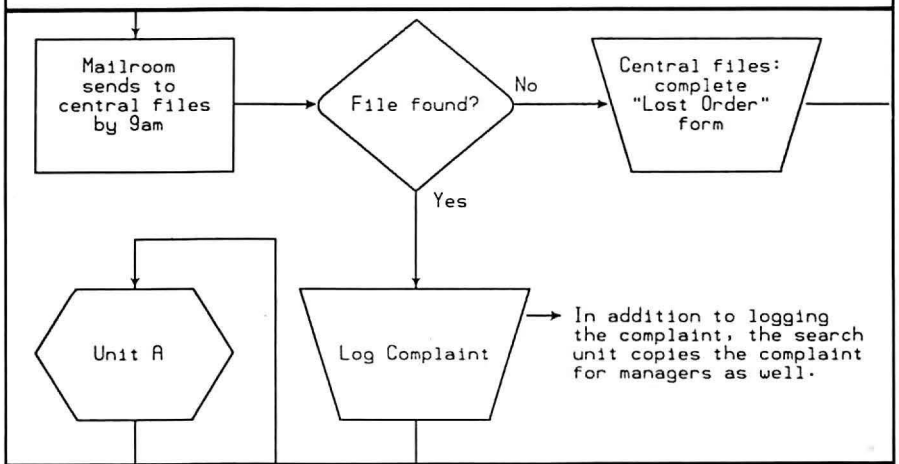
EASYFLOW

An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work. EASYFLOW is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With it you can quickly compose charts. More important, you can easily modify charts so they are always up to date.

- **Automatic:** Fully automatic text centering within shapes, both horizontally and vertically. Fully automatic line routing & re-routing.
- **Fast:** Written in assembly language for speed.
- **Large:** Charts up to 417 columns wide by 225 lines high. Chart too large for your printer? *EASYFLOW* automatically breaks the chart up & prints it in page size pieces.
- **Standard:** All standard flowcharting shapes included. Custom shapes can be ordered.
- **User friendly:** Don't take our word for it. PC Magazine says "*EASYFLOW lives up to its name. It's hard to imagine any easier and more flexible way to produce basic and even complex flowcharts*". [March 10th 1987 issue, page 278.]
- **Mouse:** Optional but fully supported.
- **It prints:** On most popular matrix printers including IBM, Epson, Toshiba, HP LaserJet, LaserJet-Plus and many others.
- **It plots:** On HP7440, 7475, 7550, 7570, 7585B and compatible plotters.
- **It works:** We are contractually prevented from mentioning the name of the "big eight" accounting firm that purchased a world-wide site license, but we can tell you that they spent months evaluating all available flowcharting packages before choosing *EASYFLOW*.
- **Rush delivery:** Order by noon today (eastern time) and you'll have it tomorrow. Rush delivery charge is $10.50 (instead of $2.00) and is available only to continental USA and Canada.
- **Documented:** 100 page manual plus over 150 screens of context sensitive help.

EASYFLOW works on IBM PC's, IBM PS/2 and compatibles. Requires 384 K memory, DOS 2.0 or higher and an IBM CGA/EGA/VGA or Hercules monochrome compatible adapter card.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by M.O., cheque, VISA, Mastercard or Company PO.



The chart fragment above was produced on an HP LaserJet-Plus and is actual size and unretouched. Publication quality charts like this can be produced using only minutes of preparation time and seconds of print time.

HavenTree Software Limited
PO Box 1093-M
Thousand Island Park, NY 13692

Order Desk: 1-800-267-0668
Information: (613) 544-6035 ext 47
Telefax(G3): (613) 544-9632

Circle 79 on reader service card

USERS SELECT ACT 1 ACCOUNTING SERIES AS "BEST BUY OF THE YEAR" FOR 1986 & 1987.

NOW IMPROVED with "LOOKUP" WINDOWS

ONLY $139.50 + Shipping & Handling

In an annual poll thousands of readers of COMPUTER SHOPPER magazine voted ACT 1 the BEST BUY OF THE YEAR for 2 consecutive years!!

Here's a number of reasons those discerning users have selected, and are changing to, ACT 1: ACT 1 is upgradeable to ACT 2 which is multiuser w/record & file lock, supports 3.1 DOS, & all data files are automatically upgradeable.

GENERAL FEATURES
"LOOKUP" Windows throughout.
Menu driven with 2 help references.
Multi company and report generator.
Sample data files included.
Complete audit trail.
All modules can post to multiple profit centers.
Fully integrated with single source entry.
Date sensitive user-defined fiscal calendar.
User defined financial reports.
User can design checks, invoices, statements & W-2s.
User defined chart of accounts, account numbers & stock numbers up to 15 alphanumerics.

GENERAL LEDGER
Allows for multi company ledgers.
Unlimited multi-level accounts for departmentalized reporting.
Allows recurring journal entries.
User can process transactions 2 periods into next year.
Allows budgeting.

ACCOUNTS RECEIVABLE
Open invoice and/or balance forward.
Allows unapplied payments.
Prints statements.
Handles recurring accounts receivable.
Supports partial payments & finance charges.
Allows unapplied credit memos.
Up to 5 user-defined aging periods.
Mailing labels & reports with 7 different sorts.

INVENTORY
Supports: LIFO, FIFO, weighted averages & standard cost.
Supports markup, margin or list.
Allows up to 4 places to right of decimal for unit cost & price.

SALES INVOICING
Supports service or product oriented businesses.
User defined tax tables including multiple sales taxes.
Prints packing slips.
Prints invoices.
Alerts user to customer exceeding credit limit.
Sales history reports.
Automatic updating of inventory daily.
Allows return credit memos.

ACCOUNTS PAYABLE
Can post to 200 general ledger expense accounts per invoice.
Prints checks.
Automatically prepares payments.
Supports partial and handwritten checks.
Processes credit and debit memos.
Computes discounts and records discounts taken.

PAYROLL
Generates automatic payroll.
Provides up to 8 user-defined rates.
Allows post facto payroll.
Allows distribution of payroll expenses to user-defined departments.
Benefits and deductions are calculated on fixed amounts.
Hourly amounts, percentage of gross or variable.
Allows additions to gross which may be taxable, nontaxable or partially taxed.
Handles 401K & cafeteria.
All tax tables easily updated by the user.
Handles payroll draws, per diem pay, contract & piece work, hourly and salary.
Handles tip accounting.
Prints checks and W-2s.

HARDWARE REQUIREMENTS
IBM PC's or compatible.
HARD DISK REQUIRED.

TO ORDER CALL (800) 344-2540
8:00-5:00 MST Monday-Friday

UNCONDITIONAL 30 DAY MONEY BACK GUARANTEE applicable on all products bought directly from COUGAR MOUNTAIN SOFTWARE. Products must be returned in resaleable condition. Restocking fee applicable.

Technical support is available via our Toll-Free Telephone Number.
Training seminars available.

To order by mail send $139.50 plus $11.50 S&H to:

COUGAR MOUNTAIN
S·O·F·T·W·A·R·E.
2609 Kootenai, Box 6886, Boise, ID 83707, 208-344-2540

Trademarks:
IBM - International Business Machines
MS - DOS Microsoft, Inc. PC - DOS IBM

Circle 127 on reader service card

programs are highly integrated, designed to use text, flat-file data managers, calendars, and outlining as inventory in a single grand data store, while windows display links among program components.

Act, for instance, maintains a data base of contact lists, a calendar, a datebook, address and phone lists, expense records, and notes. You can query that data base using an on-screen form that includes more than 30 task-oriented fields.

Because task-specific products tend to reflect a narrow worldview, they're really the templates of the PIM realm. And, as task-specific products, they provide the classic trade-off between convenience and power: They're generally easy to learn and use, but they don't provide much headroom.

Helping With Homework

Personal information managers aren't yet a stable or well-defined software category, so it's difficult to predict innovations and product wrinkles. If history is any guide, however, PIMs will evolve significantly before they settle down.

The relationship between spreadsheets and task-specific templates demonstrates that when a genre is mature, the market prefers specialized solutions only if they're implemented atop generic tools. Although no PIM includes a macro language or adequate support for application development, the next generation of PIMs (perhaps written for OS/2) may oblige on both counts. If either development occurs, the appeal of such task-specific tools as *Act* and *Info-XL* may diminish.

Free-format text data bases

(continues)

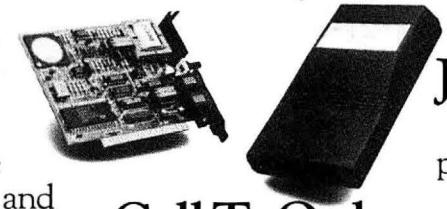
BEST SELLING PC FAX IN AMERICA

Send And Receive Fax Right From Your PC

Instead of walking back and forth to the fax machine, and waiting around, you can send and receive fax messages at your desk.

JT Fax™ – $395

With JT Fax in your PC, you can send and receive facsimile messages, including signature and letterhead.



JT Fax Portable – $495

JT Fax Portable slips into your pocket and plugs into any MS DOS machine's serial port to let you fax from wherever you are.

Call To Order

To find out why the award-winning JT Fax has been receiving such high praise, call us at (404) 564-5566. Fax: (404) 564-5528

PC MAGAZINE EDITOR'S CHOICE

TECHNICAL EXCELLENCE PC MAGAZINE

INFO WORLD PRODUCT OF THE YEAR

QUADRAM®
An Intelligent Systems Company
One Quad Way, Norcross, GA 30093

Quadram logo and JT Fax are trademarks of Quadram

Circle 168 on reader service card

are superb for extensive research work. You can entrust just about any kind of information to them, as long as you don't mind tough but powerful command languages. But because they display only single, sequential records on screen, such programs require that you work from printouts.

Although *Agenda* provides new and more potent capabilities, *GrandView*'s outline form is more familiar. Both PIMs offer a significant advantage over free-format text data bases, which resist on-line analysis and viewing and whose close adherence to the 3-by-5–card metaphor can be limiting. Even with *GrandView*'s added oomph, however, outliners are confined to relatively simple list keeping and traditional document planning and brainstorming.

At the moment, *Agenda* has emerged as the PIM to beat. Its unique item-category data base structure is particularly useful if you need to see the big picture. Unlike *GrandView*, *Agenda* fluidly relates dozens of separate lists and does so without needing exact field structures. And because *Agenda* divines an order for the text from the content itself, you can "pour" information into the program and let it organize the data for you.

With *Agenda*, and to some degree with all PIMs, you're better able to manage dynamic situations. Although the PC hasn't moved the world even a notch closer to the paperless office, personal information managers may well revive that elusive and laudable goal. ●

Robert M. Carr is the creator of Framework II *and a cofounder of Go Corporation, a software startup.*

Order Status,
Technical & Other
Info. (602) 246-2222
FAX # (602) 246-7805
Call for programs not listed

VISA MasterCard
No Charge for
MasterCard or Visa

WAREHOUSE DATA PRODUCTS

MICROSOFT PC Excel
SPECIAL $273

TOLL-FREE ORDER LINE 1-800-421-3135

NOW AVAILABLE

MICROSOFT MACH 20 ..... $309
MICROSOFT WINDOWS 386 ..... $110

FREE SOFTWARE!

Purchase over $100 and receive one of these disks absolutely FREE! Purchases over $250 get two free disks, over $400 get three, or get all four disks when your purchase is over $500! **1) MIXED BAG. 2) PC-WRITE. 3) FONT-SET. 4) ABC-LIST.**

– SOFTWARE –

Accounting

Dac Easy Acct. 3.0	Low Price
Dac Easy Light	$39
Dac Easy Payroll	39
Dollars & Sense	94
In House Acct.	112
Managing Your Money 4.0	117

Communication Programs

Brooklyn Bridge Universal	$75
Carbon Copy Plus	108
Crosstalk XVI	89
Crosstalk MK4	110
Flying Dutchman	64
PC Anywhere III	96

Data Base Managers

Clipper	$370
Condor 3	325
DataPerfect	Low Price
DBase III Plus	375
DB-XL Diamond	115
Fox Base Plus	194
Genifer	189
Paradox 2.0 Premium	435
PFS: Pro File	139
Powerbase	169
Q&A 3.0	Call
Quicksilver Diamond	329
Revelation Advanced	485
R Base For DOS	425
Reflex	90
Relate & Report	112
VP Info	65

Desktop Publishing

Pagemaker Ver. 3.0	$475
PFS: First Publisher 2.0	73
Ventura Publisher	489

Graphics

Boeing Graphics	$200
Chartmaster	199
Design Cad 2D & 3D	148
Diagram Master	199
Easy Cad	109
Generic Cad	49
In-A-Vision	270
Microsoft Chart 3.0	225
Newsroom Pro	65
Printshop	33

Integrated

Ability Plus	$145
Enable	352
Microsoft Works	108
PFS 1st Choice	79
Smart System	429
Symphony	465

Languages

Lattice C Compiler	$220
Microsoft C Compiler Ver. 5.0	Call
Microsoft Fortran Ver. 4.1	260
Microsoft Macro Assembler Ver. 5.1	88

Languages

Microsoft Pascal	$176
Microsoft Quick Basic 4.0	59
Microsoft Quick C	Call
Ryan McFarlan Fortran	390
Ryan McFarlan Cobol	612
Turbo Basic	Call
Turbo C 1.5	59
Turbo Pascal	Call
Turbo Prolog	90

Multi-User Software

Fox Base +	$299
Microsoft Word	195
Word Perfect 5.0	339
Word Perfect Modules	ea 75

Project Manager

Microsoft Project	$305
Super Project Plus	255
Timeline 3.0	323
Total Havard Man. 2	355

Spreadsheet

Lotus 1-2-3	$280
Microsoft PC Excel	273
Quattro	143
Surpass	329
Twin	35
VP Planner Plus	88

Utilities

Core Fast	Low Prices
Copy II PC	$19
Copywrite	39
Cubit	39
Desqview 2.01	72
Direct Access	49
Eureka	Call
Fastback Plus	89
Formtools	56
Graph in the Box 2	Call
Mace	55
Microsoft Windows 286 Ver. 2.1	59
Norton Advanced	75
Norton Utilities	48
PC Tools Deluxe	37
Prokey 4.0	70
Q DOS II	49
Righwriter	75
Sidekick Plus	115
Sideways	39
SQZ Plus	55
Superkey	55
Lightening	79
XTree	35

Word Processing

Microsoft Word 4.0	$185
Multimate Advantage II	285
Q and A Write	110
Webster Spellcheck	37
Word Perfect Ver. 5.0	Call
Word Perfect Executive	124
Word Perfect Library 2.0	65
Wordstar Pro	233
Wordstar 2000 – Personal Ed.	229

– HARDWARE –

Accessories

Copy II PC Deluxe Bd.	$101
Curtis Ruby	59
Logical Connection	379
Mach III Joystick	36
Masterpiece	85
Masterpiece +	95
150 Watt Power Supply	69

Boards

AST	
Rampage/2	Call
Rampage 286 w/512K	$299
Sixpac Plus w/64K	129
EVEREX	
2MB Above PC/XT w/o Mem	79
3MB Above AT w/o Mem	89
ORCHID	
Ram Quest Extra PS/2	Call
INTEL	
Above PC 64K	225
Above 286 w/512K	344
Orchid Tiny Turbo	289

COMPUTERS

EVEREX	
286, 10MHz, 0 Wait	$1149
286, 10MHz, 1 Wait	999
286, 12.5MHz, 0 Wait	1349
ACER	
710 w/o Monitor	Call
900 w/o Monitor	Call
SHARP	
PC 4501	$765
PC 4502	Call
PC 4521	Call
TOSHIBA	
T1000	799
T3100	Call
T3200	Call
ZENITH	
Super Sport 286/20MG	Call
Super Sport 8088/2-Floppies	Call
Super Sport 8088/20MG	Call
NEC	
Multispeed-2	Call
All Other NEC Products	Call

EGA Boards

ATI Ega Wonders	$175
Genoa Hi-Res	186
Orchid Designer	259
Paradise Auto 480	179
Paradise VGA Plus	289
Paradise VGA Prof.	399
Vega VGA	275

EGA Monitors

Casper	$410
Princeton Ultra Scan	539
Mitsubishi Diamond Scan	509
NEC – Multisync II	609
Zenith 14" Flat Screen	650

Hard Cards

Plus 20 MB	$529
Plus 40 MB	659

Hard Drives

Seagate 20 MB w/cont	Call
Seagate 30 MB w/cont	Call
Seagate 40 MB AT 251-2	$399
Seagate 80 MB AT	579
Seagate ST-125 w/cont	329
Seagate ST-138 w/cont	399
Priam	Call

Modems

AZ 2480 w/o Soft	$129
Everex 300/1200 w/ Soft	69
Everex 2400 EXT, Error Cor.	189
Hayes 1200 EXT w/o soft	299
Hayes 1200B INT w/ Soft	289
Hayes 2400 EXT w/o Soft	435
Novation Parrot 1200 w/Soft	99
U.S. Robotics 2400 w/o Soft	335

Mice

Genius	$49
Logitech	68
Microsoft Bus w/Paintbrush	92
Microsoft Serial	92
Optimouse w/Dr Halo	89
Optimouse w/DPE	185

Monitors

AMDEK	
410 Amber	$145
MAGNAVOX	
RGB	255
SIGMA	
Laserview – 19"	Call
SAMSUNG	
Flat Amber	Call
TTL Amber w/tilt	76
Color w/tilt	249
Viking	Call

Printers

CITIZEN	
MSP 40	$285
120 D	146
MSP 50	385
EPSON	
LQ 500	349
LQ 850	559
FX-850	Call
LASERS	
Other Lasers	Call
AST TURBO PS	Call
OKIDATA LASERLINE 6	1299
OKIDATA	
OKI 320	Call
OKI 321	Call
OKI 390	499
OKI 391	689
STAR MICRONICS	
NX 1000	180
NX 1000 Color	238

We Stock The Products That We Sell.
We Are Authorized To Repair Many Major Manufacturer's Products.
Having Technical Problems? – Call Us!
Any Hardware Purchased From Us – 7 Day DOA – We Replace It – Not Repair It.
Visit Us In Phoenix! We Have A Retail Storefront To Serve You.

TERMS: Shipping minimum is $5.00. AZ orders + 6.7% sales tax. Personal check/company check – allow fourteen (14) days to clear. We accept purchase orders from authorized institutions for 3.5% more than cash price. All returns are subject to our approval. There will be a 20% restock fee. Minimum phone order $50. All prices are subject to change. Due to copyright laws we cannot take back any open software.

TOLL-FREE ORDER LINE 1-800-421-3135
WAREHOUSE DATA PRODUCTS
2701 West Glendale Ave. • Phoenix, AZ 85051
We do not guarantee compatibility

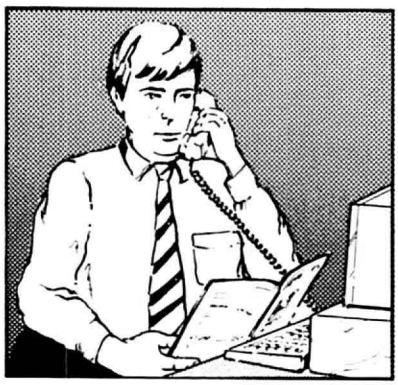
Servicing our PC buyers with low pricing and technical experience since 1979.

Phone Hours:
Monday thru Friday 7am-9pm.
Saturday 9am-5pm MST.

Circle 243 on reader service card

Buy with

Confidence



In an effort to make your telephone purchasing a more successful and pleasurable activity, The Microcomputer Marketing Council of the Direct Marketing Association, Inc. offers this advice, "A knowledgeable buyer will be a successful buyer." These are specific facts you should know about the prospective seller before placing an order:

Ask These Important Questions

- *How long has the company been in business?*
- *Does the company offer technical assistance?*
- *Is there a service facility?*
- *Are manufacturer's warranties handled through the company?*
- *Does the seller have formal return and refund policies?*
- *Is there an additional charge for use of credit cards?*
- *Are credit card charges held until time of shipment?*
- *What are shipping costs for items ordered?*

Reputable computer dealers will answer all these questions to your satisfaction. Don't settle for less when buying your computer hardware, software, peripherals and supplies.

Purchasing Guidelines

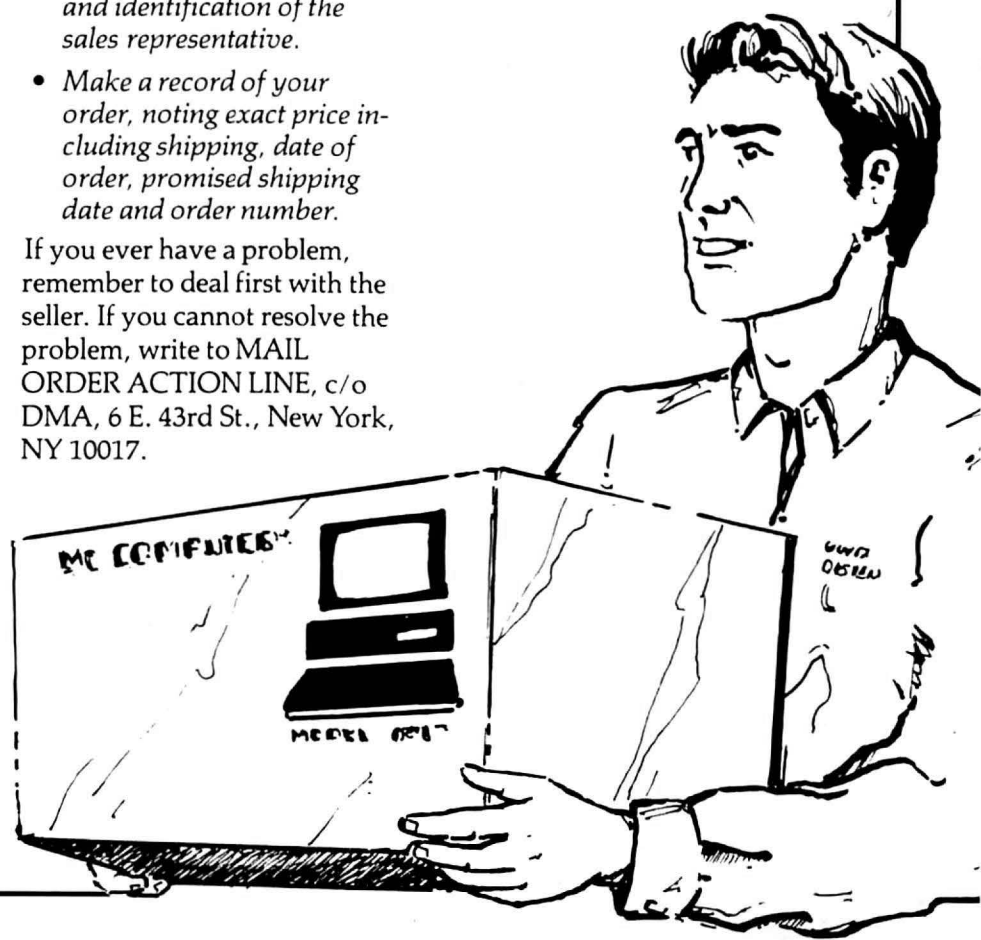
- *State as completely and accurately as you can what merchandise you want including brand name, model number, catalog number.*
- *Establish that the item is in stock and confirm shipping date.*
- *Confirm that the price is as advertised.*
- *Obtain an order number and identification of the sales representative.*
- *Make a record of your order, noting exact price including shipping, date of order, promised shipping date and order number.*

If you ever have a problem, remember to deal first with the seller. If you cannot resolve the problem, write to MAIL ORDER ACTION LINE, c/o DMA, 6 E. 43rd St., New York, NY 10017.

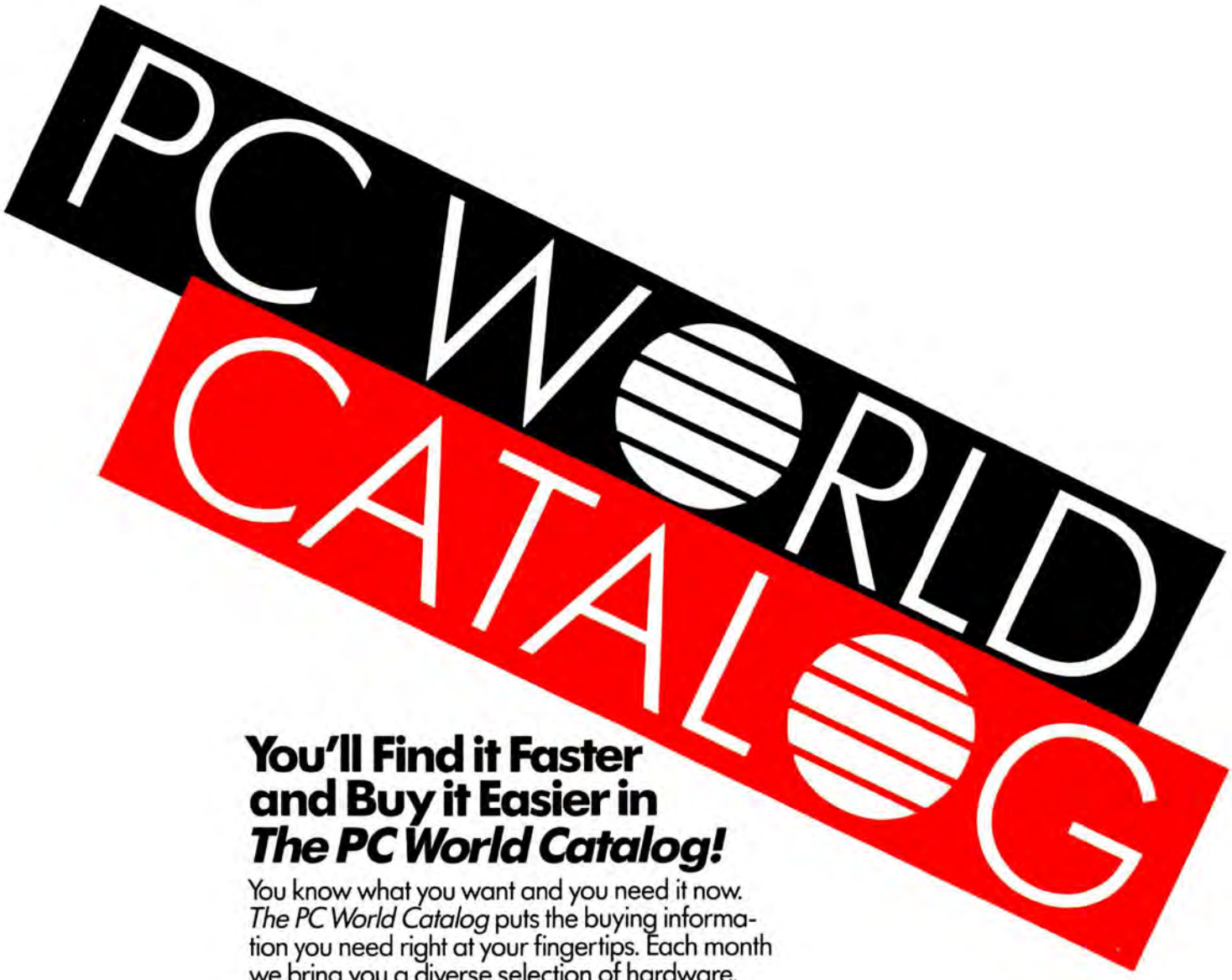
This message is brought to you by:

the MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.
6 E. 43rd St.,
New York, NY 10017

MMC
MICROCOMPUTER MARKETING COUNCIL
of the Direct Marketing Association, Inc.



© Direct Marketing Association, Inc. 1988



You'll Find it Faster and Buy it Easier in *The PC World Catalog!*

You know what you want and you need it now. *The PC World Catalog* puts the buying information you need right at your fingertips. Each month we bring you a diverse selection of hardware, software, peripherals and services along with the pricing, specs and delivery information you need to make the best possible choice for your company.

Don't Miss This Month's Collection!

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

HARDWARE

- Accessory Boards — page 261
- Communications/Modems — page 261
- Computers/Systems — page 261
- Expansion Units — page 262
- Insurance — page 262
- Peripherals — page 263
- Plotters — page 263
- Printers — page 263
- Security — page 264

MISCELLANEOUS

- Accessories — page 264
- Bar Coding — page 264
- Business Opportunities — page 265
- Catalogs — page 265
- Computer Insurance — page 265
- Contracts — page 265
- Data/Disk Conversion — page 265
- Disk Copy Service — page 266
- Disks — page 266
- Mailing Lists — page 267
- Publications — page 267
- Rental — page 267
- Supplies — page 267
- Typesetting — page 267

SOFTWARE

- Accounting — page 267
- Business Applications — page 268
- Church Applications — page 269
- Communications — page 269
- Construction — page 270
- Data Base — page 270
- Data Entry — page 270
- Desktop Publishing — page 270
- Educational — page 271
- Engineering — page 271
- Entertainment/Games — page 271
- Financial — page 272
- Flow Charting — page 273
- Graphics — page 273
- Health — page 273
- Home Use — page 273
- Inventory Control/Management — page 273
- Languages — page 274
- Laser Fonts — page 274
- Legal — page 274
- Mailing List Programs — page 274
- Maintenance Management — page 275
- Manufacturing — page 275
- Medical — page 275
- Music — page 275
- Project Management — page 275
- Public Domain/Shareware — page 275
- Real Estate — page 276
- Sales/Marketing — page 276
- Security — page 277
- Statistics — page 277
- Surveys — page 278
- Taxes — page 278
- Terminal Emulation — page 278
- Time Management — page 278
- Utilities — page 279
- Word Processing — page 279

ADVERTISING SALES STAFF

Margaret O'Reilly
Publisher

Eric Cressy
Western U.S.

Sharon Van Leuven
Western Ad Manager

Deborah Tarantino
Eastern U.S.

ADVERTISING RATES & INFORMATION

The *PC World Catalog* serves as a cost-effective monthly meeting place for advertisers and volume purchasers. *Our readers don't want to shop, they want to buy!* And your message can reach them in two formats—classified or directory. Both are arranged by product category for easy reference.

Classified ads are sold by the column-inch (2-inch minimum). You must supply camera-ready type and artwork. Standard red is available as a second color.

Directory ads are sold at a minimum three-time rate of $358 per issue for a total of $1,074. You supply copy. We set type. For logos, add $225.

For further information regarding the *Catalog*, space closings and material deadlines, please call Toll-Free 800/435-7766. Within California, call 800/435-7760.

PC World
501 Second Street
San Francisco, CA 94107

PCW Communications, Inc.
An IDG Communications Publication

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

HARDWARE/Accessory Boards

Add Slots to IBM PC

The Addcard unit updates your genuine IBM PC or your Tandy 1000 by adding 4 more card slots. Easily installs in the existing chassis providing slots for Turbo, RAM, EGA, Disk Controllers, modems, tape backup, ports, & other cards. IBM PC model only $79, Tandy 1000 model only $89, + $3 P&H each. Visa/MC/COD.

Merak Industries
8704 Edna Dr.
Warren, MI 48093
313/562-9768, 800/231-4310, ext. 768

Motherboard Clock $59

SideClock does not use an expansion slot! The Innoventions' Clock/Calendar, installs easily by snapping into place. Never enter the time & date again, SideClock does it for you. Battery & Software included. 30-day $ back gtd. 2-year warranty. For XT, PC, PS-25 & compatibles. $59 + $3 s/h. Site discounts. Dealers welcome.

Aristo Computers, Inc.
6700 SW 105th Ave. #307-J
Beaverton, OR 97005
503/626-6333, 800/3ARISTO

IBM PCs Use Mac Disks

MatchMaker lets you plug any Macintosh external floppy drive into an IBM PC. Half size card & software lets you copy to/from, view directory, initialize, or delete files on the Mac diskette. Works with PCs, XTs, ATs, & compatibles. The easy way to move information! $149 Visa/MC/COD/chk.

MicroSolutions
Computer Products

132 W. Lincoln Hwy.
DeKalb, IL 60115
815/756-3411

CIRCLE 536 ON READER SERVICE CARD

NEW! VERS. 2.0

BIGMOUTH™

REAL VOICE Digital Recording for your PC, XT, AT or Compatible

- ◆VOICE MAIL SYSTEM
- ◆TELEMARKETING - *Inbound & Outbound*
- ◆SMARTEST ANSWER MACHINE
- ◆AUTODIAL-DATABASE
- ◆VOICEPAD™ - *Voice for your Programs*
- ◆PROGRAMMER'S TOOLKIT *(optional $79.95)*

½ card, software, cables, & speaker

$269.00 + 5 s/h

(415) 652-9600

Talking Technology, Inc.
4383 Piedmont Ave. Suite B
Oakland, CA 94611

CIRCLE 521 ON RFADER SERVICE CARD

COMPFAX, INC.

CHIPS - All Speeds

64K ..... Call
256K ..... Call
Processors-Intel ..... Call

SHARP FAX MACHINES

FO 300 $1174.00
FO 500 $1579.00

FAX PAPER AVAILABLE

DIGITIZERS

Summasketch/Plus $339.00

TOSHIBA LAPTOPS
call for prices

"We Are The CHEAPEST"

2323 James Ct., Arlington Hts., IL 60004
Nationwide - 1-800-243-7775
Illinois - 312-394-3334

CIRCLE 588 ON READER SERVICE CARD

REACH 1.1 MILLION BUYERS. ADVERTISE IN *The PC World Catalog.* CALL 800-435-7766
In CA: 800-435-7760

Computers/Systems

Name Brands ★ Low $$

EXPANSION BOARDS
AST Sixpackplus (64-384K) $129
Advantage (128k-1.5M) $249
Advantage2 386 for PS2 80 W/Ok ... $429
Rampage (Ok-2M) $189
Rampage 286 (512k-2M) $409
Rampage2 286 for PS2 50/60 ..... $call
Intel Above 286 XT/AT (512k-2M) $379
Above PS 286 (512k-2M) $409
Above Board 2 for PS2 50/60 (Ok-2M) $275
Inboard 386 PC (1M) . $call . AT (ok) $949
Quadboard (0-384k) $129
GRAPHICS CARDS
HERCULES Mono: $189; ... ATI EGA .. $189
QUAD Prosync: $219; ... VEGA Dlx ... $219
HARD DRIVES
SEAGATE Kits from 20mb $279
MINISCRIBE Kits. from 20mb $289
PLUS Hard cards ..... from ... $539
MEMORY 64k, 256k, 1MB, Simms Modules $call
FLOPPY DRIVES: Toshiba for PC, AT: $89; .. 1.2MB: .. $99; .. 3.5": $109
External 5-1/4" drives for PS2 ..... $call
COMPUTERS . . AST, SAMSUNG
Tape Backup. . Maynard, Everex

VLM Computer Electronics
10 Park Place, Morristown, NJ 07960
(201) 267-3268*Visa, MC, Check or COD

Communications/Modems

Sharp FO 300/500/700 $1195/1525/CALL
Sharp UX50/140/160/FO420 $795/CALL
Toshiba Laptops CALL
H.P. LASERJET I CALL
SCANNERS
- P.C. Complete Scanner $245.00 with software 200DPI
- **Shape** Scan 300DPI+Halftone with Card & Paint Brush for PC/Mac. $795.00
- **Panasonic** SF 505 Scanner 400 DPI $995.00

BEST FAX PAPER $4.00/ROLL

FAX Machine 395.00

Panasonic KXF120	$1150
Murata M208AM1600	$795/995
Ricoh 07/10	$1195/1295
Ricoh 20/60	$1595/CALL
Toshiba 3010/3300	$1088/1295
TOSHIBA 3700	$1450
Canon FAX 20/8	$1279/895

Terms: Prepayment Prices Visa/MC+2% COD+2% restock 20% Telephone Products Center, 23591 El Toro Rd., #213, El Toro, CA 92630

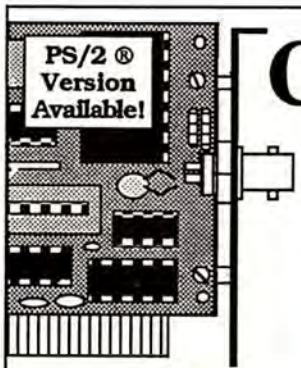
(714) 898-8374 • FAX 714-670-2760

CIRCLE 591 ON READER SERVICE CARD

PRICE UPDATE

Tandy
COMPUTERS AND PRINTERS etc.
Radio Shack
CELLULAR TELEPHONES FAX MACHINES etc.
IN 30 SECONDS
1-800-433-SAVE
CUST SERV (817) 573-4111
24 hrs. FAX: (817) 573-SAVE
FORT WORTH COMPUTERS
377 PLAZA, GRANBURY, TX 76048

CIRCLE 455 ON READER SERVICE CARD



Connect with ARCnet™

*** Top Quality * Tested by Novell * One Year Warranty**

ARCNET CARDS AND HUBS
ETHERNET CARDS
STANDARD AND PS/2 BUSS
CABLES AND CONNECTORS
NETWORK OPERATING SYSTEMS
UTILITIES
MULTIUSER SOFTWARE

Network Support Corporation
Local Area Network Distributors
3701 Kirby Drive, Suite 1110, Houston, TX 77098
(713) 521-1211

"this board functions exactly like the card available from Novell"
[Novell, Inc. Test Bulletin]

CIRCLE 590 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

MITSUBISHI ELECTRONICS

- 80286 / 12MHz/1wait
- 640K RAM
- 20MB fixed drive
- 1.2 MB floppy drive
- Serial / Parallel ports
- 6 expansion slots
- Color EGA monitor
- MS-DOS™ 3.2
- BASIC 3.2
- 1 year warranty

ELS Enterprises, Ltd.
P.O. Box 1418
Oak Park, IL. 60304
(312) 343-4266

CIRCLE 598 ON READER SERVICE CARD

When Speed is Everything. You need the hottest 80386 Supersystem on the market!

EVEREX—Step 386/20

Bench Mark Test
Power Meter MIPS Ver 1.2

Everex 386/20	4.91
Compaq 386/20	4.59
IBM PS/2 Model 80	3.52

-Novell/OS/2/UNIX Compatible
-13 Month on-site service
-Includes MS-DOS 3.3

Call 1-800-33DAYCO

Dayco Computing, Inc.
711 Crandall Ave.
Youngstown, OH 44510
Full line of Everex peripheral products.

CIRCLE 587 ON READER SERVICE CARD

Expansion Units

CALL DRAM CO.

— Lowest Price in Market
— Volume Discounts
— 100% Guaranteed

Dynamic RAMS

1M 120NS, 100NS, DIP & SOJ
256K 150NS, 120NS, 100NS & 80NS
64K 150NS, & 120NS

Policy: Price subject to change. Min. order $20, MC/VISA add 4%. CA residents add 6.5% sales tax. UPS: Ground $5, air $7 (1 lb)

Call for lowest price in the market
(415) 398-2987
Open M-F 9-6
P.O. Box 590127, SF, CA 94159-0127

CIRCLE 595 ON READER SERVICE CARD

640K On MotherBoard

640K RAM without using an expansion slot. Upgrades allow easy insertion of 256K chips on system board. Highly reliable due to reduced heat & chip count. 100% comp. 30-day $ back gtd, 2-yr wrnty. COMPAQ Portable, Zenith151,161: $29 + memory; IBM XT, Portable & 3270: $39 + memory; IBM PC: $49 + memory. Call for current memory prices. $4 s/h. Site discount, dealers welcome.
Aristo Computers, Inc.
6700 SW 105th Ave. #307–J
Beaverton, OR 97005
503/626-6333, 800/3ARISTO

Radio Shack Tandy®

Our 10th year of **DISCOUNTS COMPUTERS & CELLULAR PHONES**
Fgt. Prepaid. Save Tax
Toll Free **800-231-3680**

We will meet or beat . . .
GUARANTEED LOWEST PRICES

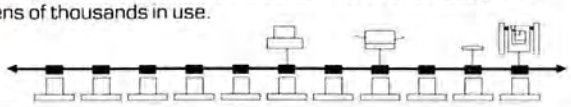
MARYMAC INDUSTRIES INC.
22511 Katy Fwy.
Katy (Houston) TX 77450
1-713-392-0747 Telex: 774132

CIRCLE 563 ON READER SERVICE CARD

Connectivity

Share Printers
Share Plotters
Share Modems
Exchange EMAIL
Transfer Data Files

Systemizing lets as many as 31 computers do *all* of the above and more. It's a distributed processor system that yields up to 62 ports and 31 Meg's of memory! Use almost any brand or model of computer, parallel or serial. Owner installable, remarkably flexible, ***Systemizing*** is uniquely suited to large organizations where people and facilities are constantly being moved, because configuration changes are a breeze. Proven technology with tens of thousands in use.



If you want these capabilities, call now for a FREE DEMO!

Applied Creative Technology Inc.
(214) 358-4800 (800) 433-5373

Systemizing is a trademark of Applied Creative Technology Inc. Dallas TX USA - 1988

CIRCLE 452 ON READER SERVICE CARD

Insurance

Sure it's insured?

SAFEWARE® Insurance provides full replacement of hardware, media and purchased software. As little as $39/yr. covers:
• Fire • Theft • Power Surges
• Earthquake • Water Damage
• Auto Accident • No lists of equipment required

For information or immediate coverage call:

1-800-848-3469
On Compuserve, GO SAF

SAFEWARE

SAFEWARE, *The Insurance Agency Inc.*

CIRCLE 517 ON READER SERVICE CARD

Radio Shack-Tandy

COMPUTERS
PRINTERS
CELL-PHONES
FAX-UNITS, etc.

SHOP AROUND . . . BUY HERE!

NATIONAL
COMPUTER WAREHOUSE CLUB
1200 HWY 377, GRANBURY, TX 76048
Cust. Serv.: (817) 573-0220

CALL FREE **800-433-SALE**
(24 Hrs.-FAX: (817) 573-0227)

CIRCLE 458 ON READER SERVICE CARD

Data Security Insurance offers two policies for computers, each with essential coverages not available elsewhere. As low as $35/year.

DATA SECURITY INSURANCE

INSURE YOUR COMPUTER AGAINST ACCIDENTAL BREAKAGE
1-800-822-0901

CIRCLE 560 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Peripherals

9-Track Tape Subsystem

MINISTREAMER™

Now you can exchange data files between your IBM PC/XT/AT and any mainframe or minicomputer using IBM compatible 1600 BPI 9-Track tape. Unit can also be used for disk backup. Transfer rate is up to 4 megabytes per minute on PCs and compatibles. Subsystems include 7" or 10 ½" streaming tape drive, tape coupler card and DOS or XENIX compatible software.
Prices start at $2,995.

QUALSTAR

9621 Irondale Avenue
Chatsworth, CA 91311
Telephone: (818) 882-5822

CIRCLE 527 ON READER SERVICE CARD

SURGE SUPPRESSOR

A new affordable surge suppressor/power controller. It not only protects your computer and peripherals from power surges, spikes and line noise, but also provides brownout/overvoltage and current usage bargraphs to warn you if you are about to exceed the power limit. This unit has six power outlets/switches and a master on/off switch. It is also capable of protecting against a higher electrical surge than most power protection devices.

Works with any personal computer (14.4"w x 14.5"d x 1.5"h).
Introductory Offer: ▶ Puriden 8 $89
▶ Puriden 9 $89 with voltage & current bargraphs

To order call or write:
SSB Design
17971-G Sky Park Circle, Irvine, CA 92714
(714) 261-6857

CIRCLE 599 ON READER SERVICE CARD

SAVE ON 9 TRACK TAPE SYSTEM FOR IBM PC/XT/AT

- Mainframe to PC Data Transfer
- High Speed Backup
- All Software, Complete System
- Service and Support, easy Installation

call **(818) 343-6505** or write to:
Contech Computer Corp.
P.O. Box 153 Tarzana, Calif. 91356

CONTECH

CIRCLE 506 ON READER SERVICE CARD

Printers

Laser Printer Accessories

•HP 1 MB Memory Expansion	$299
•HP 2 MB Memory Expansion	$599
•HP/Canon EP/EPS New Toner	$ 83
•Recharged Cartridges	$ 47
•HP Jetfont B/$113 •F/$175	
•HP Jetfont Z	$248
•HP Jetfont 4in1 (C,D,E,M)	$248
•HP Jetfont 1-2-3 (Lotus)	$248
•HP Plotter Supplies***	30% OFF

Same day shipping! MC/Visa/COD/Chk

TSA Computer Centre
PO Box 593, 36D Rte 3 N
Millersville, MD 21108
800/TSA-7772

KODAK DATASHOW from $599

• Project Your PC Screen To Large Screen • Solution for EGA, CGA, MAC, DEC and More • Sales and Rentals

BOXLIGHT CORPORATION
(415) 892-4744
Computer Based Presentation Systems Since 1984

CIRCLE 596 ON READER SERVICE CARD

Plotters

The Zericon Model 3600-D Plotter Astounding price and performance for only $2295. (including stand)

INTRODUCTORY OFFER $1,695 Call Now!

Zericon dares to compare value
- **Price:** a full $1,000 less than our nearest competitor.
- **Compatibility:** operates with all popular CAD software supporting DM/PL™
- **Speed:** at 7 inches per second, the 3600-D offers the best price-performance ratio in its class.
- **Repeatability:** .001 inches assures you of drawing quality you can be proud of.
- **Unique:** X & Y axis scaling allows you to calibrate to 1 part in 10,000. Ideal for applications where scale is critical.
- **Vacuum** paper hold down assures perfect registration.
- **High Resolution Circles:** Suitable for PCB Artwork

CALL NOW AND WE'LL SEND YOU A FREE SAMPLE PLOT.
(415) 490-8180

Dealer inquiries invited.

ZERICON
Stevenson Business Park
Box 1669
Fremont, CA 94538
DM/PL is a trademark of Houston Instrument

CIRCLE 532 ON READER SERVICE CARD

CONNECT!

9-TRACK TAPE

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write 800/1600/6250
- Use with IBM, DEC, HP tapes
- Links to FORTRAN, C, COBOL
- Networking capability
- Customized software available
- Powerful data extraction
- Large inventory of Anritsu, Cipher, Kennedy, Qualstar
- Fast technical support
- System prices from $2995

Avoid the middleman—Go direct!

FLAGSTAFF ENGINEERING 602-779-3341 FAX 779-5998

CIRCLE 582 ON READER SERVICE CARD

Share 2 Printers!

This Buffered Automatic Printer Controller has 4 Parallel Inputs, and 2 Parallel Outputs! HP Laser Compatible! Multiple Copies and Numeric Display! 64K Buffer is Expandable to 256K! Automatic or Manual Operation! Your Best 4 to 2 Printer-Sharing Choice !!!

64K Model $299

MaxTech Computer Products
(918) 437-2600
Call for Best Price Switchboxes!
No Minimum. COD's and NAPO's accepted. Shipping + Handling added. 3% surcharge on MC/VISA. FAX No. (918) 438-6198
Prepaids: POB 690958 Tulsa,OK 74169

MaxTech

CIRCLE 511 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Security

DataLock™ Security Card

Prevents Unauthorized Access to your PC

- Password protected system boot
- Activated automatically at power up
- Controls access to all hard/floppy drives, printers, serial network & modem
- Administer passwords and device access rights to as many as 20 users
- Completely menu driven
- Screen-saver
- Floppy disk utilities included
- Easy installation in any available full or half slot
- Secures all PC/XT/AT and 100% compatible PCs, DOS or XENIX

Don't be taken by software-only security that leaves your system bootable by floppy!

PC Cabinet Lock included with every order

$145 + 5 S/H (first three)
CHK/MO/COD/VISA/MC
NY residents add 7 1/2% tax
1 Year Warranty
Call for our free Demo Disk!

MicroDevelopment Corp.
8 Milford Lane
Melville, NY 11747
(516)673-9257

Datalock is a trademark of MicroDevelopment Corp. PC,XT, & AT are trademarks of IBM Corp. XENIX is a trademark of Microsoft Corp.

CIRCLE 547 ON READER SERVICE CARD

CompuTogs Dust Covers

The ultimate in dust protection. Available in natural canvas/brown trim or new designer gray/black trim (add $2/cover). Our covers are far superior to vinyl. TYPICAL PRICES:

MONITOR	15.95	PRINTER (specify)	15.95
KEYBOARD	13.95	MON/CPU	24.95

COMPARE OUR PRICES!

CompuTogs. P.O. Box 19728, Greensboro, NC 27419 • (919) 292-9060

VISA/MC Accepted. Include $2.50 Shipping
CUSTOM EMBROIDERY SHOWN AVAILABLE

1-800-227-TOGS

CIRCLE 559 ON READER SERVICE CARD

Security Kits•Cust Cables

PC Lock secures PC, XT, PS2, & clones, including base, monitor, keyboard, & most peripherals & boards. Attractive 8' steel cable. Lock incl. No tools req. $back guarantee. $50 + $4s/h. Special kits also avail. for Mac & many others. Custom PC Cables, any length, connect any devices. Std. 8' $29.95.

Mac Products
20231 San Gabriel Valley Dr.
Walnut, CA 91789
714/595-4838

Custom Key Imprinting

Customize your keyboard with custom imprinted replacement keys, Keytop Shells, Snap-on KeyCaps & Keytop Labels. Small or large OEM runs. Also, FlexShield™ Keyboard Protectors, KeyStopper™ individual key lock-outs, vinyl templates, original Touchdown™ Keytop Expanders & more. FREE CATALOG.

Hooleon Corporation, Dept. PCWD
PO Box 201
Cornville, AZ 86325
602/634-7515; FAX 602/634-4620

FREE GLOBAL CATALOG

148 page guide to computer furniture, supplies and accessories

Dial Toll-Free
1-800-8-GLOBAL

GLOBAL COMPUTER SUPPLIES
45 S. Service Rd., Dept. CL
Plainview, NY 11803

CIRCLE 508 ON READER SERVICE CARD

LABELING SOFTWARE

for DOT MATRIX and Laser Printers
(Epson/IBM/Oki/LaserJet)

- Labels for shipping, bins, shelves & inventory
- Text readable up to 50 ft.
- 13 text sizes up to 1.2"x1"
- 10 Bar Codes: 11, UPC/EAN, I 2 of 5, MSI, Code 39
- DOD LOGMARS • AIAG
- Flexible Label Size/Design
- Color options • File input
- Menu driven or user program controlled
- FAST • EASY • $279
- Other bar code programs from $49.

Bar Code Readers
PC/XT/AT and PS/2
Plus all compatibles and Kimtron, WYSC-60, Link, & RS-232

- Attaches as 2nd Keyboard
- No software changes
- Rugged metal pen and holder
- Reads I 2 of 5, UPC/EAN, Codabar, Code 39, etc.

All models complete... $399

ALSO: Portables, Lasers, Mag-Stripe. Direct from Manufacturer

WORTHINGTON DATA SOLUTIONS
417-A Ingalls Street,
Santa Cruz, California 95060
800 345-4220
IN CALIF. 408/458-9938
30 Day $ Back Guarantee

Bar Coding

EZBarcode™

Bar Code Reader

Model PC-WEDGE Reader $289.00
- No software changes necessary
- For PC/XT/AT or compatible
- Reads Code 39, 2 of 5, UPC, Codabar
- EZBarcode I printing software included

EZBarcode I Printing Program
(ordered separately) $49.00
- Enter and print Code 39 and UPC-A
- For dot matrix and LaserJet printers
- Vary bar code height, spacing, etc.

EZBarcode II Printing Program ... $99.00
- Keyboard or text file data input
- Prints Code 39, Interleaved 2 of 5, UPC-A
- Automatic incrementing, multiple columns

dBARCODE™ Program prints bar codes from within dBASE III Plus $99.00

TimeKeeping Systems, Inc.
12434 B Cedar Road • Cleveland, OH 44106
(216) 229-2579 • Fax: (216) 229-2573

MISCELLANEOUS/Accessories

Mouse Pads

Co. Logo Specialist.
Grey, Green & Red Pads.
Size: 9¼" × 8" × ⅛"

- 12 pads w/logo $9.50
- 72 pads w/logo $6.90
- 144 pads w/logo $4.70
- 500 pads w/logo $4.14
- 1000 pads w/logo $4.02

ENTIRE pad imprintable.
GUARANTEED to last.
MULTI-COLOR jobs OK.
SAMPLES w/logo $12.50.

Computer Expressions
3833 Chestnut St.
Philadelphia, PA 19104
800/443-8278

SECURITY

PADOLOCK™ physically secures your computer from theft without cables or bolts. Two interlocking steel pads use high-bond acrylic adhesive technology to protect your equipment with 10,000 lbs. of strength. Easy to install. Order keyed different or alike. $ 79.95 + $5.00 shipping

CONTROL POWER™ gives you control over the use of your computer with a key. No unauthorized access. Control Power attaches to any electronic device with a removable, 3 prong power cord. Order keyed different or alike. $69.95+$3.00 s/h

(415) 861-2223

DOSS INDUSTRIES
1224 Mariposa St S.F. CA 94107

CIRCLE 550 ON READER SERVICE CARD

Key Lockout Kits $4.95

For most IBM keyboards. These key-return booster springs are actually better than "lockouts." Keys remain fully functional, but won't depress under normal typing pressure. Great for the caps-lock key, function keys, control keys, etc. Add $1 *per order* s/h or send for *free* fact sheet & price list.

Control-Key Co.
2827-B Anza St.
San Francisco, CA 94121
415/751-8065

Reclaim Your Desk From Your Disks!

with the Vertical Disk Storage System for 3.5" disks

- Holds over 240 Disks; no more juggling disk boxes,
- Mounts on Wall: Reclaims desk space,
- 13.25" × 13.75" × 4": other sizes available,
- Dust covers and office partition hangers available.

Open 7 days. Govt. and Education PO's accepted,
1-800-942-4008 COD, VISA, MC, AMEX
Vertical Solutions • P.O. Box 7535 • Olympia, WA 98507
We Stood Disk Storage On End.

CIRCLE 586 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

PrintBar II
BAR CODE PRINTING SOFTWARE
Print Code 39, 2 of 5, UPC, and EAN bar codes directly from your own programs in dBASE, Lotus, WordStar, C, BASIC, without copying data to special print files. IBM PC/XT/AT and compatibles. Easy set-up. **$295.00**

CodeScan 2000 Bar Code Reader **$495.00**

FREE Brochure (916) 622-4640

Bear Rock SOFTWARE COMPANY, Inc.
6069 Enterprise, Placerville, CA 95667

CIRCLE 557 ON READER SERVICE CARD

BAR CODE & MAGNETIC STRIPE READERS for the IBM PC & PS/2
Simple & quick installation
No additional software or port
Metal wand & case
Also available:
Bar code printing software
Magnetic stripe encoders
Units for other computers & terminals
GSA pricing available

TPS ELECTRONICS
4047 Transport Street
Palo Alto, CA 94303
Telephone: 415-856-6833
Telex: (Graphnet) 371-9097 TPS PLA
FAX: 415-856-3843

CIRCLE 522 ON READER SERVICE CARD

PC WAND

BARCODE BARGAINS

NEW TWEDGE™ BARCODE READER

Fits between a dumb ASCII Terminal and a CPU emulating the keyboard. Ideal for Multi-users.

ITS WANDERWAND has more 64Kb-192Kb, portable, programmable, handheld, lightweight. Simple standard RS232 connection. • Discriminates between label codes, time stamp labels. • Calculates and dumps scans. • Wand included.

ITS5306-PC WAND Barcode Reader. Emulates keyboard. • Works with IBM PCs, ATs, and clones. • Lowest cost. • Simple, proven, durable.

PC-MS/DOS Printing Software. Generate your own bar code labels on your existing printers.

INTERNATIONAL TECHNOLOGIES & SYSTEMS CORP.
635 North Berry Street, Suite C, Brea, CA 92621
PHONE: (714) 990-1880
FAX (714) 990-2503

GUARANTEED LOWEST PRICES
Visa & Master Charge Accepted

CIRCLE 501 ON READER SERVICE CARD

Business Opportunities

Software Dealers Wanted

Perfect Care program needs dealers. We teach how to sell, install & support our medical billing sys. to MDs . . . a profitable high growth service industry. We offer • Training & continuous support • 7 yrs of medical computer exp. • Protected territories nationwide.
Ted Itzkowitz
STI Computer Services, Inc.
251 W. DeKalb Pike-Concord 107
King of Prussia, PA 19406
215/768-9030

Catalogs

PCjr
Expansion Products

Possibly the largest selection of PCjr products in the country. We don't just sell PCjr products, we design them.

- Speed Up Products
- Pseudo DMA Cartridges
- Second Floppy Disk Drives
- 3½ Disk Drives
- PCjr Optical Mice
- Monitor Adapters for PC's
- Parallel Printer Ports
- Full Size Keyboards
- Speech Attachments
- Joysticks, Cables, & Adaptors

Call or write to receive our free 32-page catalog of PCjr Add-On products. For even faster results, circle our reader service number.

PC Enterprises
"The jrProducts Group"
Box 292, Belmar, NJ 07719
(201) 280-0025 (800) 922-PCJR

CIRCLE 516 ON READER SERVICE CARD

IBM PCjr Specials

Full line of IBM PCjr hardware accessories including: Memory expansions, Second floppy drive, Hard drives, Cables, Larger keyboards, Modems, Printer expansions, Manuals, & software. Many more items are available. Send today for the complete catalog.
Computer Reset
Dept. PW, Box 461782
Garland, TX 75046-1782

IBM/Apple Software

Full line of IBM/Apple software & hardware includes Data Base Mgt., spreadsheets, acctg. systems, communications systems, & more for IBM, Apple, or PC comp. Also, computer peripherals, monitors, or printers. Call/write when purchasing software or hardware in these areas: Business/Institutional, Home/Educ., Recreational Software.
Clemco Software
PO Box 1568
Tahlequah, OK 74465
918/458-0282

Computer Insurance

SAFEWARE

Insure your computer. Safeware provides full replacement of hardware, media, & purchased software. As little as $39 a year provides comprehensive coverage. With our blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 10pm EST (Sat 9 to 5)
Safeware, The Insurance Agency
2929 N. High St., PO Box 02211
Columbus, OH 43202
800/848-3469, 614/262-0559

Contracts

For Entrepreneurs

Legal forms for hardware/software developers. Employee agreement, non-disclosure form, contracts for sale (hardware and/or software), consulting, development, hardware/software maintenance, non-competition, copyright notices, software licenses, project delivery & more. Complete, documented, modifiable. $50 + $5 S/H.
Waters Publishing
8235 Douglas #1000
Dallas, TX 75225
800/445-9522, 214/357-7751

Data/Disk Conversion

Data/WP Conversions

MAGNETIC TAPE TO DISK
DISK TO MAGNETIC TAPE
(800/1600 BPI)
DISK TO DISK
SPECIAL APPLICATIONS
Over 2000 Conversions Available. $35 per disk. Quantity discount available.
Magnetic Data Conversions Inc.
180 N. Michigan Ave. #1040
Chicago, IL 60601
800/621-9155, 312/726-6455

TAPE/DISK CONVERSIONS

Conversion services to or from over 1000 computer systems:
- Mag Tapes • Mini Computers
- Micro Computers • Typesetters
- Word Processors

CALL THE INDUSTRY LEADERS

PIVAR COMPUTER SERVICES, inc.

(312) 459-6010
165 Arlington Heights Rd #W
Buffalo Grove, IL 60089

CIRCLE 597 ON READER SERVICE CARD

CONNECT!

YOUR OWN DESKTOP CONVERSION SYSTEM

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write most 8"/5¼"/3½" diskettes from IBM systems and word processors
- Read & write ½" 9-Track tapes from most computers
- Read text from documents, forms, books and magazines using "SPOT" OCR program
- Customized software available
- Fast technical support

Avoid the middleman—Go direct!

FLAGSTAFF ENGINEERING 602-779-3341 FAX 779-5998

CIRCLE 581 ON READER SERVICE CARD

SOFTWARE DUPLICATION

- One Stop Shopping
- Custom Packaging
- Copy Protection
- Technical Support
- Drop Shipping
- Fast Turn-Around
- Competitive Pricing

SATISFACTION GUARANTEED
800-222-0490
In NJ 201-462-7628

MEGASoft
P.O. Box 710, Freehold, NJ 07728
"We are the Industry Leaders"

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Disk Copy Service

Duplication from 59¢
Affordable rates only 59¢ for 5.25" & $1.59 for 3.50" MS/DOS Disk Duplication. *Cumulative Purchase Plan* rates go even lower as you continue to order! *Price Includes:*

- *Quality Brown Disc Media*
- *Duplication + 100% Verify*
- *Label Application*
- *Quick Turn Around*
- *Guaranteed Products*

Diversified Systems Group, Inc.
PO Box 1114
Issaquah, WA 98027
800/255-3142, 206/392-0900

WE HAVE IT!
MAXELL STREAMER CASSETTES ON SALE
Reliable, Convenient and Now Backcoated for Greater Durability
CS500HD $12.00 ea.
CS600HD $14.45 ea.
S&H: $2.00/5

IT'S NEW! IT'S HERE!
2.8" QUICKDISK QD-2
DS 128K $2.85 ea.
3" COMPACT FLOPPY DISK
DS 500K $3.30 ea.
3-1/2" MICRO FLOPPY DISK
DSHD 2.0 MB $5.00 ea. (Gray)
Minimum: 50 disks. S&H: $4.00/100 disks

Toll FREE: 800-258-0028
CALL FOR FREE CATALOG
Prices Subject to Change
MI Res. add 4% tax.

In MI: 800-632-2468
Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
616-452-3457 FAX: 616-452-4914

CIRCLE 526 ON READER SERVICE CARD

The BEST for LESS

29¢ EA

Quality 5¼" DS/DD Diskettes
Min. 100
Guaranteed Two-for-One Replacement
if found initially defective within six months
FREE sleeves, tabs, labels

5¼" COLOR (Min. 100) ... 39¢
5¼" HIGH DENSITY (Min. 50) ... 69¢
Brand Box 5¼" (Min. 10) . $3.99
Brand Box COLOR 5¼" with FREE Plastic Case (Min. 10) ... $4.99
3½" DS/DD (Min. 50) ... $1.09

100% Lifetime Warranty
Shipping: $4.50 per min. order
$2.00 each addtl. lot
MC/VISA Only
1-800-537-1600
Operator No. 174
MEP
Dept. No. 1523 P.O. Box 61000
San Francisco, CA 94161

CIRCLE 512 ON READER SERVICE CARD

SOFTWARE PRODUCTION

- ★ Disk duplication
- ★ All formats
- ★ EVERLOCK copy protection
- ★ Label/sleeve printing
- ★ Full packaging services
- ★ Warehousing
- ★ Drop shipping
- ★ Fulfillment
- ★ 48-hour delivery
- ★ Consultation & guidance

Star-Byte, Inc.
713 W. Main St., Lansdale, PA 19446
800-243-1515 215-368-1200

CIRCLE 519 ON READER SERVICE CARD

Why waste your time formatting disks?

Preformatted disks save you time and money!

Memorex • Nashua • 3M
5¼" (from 48¢) • 5¼" HD • 3½" • 3½" HC
Call toll-free TODAY!
1-800-321-4668
In Colorado (303) 234-0871. Open 8:00 to 5:30 Mountain Time, Monday—Friday.
ALF
ALF Products, 1315F Nelson St, Denver, CO 80215

CIRCLE 502 ON READER SERVICE CARD

Disks

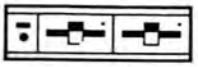
MAXELL
100% CERTIFIED
5¼" BULK DISKS
5¼" DS/DD **59¢**
3½" DS/DD **1.09**
Price based on quantity of 300 includes sleeves, labels and tabs.
800-222-0490
In NJ 201-462-7628
FAX 201-462-5658
● 24 Hour Shipment ●
MEGASoft
P.O. Box 710, Freehold, NJ 07728

AMERICAL GROUP
5 1/4" DS DD 29¢ ea.
INCLUDES SLEEVES & LABELS
MIN. QNTY 200
100% LIFETIME WARRANTY

3 1/2" DS DD (min 25)	1.10 ea.
5 1/4" DS HD (min 30)	.69 ea.
5 1/4" DS HD (Color)	.90 ea.
5 1/4" DS DD (Color, min 100)	.45 ea.

Visa/MC accepted
12132 Sherman Way
N. Hollywood, CA 91605
Shiping $4.00 per min order/$2.00 each additional lot
(818) 765-3040

CIRCLE 541 ON READER SERVICE CARD



BUY QUALITY FOR LESS!
DYSAN
5¼" DS/DD **39¢**
100% CERTIFIED
LIFETIME WARRANTY
Price based on quantity of 250 in bulk includes Tyvek sleeves and label kits.
800-222-0490
In NJ 201-462-7628
FAX 201-462-5658
● 24 HOUR SHIPMENT ●
MEGASoft
P.O. Box 710, Freehold, NJ 07728
Full service duplication facility

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Mailing Lists

FREE CATALOG
Over 2 million names on 75 owner/user lists: IBM, Apple, mini sites, resellers, stores, VARs, chains, mail order dealers, educational, UNIX, Pascal, COBOL, Lotus, *dBASE*, modem, investor, publications, clubs. Call/write for free catalog. NOTE: We do *NOT* sell hardware or software.
Targeted Marketing Inc.
Irv Brechner
Box 5125-W
Ridgewood, NJ 07451
201/445-7196

Publications

PCjr Lovers!
The Junior Report: The 32 page monthly mini-magazine just for you! Each issue is devoted to "How to's" for increasing PCjr compatibility, Q&A, & more. Acclaimed by *PC World* Nov. 6th, 1986, *Family Computing* April 1987. Call or write today for a free sample. $19.97/yr, Canada & Mex. $25.97 (US Funds).
The Junior Report
Dept. W, PO Box 59067
Schaumburg, IL 60159-0067
312/310-9033

Rental

Software Rental
IBM PC users, if you are tired of buying high priced software which does not suit your needs, why not rent! Now you can spend as little as $10 to test the products for a full 14 days to see if they meet your needs before you decide to buy. Send TODAY for free info.
Twintzt Electronic Co.
39 Bowery, Box 396
New York, NY 10002

Supplies

High/Res. Paper/Film
Get high resolution from plain paper laser printers, and color plotters. LASEREDGE™ high resolution Papers/Films are waxable for paste-up. The bright white background, denser image, and finer edge of line will allow enhanced capability for 300 dpi to reproduce on camera. Call or write for samples today. *Visa/MC.*
CG Graphic Arts Supply, Inc.
481 Washington St.
New York, NY 10013
800/342-5858

Long Life Laser Cartridge Recharge
LASTS 30–50% LONGER!
FACTORY LIKE METHOD–NO HOLES CUT!
For Apple, H.P. & 25 more using Canon EP Engines.
100% Money Back Guarantee in writing!
24 hr Turn-Around
SEND $38.50 + $3.00 S/H With Each Cartridge To:
Texas Toner Cartridge Co.
11408 Audelia Rd. #4740, Dallas, TX 75243
214/475-5006 Business Opportunities Available

CIRCLE 546 ON READER SERVICE CARD

reconditioned **TONER** **cartridges!**
for laser printers & Canon PC Copiers
BETTER THAN NEW!
● 20% MORE TONER
● DARKER PRINT
● 100% GUARANTEED
$44.95
We buy empties-$10
call for brochure
800-426-8196
Willow Products Corp.
3857 Willow Ave, Pgh, PA 15234
WILLOW

CIRCLE 535 ON READER SERVICE CARD

LASER CARTRIDGE RECHARGE
Cut your cost in half with recharged laser printer cartridges.
Exclusive toner with blackest print and top quality.
Cartridges last 20% longer.
Money back guarantee.
27 different Laser Printer engines to recharge.
Send empty cartridge with $40 + $3 s/h.
Monthly discounts. Toner available.
LASER SYSTEMS/
TONER TECHNOLOGIES
545 NO. MAIN STE. #4 or
P.O. BOX 407
KAYSVILLE, UT 84037
(801) 547-9736

CIRCLE 570 ON READER SERVICE CARD

Laser Cartridge Recharge
Don't throw out empty toner cartridges. Sell them to us. Cartridge $6.50, cleaner $3, & box + packing $.50. ● PRINTERS: HP, Apple, + more ● COPIERS: Canon PC models ● BUY OUR RECHARGED CARTRIDGES $50, Blu/Brn $70. We supply empty cartridge & felt cleaner. QC test sheet provided. Support available.
Michlin Computer Consultants Inc.
Laser Cartridge Division
3770 Plaza Dr. #1
Ann Arbor, MI 48108
800-63-Toner, 313/663-9800, Telex: 981520

Typesetting

$35 --- RECHARGE --- 35$
Your LASER PRINTER and COPIER CARTRIDGE, and save up to 70 %
*100% guarantee
*super black toner
*free fast delivery (UPS)
*lasts 30-50% longer (more toner)
*safe factory method
*CANON, HP, APPLE, WANG and 27 other CANON style printers and copiers
Send us your empty Cartridge (include fixing assembly) along with $35 + $3 P/H (CA residents add $2.47 tax). Return by UPS
TEIK PRODUCTS,
1531 7TH AVE.
SAN FRANCISCO, CA 94122
(415)6652502

CIRCLE 600 ON READER SERVICE CARD

High-Tech Typesetting
Transmit your text toll-free, error-free via modem to our fully automated typesetting system. $2 per thousand characters, $5 minimum. Same-day service. 200-typefaces, sizes up to 72 point. Send $20 ppd. for our 200 page guidebook, or call toll-free & use your MC/Visa/AmEx.
Intergraphics
106A South Columbus St.
Alexandria, VA 22314
800/368-3342 or 703/683-9414 in DC

SOFTWARE
Accounting

PC-FUND®
The leading fund accounting system for local governments and non-profit organizations. Modules include General Ledger, Payables, Encumbrances, Obligation Tracking, Receivables, Payroll, Budgeting, Fixed Assets and Donor Receipts. PC-FUND runs on the IBM-PC and compatibles under MS-DOS, XENIX, AND most LANs.
American Fundware, Inc.
Box 3028
Steamboat Springs, CO 80477
303/879-5770, 800/551-4458

Fixed Assets System
CFAAS™ is a powerful tool for fixed assets accounting which calculates separate financial & tax depreciation using all standard methods. Easy to learn & simple to use, it edit checks for tax code compliance & prepares tax worksheets. Updated for TRA86. $695. 30 day free trial. Visa/MC.
Comprehensive Microsystems, Inc.
609 Fifth Ave.
Safford, AZ 85546
602/428-7225

MIP Fund Accounting
The MIP Fund Accounting System meets the financial & managerial reporting requirements of not-for-profit & governmental organizations. Modules offered: G/L, A/P, A/R, Payroll, Encumbrance, Expenditure Budget, Revenue Budget & Lotus/dBASE Interface. MIP FAS is available for IBM XT/AT. Also, Network available.
Micro Information Products
505 East Huntland Dr. #340
Austin, TX 78752
800/647-3863, 512/454-5004

dBASE Business Tools
- GENERAL LEDGER
- ORDER ENTRY
- dINVOICER & A/R
- SALES ANALYSIS
- SERVICE BILLING
- ACCOUNTS PAYABLE
- PURCHASING/INVEN.
- JOB COSTING
- JOB ESTIMATING
- PAYROLL

$99 ea + s/h includes *dBASE* 2, 3 or 3+Source Code. MC/AmEx/Visa/chk/COD.
Datamar Systems
4876-W Santa Monica Ave.
San Diego, CA 92107
619/223-3344

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Accounting At Its Best

ACT 1 SERIES

$139.50

+ 11.50 Shipping & Handling

Includes:
- General Ledger
- Accounts Receivable
- Inventory
- Sales Invoicing
- Accounts Payable
- Payroll

1-800-344-2540

GENERAL FEATURES
"LOOKUP" Windows throughout.
Menu driven with 2 help references.
Multi company and report generator.
Sample data files included.
Complete audit trail.
All modules can post to multiple profit centers.
Fully integrated with single source entry.
Date sensitive user-defined fiscal calendar.
User defined financial reports.
User can design checks, invoices, statements & W-2s.
User defined chart of accounts, account numbers & stock numbers up to 15 alphanumerics.

COUGAR MOUNTAIN
S·O·F·T·W·A·R·E.
2609 Kootenai • Boise, Idaho 83707

CIRCLE 553 ON READER SERVICE CARD

Business Applications

Do You Ship by UPS®?
If you do, the Aristo Parcel Shipping System (APSS™) is for you! Meets all UPS requirements. Prints COD & regular labels, Pickup Manifest, etc. Saves customer list. Calculates zones & charges. Flexible setup menu to suit your needs. On-line help. Optional scale interface & other carriers. $395; 60 Day $ back gtd. UPS approval gtd. Ask for full featured demo disk.
Aristo Computers, Inc.
6700 SW 105th Ave. #307-J
Beaverton, OR 97005
800/3ARISTO, 503/626-6333

Linear Programming
MINI-MAX ($395) is saving a copper refiner $10,000 a month. "It's extremely easy to use," says an investment counselor in Oakland, CA. See how linear programming can boost your profits. The demo disk ($35) includes a Beginner's Guide and 70-page manual with 7 examples from business & industry.
ASC, Inc.
PO Box 32, Dept. P
Kingsville, TX 78363
512/595-1937 Telex 6713995

Business Plan on diskette

BizPlanBuilder™

A working business plan template — Over 85 pages of outlines, headlines, started sentences & paragraphs, lists, financial statements, suggestions... Already typed into 29 ASCII text files. Fill in the blanks and edit into a comprehensive plan. A big head-start for managers and entrepreneurs.

From Tools For Sales™

$79.00 (415) 941-9191

CIRCLE 555 ON READER SERVICE CARD

PLACE YOUR AD IN *The PC World Catalog* TODAY.
800-435-7766
In CA: 800-435-7760

Timeslips® III-$199.95
Rated 9.3 by *InfoWorld*! Ram-resident time & expense tracking/billing system, with complete Accounts Receivable. Times activities then multiplies totals against assigned rates. Generates custom invoices (5000+ formats), reports, charts & graphs. Available for IBM PC & compatibles; Macintosh computers.
North Edge Software Corp.
239 Western Avenue
Essex, MA 01929
800/338-5314, 508/768-6100

EZ-FORMS™ *Lite* • $29‡

"Premier Forms Generator & Manager!"

- **Create, Revise, Fill-in/out (pre-printed), File, Print,** all kinds of **FORMS.** Ver. E10
- Line/box draw, ex/import, cut/paste, protect fields, auto-date/time/#. Most printers incl. HP-lasers. upto 132c X 84r, PC/MS DOS 2+, 320K ram. Doc on disk. On-line help, more...
- **With 90+ forms, printed manual–$48+s/h**
- **Forms Library Pack:** 230+ forms. – $79
- **Laser Font Pack** – 5 p & 5 ls soft fonts – $49
- Ask about EZ-Spreadsheet & EZX-WRITE.

‡S/H: $5/US48; $10/AK/HI/PR/VI/Canada; $20 fgn; Texas tax 8%. M.O., USA cks ok.

• Send orders to: **EZX Corporaton**
403 E. NASA, #1777, Webster TX 77598

VISA/MC/AX ORDERS ONLY PLEASE-
1•800•XXX•MXXX ext. W29
Info: **713-338-2238,** BBS:713-280-8180

CIRCLE 589 ON READER SERVICE CARD

Business Bookkeeping
Ingenious no-accounting way to keep accurate books! Print checks, schedule payments, predict cashflow, reconcile statements in a flash. Save accounting fees; send transactions to your accountant electronically. Worth every penny ($395) or money back. Explore in detail & print sample reports with $5 demo.
Microcomputer Specialists, Inc.
PO Box 795
Woodstock, VT 05091
800/833-1500, 802/457-4600

Focus Fund Accounting
Since 1979 the best value in non-profit Fund Accounting. Unique tutorial makes it easy to learn & use. Moneyback guarantee makes it risk-free. Loaded with features & reports. Integrates with AP, AR, Payroll, others. More than 1000 installed. For IBM micros, compatibles, networks. Ask about DEMO.
International Micro Systems
4331 Merriam Drive
Overland Park, KS 66203
800/255-6223, 913/677-1137

FUND Accounting
Automatically reports your most pressing info needs: Mgt. reports, financial stmts., budget comparisons, project expenses. FREE spreadsheet interface. Integrates with AR, AP, Payroll. PC-Network compatible. Demo, pre-sale set up, post-sale training/installation available. 30-days FREE phone support.
Executive Data Systems, Inc.
1845 The Exchange #140
Atlanta, GA 30339
800/272-3374, 404/955-3374

Non-Profits Only
ECHO products have been meeting agency need since 1980 with complete Financial Accounting, Fund Raising Management, Human Services Client Information & Billing systems. All provide rigid audit trails with flexible reporting sub-systems. For more information:
Echo Consulting Services, Inc.
Main Street
Center Conway, NH 03813-540
603/447-5453

TRACK TIME. CAPTURE CASH. NO SWEAT.

▶timeslips® III◀

Perfect for attorneys, accountants, consultants, and ALL service professionals. By automatically tracking time and expenses, TIMESLIPS III gives you faster and more accurate billing. The ability to recover cash that could have fallen through the cracks. And a better handle on your own productivity.

- Memory resident, uses 60K RAM
- Tracks time with a "stop-watch"
- Batch enters time/expense data
- Thousands of custom bill formats
- Generates custom financial reports
- Exports data to spreadsheets and databases
- Auto backup, built-in macros

• Optional "Accounting Link" software bridge makes TIMESLIPS III compatible with Dac-Easy™, Peachtree®, Great Plains™, and many other accounting packages.

(Rated 9.3 by InfoWorld)
"TIMESLIPS is the best time and billing system at any price."
—Chicago Tribune

1-800-338-5314 TO ORDER
Call 508-768-6100 for information/rush service.
$199.95 plus $7.00 s/h
Not copy protected. 30-day money back guarantee.

NORTH EDGE SOFTWARE CORP.
239 Western Avenue
Essex, MA 01929

CIRCLE 569 ON READER SERVICE CARD

CATALOG PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Save Legal Fees By Using LegalEase™

LegalEase™ is a simple, ready-to-use business and legal forms system for IBM® PC's with over 150 time-tested models for contracts, agreements, leases, notices and binding business forms. Edit with PC Write™ WordStar® MultiMate™ or any other standard word processing software. LegalEase™ is menu driven and was written for non-lawyers by a respected Boston attorney, Richard H. Gens.

Now! **The Real Estate and Corporate Modules of LegalEase.™** The Real Estate Module comes complete with a wide range of Real Estate forms. The Corporate Module contains all the basic legal forms for corporate meetings.

Now available! **The High Tech Module of LegalEase.™**

LegalEase: $129.95 (add $7.50 p&h). Both the Real Estate Module and the Corporate Module: $99.95 ea (add $7.50 p&h). Any combination of packages: take $10.00 off each package (add $10.00 p&h).

1-800-628-2828 Ext. 706

LegalEase™

HDG Software, Inc.
381 Old Jail Lane, Barnstable, MA 02630
For faster service, (617) 362-8109

CIRCLE 510 ON READER SERVICE CARD

XA–Spreadsheet LP

World's Fastest linear programming system available today! Use *1-2-3/Symphony* for model formulation. Mixed 0/1 integer variables, generalized lower & upper variable bounds, advanced basis restarting, MPS format, & more. Price–$1 per constraint plus $300 up to a maximum of 1,000 constraints. Educational version $39.
Sunset Software Technology
1613 Chelsea Rd. #153
San Marino, CA 91108
818/284-4763, Telex 289019 SMMB

MILP88—Mixed Integer LP

A general purpose system for mixed-integer linear programs w/700 constraints & 3500 integer, 0/1 or noninteger variables. Reads/writes Lotus files, interactive & batch oper.,spreadsheet display & editing,equation processor, problem/branch list storage, file I/O, download/reload/restart, rpt. generator. $149.
Eastern Software Products, Inc.
PO Box 15328
Alexandria, VA 22309
703/360-7600

OSHA/EPA Reporting

HAZCOM/2® is a DBMS that allows entities to comply with OSHA's Hazard Communications and/or EPA's SARA reporting requirements. HAZCOM/2 allows the user to create & maintain MSDS's, Tier Inventories & Toxic Chemical Release reports. Prepares Federal and/or State facsimile forms. Demo, manual $25. MC/Visa/PO/pp.
PICO Information Systems
4217 Main St. Suite "A"
Springfield, OR 97478
503/726-7823, 503/746-4547 Fax

Complete Office System

POWER DESK is a name/address database, word processor/spell checker, calendar/reminder, calculator, autodialer, alarm, duplicate checker & more for 360K compat. w/HARD DRIVE. It does mail-merged letters, labels, envelopes, custom reports, time/expense logs, invoices + more! $99 + $5 S&H Check/Visa/MC/COD
Software Studios, Inc.
8516 Sugarbush
Annandale, VA 22003
800/272-3375 or 703/978-2339

Church Applications

Parish Data System™

Comprehensive census/contribution program. Easy to operate, menu-driven. Family, member, financial info & reports fully integrated. Selective listings, labels; contribution, tuition statements; personalized letters. User can create own reports, letters. Other church programs available. Over 2500 users.
Parish Data Systems, Inc.
3031 W. Northern Ave. #121
Phoenix, AZ 85051
602/247-3341

ICMS

Most of our clients investigated or even tried the alternatives, but, in the end, they chose the Integrated Church Management System. We've been providing state-of-the-art church software and support for over six years. Call for a demo.

Omega C.G. Limited
377 East Butterfield Road, #675
Lombard, IL 60148
312/969-7799

CIRCLE 556 ON READER SERVICE CARD

CHURCH SOFTWARE

POWERCHURCH PLUS!®
Fast, friendly, reliable church administration system. Membership, full fund accounting, contributions, payroll, payables, multi-user support, & much more - **ALL** for $695 complete! Compare us feature-for-feature against any over-priced package. We're helping thousands of churches with great software at a great price! FREE phone support, no time limit. No high-pressure sales pitch. To order your **FREE** full-working **DEMO** version, call Customer Support.

F1 SOFTWARE
P.O. BOX 3096 BEVERLY HILLS, CA 90212
(213) 854-0865

CIRCLE 562 ON READER SERVICE CARD

CompuBible

- **OUR FAMILY OF PROGRAMS HAVE MORE FEATURES THAN ANY OTHER PROGRAM OR YOUR MONEY BACK!**
- **Find any word or phrase in seconds!**
- **Access the Bible, insert verses and find words or phrases while using your word processor!**
- **KJV, ASV, NIV, NKJ, RSV**

For information on all products call or write:
NASSCO P.O. BOX 65600-222
Lubbock, TX 79464
(806) 866-4223 (800) 262-7726

CIRCLE 514 ON READER SERVICE CARD

Romar Church Systems™

Membership-61 fields, alternate addresses; labels, letters, reports any field(s). Offering-256 funds; pledge option; statements; post 255x/yr. Finance-G/L w/budget; 500 subtotals & 99 depts; month & YTD reports anytime for any month. Attendance-8 service times, 250 events. 60 consec. weeks. Floppy 3½ & hard disk. Ad too short! Write!
Romar Church Systems
Attn CJP
PO Box 4211
Elkhart, IN 46514
219/262-2188

CMS

Church Management Systems are easy-to-use, documented, flexible, integrated and supported. Call or write for information on our comprehensive line of Church & School administrative products. 1000+ satisfied Church, School and Government Users. Demo available.
The Software Library
3300 Bass Lake Rd.
Brooklyn Center, MN 55429
800/247-8044, 612/566-4212

Communications

Computer-Telex-Link

Use your computer for telex communications! Replace that old telex machine with your PC & Cawthon's Computer-Telex-Link. Save Money! Save Time! Increase Productivity! Cawthon's Telex-Link is easy to install & easy to use. Since 1978 Cawthon has been linking computers to U.S. & overseas telex services. Many satisfied customers. Excellent support.
Cawthon Scientific Group
24224 Michigan Ave.
Dearborn, MI 48124
313/565-4000. Telex: 4970016 CAWTHON

Business E-Mail System

PC-tPOST™ is your company's own E-Mail network. Transmit files quickly between branch offices, in-house PCs, sales force portables, & customers. Easy to use & learn, menu-driven, unattended operation, scheduled deliveries, distribution lists, editor, phone directory, remote mail collection, & more! $99 (2-9)
Coker Electronics
1430 Lexington Ave.
San Mateo, CA 94402
415/573-5515

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

PC-HOOKER

Bridges the Lap Gap

Hooker is a powerful and easy to use connectivity tool that hooks any two IBM PC compatibles together and transfer files at amazing speeds. Serial transfers exceed 115,000 baud, parallel is even faster, and nothing could be easier to use. You will be transferring files seconds after opening the package.

Hooker comes with everything you need. Software on 5 ¼" and 3 ½" disks, a Quick start user guide and a universal cable are all included. You supply the computers, and Hooker will do the rest.

Among its many standard features are Hooker DOS and Hooker Edit. Hooker DOS gives you instant access to the most commonly used commands, taking the drudgery out of using DOS. Hooker Edit includes many advanced features found in leading word processors.

For an additional $10 our new Hooker Plus version includes Hooker Phone which gives you complete telecommunication power. For a limited time only Amica is offering Hooker for the introductory price of $59.95, with a 30-day money back guarantee.

Hooker at a Glance

- Connect any two PCs
- Serial and parallel
- Exceed 115,000 baud
- Two way transfers
- DOS organizer
- Full text editing
- Talk mode
- Hayes modem support
- Print facilities
- Universal cable
- 5 1/4 and 3 1/2 disks
- PS/2 ready

AMICA

To Order call toll free
1-800-888-8455

102 South Main Street, Park Ridge, IL 60068 312-825-0110

CIRCLE 503 ON READER SERVICE CARD

Data Entry

Data Entry Emulator

Fast, accurate heads-down data entry and two-pass verification for PCs. Quick & easy paint-the-screen formatting. Features include: auto-dup, constants, format chaining, range checks, table lookups, batch totals, logic fields, operator stats, optional 129 keybd & lots more. Free 30 day trial. PCs $395.
COMPUTER KEYES
21929 Makah Rd.
Woodway, WA 98020
800/356-0203, 206/776-6443

KeyEntry III®

Multi-User Data Entry System. A complete data entry system for multiple users running in a LAN, or in a stand-alone environment. Provides all necessary tools for designing data entry applications, controlling data flow, & monitoring/reporting operator activity & performance. Complete evaluation copy (all programs & documentation) avail. Call for your copy today!
Southern Computer Systems, Inc.
2732 Seventh Ave. South
Birmingham, AL 35233
800/533-6879, 205/251-2985

VDE–Viking Data Entry

The premier data entry system. Full-featured to replace key punch & keydisks. Full screen "FORMS", double-key verify, wide variety of options, crossfoots, subtotals, batch balancing, duplicating, statistics, skipping, etc. Character, field & record level validations. $120-600. Also for minis.
Viking Software Services, Inc.
2815 East Skelly Dr.
#816, Tulsa, OK 74105
918/745-6550

Desktop Publishing

SPOT pointe erkennen

A revolutionary OCR program that can read printed characters in over 100 languages. Your PC can now read books, magazines, journals, newspapers, contracts, invoices, government publications, manuals, typewritten articles and documents. SPOT works with most low cost desktop image scanners and can read a page in less than one minute using an 80386 PC. SPOT can be trained to read almost any printed character set with high accuracy. SPOT is only $995. Call today!

FLAGSTAFF ENGINEERING 602-779-3341 FAX 779-5998

CIRCLE 580 ON READER SERVICE CARD

Construction

Construction Management

Affordable, understandable software for builders. Job cost, billing time & materials or percent complete, payables, change order & retention tracking in one package. Prints checks, statements, bids, 30 + reports. Clear manual & help windows, backed by our professional phone support staff. $795.
Yardi Systems, Inc.
930 Laguna St.
Santa Barbara, CA 93101
805/966-3666

Cost Estimating System

Powerful, comprehensive system for building fast, accurate and competitive estimates. A complete, stand-alone program. Menu-driven, very easy to use. Over 30 types of reports. IBM XT/AT and compatibles. Hard disk 512K dBIII version with source code also avail. System $245, demo $15 (CA add tax), CK/MO/COD.
CPR International, Inc.
2038 Lakeshore Ave.
Oakland, CA 94606
415/268-1948

Data Base

SQL/QBE, dBase & Lotus

dQUERY 2.1 is an interactive query system & report writer on dBASE & LOTUS files using SQL (IBM DB2 compatible) & Query-By-Example. Its nice windowing facilities let users easily do ad hoc queries on their dBASE & LOTUS Files. $150. dQUERY/lib is a C-callable SQL lib (dQUERY 2.0 included). $295. $5 s/h.
Quadbase Systems Inc.
790 Lucerne Drive #51
Sunnyvale, CA 94086
408/738-6989

FREE
DATABASE CATALOG
Unique 28-page catalog of Databases on diskettes for the IBM-PC
1-800-443-8834
In CA (714) 661-5885
MELISSA
DATA COMPANY
32118-8A Paseo Adelanto
San Juan Capistrano, CA 92675

CIRCLE 592 ON READER SERVICE CARD

Everyone is talking about
RODE/PC* from *DPX

DATA ENTRY

"We evaluated all of the PC-based data entry systems. RODE/PC and the DPX organization stood out as clearly superior." – Computer Manufacturer

Six of the ten largest companies in the U.S. and most Federal Government agencies have selected ***DPX*** to lead them into PC-based data entry. Call today for your evaluation copy of ***RODE/PC***.

DPX– for experience, quality, and service
20825 Stevens Creek Blvd.
Suite 150
Cupertino, CA 95014
(408) 973-9292

CIRCLE 558 ON READER SERVICE CARD

REACH 1.1 MILLION BUYERS. ADVERTISE IN *The PC World Catalog*.
CALL 800-435-7766
In CA: 800-435-7760

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

COREL Desktop Publishing Software

TABIN for WordPerfect, Ventura, PageMaker, WORD etc. $99
- Replaces spaces with TABs to facilitate great looking tables (with proportional fonts) from Lotus, Paradox, DB3, ASCII, etc. Great time saver!

✓ *"☆☆☆☆☆ Rating - on all points the winner!"- Bill Crider, Publish Magazine July '88*

HEADLINE for Ventura, PageMaker, WordPerfect, etc. $185
- Liven up your documents! Easily creates dazzling special effects for headlines, logos etc. 43 samples are included to illustrate the endless possibilities. (EPS File format)

✓ *"The results can be spectacular!" - Edward Mendelson, PC Magazine June'88*

NEWFONT for Ventura $185
- Modify any of your existing fonts with 13 variables such as outline, shadow, skew etc. and then include the renamed font in your standard Ventura menu.

✓ *"Add Newfont to your software list!" -Daniel Will-Harris, Personal Publishing June '88*

VENTURA UTILITIES for Ventura $99
- *Styler* prints style sheets, *Psprint* turns your Postscript printer to Diablo mode, *Vpcopy* copies Chapter files, *IK* allows special key characters, *+More*

✓ *Annual Software Roundup "Best Buy!"-Eric Brown, PC World July '88*

LOADER for all Postscript Printers $59
- Loader saves printing time by allowing downloading of Adobe fonts.

Please send me:

☐ TABIN $99
☐ HEADLINE $185
☐ NEWFONT $185
☐ VENTURA UTILITIES $99
☐ LOADER $59
Shipping (1 day Courier) . . . $18
TOTAL (US) . . . . . $____
☐ Check or money order included

☐ Visa ☐ Mastercard ☐ AMEX

Card # Expiry Date
Name Signature
Address
City State
Zip Phone

COREL, 1600 Carling Ave., Ottawa, Ontario K1Z 8R7. (613) 728-8200

CIRCLE 454 ON READER SERVICE CARD

VIDEO INSTRUCTION TOOLS

Throw away your computer manuals and learn by watching and following the instructions of a professional. Learn:

Intro To Computers (1½ hours)	$99.95
Lotus 1-2-3 (3 hours)	99.95
Wordperfect 4.2 (3 hours)	99.95
Wordperfect 5.0 (4 hours)	129.95
DOS (3 hours)	129.95
Ventura Publisher (2 hours)	159.95
Ventura - techniques (2 hours)	179.95
Pagemaker - PC (2 hours)	179.95
Pagemaker - MAC (2 hours)	179.95

All videos are professionally produced, showing the computer screen and keyboard simultaneously. These are *not* lecture tapes! They are self-contained training guides which allow the user to see a particular command executed on a video screen and then repeat that same command on his/her computer. Each kit includes carrying case and workbook.

Call for Product Information
1-800-537-1641

IN MI CALL (313) 729-0325
MICHAEL HALVERSON & ASSOCIATES
1313 Newburgh
Westland, MI 48185

CIRCLE 578 ON READER SERVICE CARD

Structural Design

Fast, highly interactive, integrated programs for structural analysis & design of BEAMS, COLUMNS, TRUSSES & FRAMES of any material. Easily mastered programs result in dramatic time savings while producing efficient, accurate designs. Specify PC, XT or AT & send $25 for demonstration disk to:
C-Squared B-Squared Software Design, Inc., Dept. A-1
461 Bush St., Suite 220
San Francisco, CA 94108
415/391-7309

Simulation

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. Specifically designed for interactive use on today's high-speed microprocessors, it is loaded with features such as interactive graphics & animation. Using GPSS/PC, predict the behavior of complicated real-world systems.
Minuteman Software
PO Box 171/W
Stow, MA 01775-0171
800/223-1430 x315, 617/897-5662 x315

Educational

Grade Week Vacation!

Average and print out your grades with the fast, easy-to-use AEIUS GRADEBOOK V2.4. Won Classroom Computer Learning Magazine's 1988 Software Excellence Award. Free literature. Shareware disk with tutorial only $10 ppd. Program, printed manual, phone support, and updates for only $35 ppd. Visa/MC.
AEIUS CORP.
PO Box 700457
San Jose, CA 95170
408/257-0658

The GMAT Course

Covers every type of exam question with instant feedback, solutions, timed tests, personalized score analyses, math & grammar reviews. Designed by MBAs, the program has improved scores by as much as 250 pts! 5 disks + manual. *PC-Magazine* Editor's choice. $59.95 + $4 s/h. Visa/MC/chk.
Comwell Systems, Inc.
2100 S. Rural Rd. #2
Tempe, AZ 85282
800/255-2789, 602/894-6866

New GRADEBOOK II!

The comprehensive grade analysis software-handles 200 students/class, any number of classes. Calculates course grades your way. Predicts course grades. Calculates statistics. Ranks students. Posts grades. Averages. Alphabetizes. Corrects grades/auto corrects averages. Progress reports. And more! $49.50
Wren Software Inc.
Dept. W
PO Box 1138
Castle Rock, CO 80104

PC-Quizzer

Courseware Authoring System. Ideal for home & School. Ask Multiple Choice, True/False, Fill-in & K-type questions. Menu driven, Windows, Music, Speech, Color Text & Graphics. 256 colors on PS/2. Many other features. Improve Grades for only $35. A Site license is available.
Data Assist
6555 Busch Blvd, #148
Columbus, Ohio 43229
614/847-8348

SOFTWARE VIDEO TRAINING

- All popular PC training courses available Lotus, WP, DBase, DOS, PC's etc...
- Information packed quality videos - We use traditional and professional teaching methods
- Great for repetitive training anytime anywhere
- Beginner and advanced classes each 2 hrs. in length

Beta - VHS Versions

$79.95 per class

MICRO PLUS TECHNOLOGIES, INC.

Extension 857

1-800-628-2828

Engineering

$39.95 CAD

Fully featured, symbols, auto dimensioning, hatching, fillets, reads DXF, handles all but the largest drawings. Extremely powerful BASIC-like macros, on-line manual + so much more. Requires IBM XT/AT/PS2 with 640K + hard disk. 20,000 new users this year.

PAFEC, INC.

5550 Peachtree Parkway
Norcross, GA 30092
1-800-52PAFEC (404) 441-9300

CIRCLE 594 ON READER SERVICE CARD

Entertainment/ Games

NEMESIS™ Go Master™

Go, a game of rare elegance and simplicity, has been a way of life in the Orient for over four thousand years. Packed with features, NEMESIS™, the world's strongest program, is an ideal playmate and tutor. Jerry Pournelle named it game of the month *twice*:

"If you are interested in Go, buy this program." BYTE 7/87

$79 for Go Master™, $49 for Joseki Tutor™ Add $3 S&H

Toyogo, Inc. 76 Bedford Street, #34-W
617-861-0488 Lexington, MA 02173

CIRCLE 565 ON READER SERVICE CARD

PC-GLOBE

Put The World At Your Fingertips!

With 100s of colorful maps and an extensive database for 177 countries, PC-GLOBE offers info on topics ranging from demographics and economics to climate and tourist sites. Incl. 5 disks, runs on color IBM-PCs (5¼" or 3½"), 2FL or hard disk.

PC MAGAZINE Editor's Choice

ONLY **$59.95**

CSI **Comwell Systems, Inc.**
2100 S. Rural Rd., #2 **800-255-2789**
Tempe, AZ 85282 **602-894-6866**

CIRCLE 573 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

STATBOOK SERIES

Features include printing of player/team game, y-t-d & lifetime stats; team/league leaders & team standings. Number of players/teams limited only by disk space. Ideal for high school, college, amateur and professional teams/leagues. Football $69, baseball/softball $59, basketball $49 and hockey/soccer $49. Also league scheduler $55. MC/Visa.

RJL Systems
106 New Haven Ave.
Milford, CT 06460
203/878-0376

Adult Software

For IBM PC, XT, AT, PS/2 & Compatibles
GRAPHICS CARD NEEDED

Volume I	$11.95 ppd
Volume II	$11.95 ppd
Volume III	$16.95 ppd
New Series	
M1 thru M7	$5.00 each ppd
Catalog Diskette	$4.00 ppd

World's Largest Distributor
Check, Money Order, Bank Check Accepted

AOS
P.O. Box 106
Marion, CT 06444
Must State Age is Over 21

CIRCLE 461 ON READER SERVICE CARD

Execamort™ Amortizer+

Loan Amortization's simple/complex, extra pymts, points/fees, APRs(per Reg. Z), balloons, solve for unknowns, yields/IRR, PV, FV, store/retrieve, more. IBM PC/XT/AT/PS2/compat. Simple yet complete–great for client services. Acclaimed nationwide by Banks/CPAs/CUs/Finance/Legal/R.E./S&Ls. $149.95 + $5 shipping. Visa/MC/AmEx.

Electrosonics
36380 Garfield #1
Fraser, MI 48026
800/858-8448, 313/791-0770

LOAN MAKER™ $89.95

Godfather of Loan Calculation & Amortization Programs. Instantly computes results. Used by CPAs, atty., banks, etc. Makes amort schedules for Level, Specified Amt., & Decreasing Pymts for any time period. Balloon Pymts. Save/Recall/Delete schedules. IBM/comp. Superb manual. Demo $2; demo + manual $20, credited on program. Visa/MC/AmEx/chk.

Powder River Properties, Ltd.
1510 Stone St.
Falls City, NE 68355
402/245-2029 (24 hr)

HI-TECH LOTTO ANALYZER

THE LOTTO EDGE

Quality Computer-Assisted Number Analyzer

You make your analysis and choose your game-play numbers from computer calculated displays and reports. Data is based on your state's winning number history, using hi-tech statistical methods. You update weekly. Min. 256K. Programs, manual, one state's data, $44.95 + $3.00 shipping and handling. Each additional state $10.95. Credit card: *800/992-4045, ext. 439 (CA): 800/331-5236, ext. 439. Check/M.O.:*

The LOTTO EDGE, ODDS UNLIMITED, P.O. Box 1223, Addison, IL 60101

PLAY TO WIN
LET YOUR PC DO THE WORK!

CIRCLE 549 ON READER SERVICE CARD

Financial

The Right Time System

The Stock, Index & Futures programs generate accurate Buy/Sell signals for individual stocks, indexes & commodities. The software was developed by an expert portfolio manager for his own personal use & are now available for any smart trader who wants to make quick profits. Call or write for free info.

T.B.S.P., Inc.
2265 Westwood Blvd. #793
Los Angeles, CA 90064
213/312-0154

Stock Analysis

Individual Investor Security Technical Analysis: fast manual data entry w/many error tests, analyze 800 daily/weekly pts, 10 techniques, security sets, Bar Chart 256 pts, scroll 800, auto controls, save trendlines, fast, 140pg manual w/examples, sample data, CGA/MCGA DOS 2.0+ $80+$5s&h + NY tax. Free brochure.

Cynosure Software
PO Box 65 Dept W
Syracuse, NY 13209
315/468-3594

NumberCruncher™

RAM- resident calculator with 35 functions! Basic functions. Scientific equations. Programmer calculations. Plus financial calculations, including:

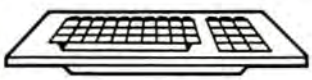
- IRR
- Loans
- NPV
- Annuities
- And Much More

Insert results into any program with a single keystroke!
IBM and Compatibles
VISA/ MC/ Amex

$19.95

Good Software Corp.
13601 Preston Rd. Suite 500W
Dallas, Texas 75240
(800) 272-GOOD

CIRCLE 456 ON READER SERVICE CARD



FundManager™ $49.95

Complete spreadsheet program tracks mutual fund portfolios • Requires Lotus 1-2-3 v2 or later • Menu driven, graphics, moving averages, stop-loss & compare features • NAVs adjust • Reinvest option • Alpha/Beta • Indexes • NAV history via CIS, manual or sold separately • Free Info, VISA/MC/Chk, S/H $3.

PERFORMANCE APPLICATIONS
18321-149th Avenue, S.E.
Renton, WA 98058
206/226-5921

M. D. KRAM Won $74,000

finishing 1st of 484 using his ULTRA-PICK computer program at

CAESARS PALACE
Las Vegas, Nev.
World Cup
Thoroughbred Handicapping

ULTRA-PICK	$395.00
EXACTA	$995.00
TRI-FECTA	$5,000.00
HANDICAPPING	$99.95

215-435-4178

CIRCLE 457 ON READER SERVICE CARD

"I was impressed. It (MONEYCOUNTS® 4.0) wins the cost-effective award." John Dvorak, *PC Magazine*.

Now there's **MONEYCOUNTS® 5.0...** an unbelievable buy at just $29!

Easy-to-use CPA-designed money management/accounting program for home and business. **MONEYCOUNTS® 5.0** gives you cash, checking, savings & credit card management, checkbook balancer, budgeting, financial statements, graphics, fast financial data base with three-way look-up, inquiry reports, on-line help, **printed manual.** Handles up to 999 accounts and 100,000 transactions. **Not copy protected.**

Now Version 5.0 also:

- prints any type of pin-feed check and updates your records automatically
- estimates your 1988 income tax
- analyzes financing options, savings programs...computes interest rates, loan payments...prints amortization schedules
- manages mail lists—zip and alpha sorts—and prints labels and index cards
- provides password protection, fiscal year support, and pop-up notepad.

Call or send $29 plus $5 shipping/handling. Check/VISA/MC/COD
1-800-223-6925
(in Canada 319/395-7300)

Personal Technology

Dept. W • 373 Collins Road NE • Cedar Rapids, Iowa 52402

CIRCLE 515 ON READER SERVICE CARD

Win Lotto Millions!

LOTTO PICKER

NEW! LOTTO PICKER PLUS v2.1, stores past Lotto, Keno, & Daily #'s & uses various probability analysis to select your possible million $$ ticket! Bonus #'s are easily handled. Access your files with our editor. GUARANTEED to work for all lotteries worldwide! We give you the PICKS – not a bunch of jumbled statistics! For IBM, C64/128, & 64k Apple II **$34.95** (+ $5.55 s/h) For a 3.5" disk add $10

ORDERS 1-800-634-5463 x 293

RIDGE
GE RIDGE SERVICES, INC.
170 B'way, Suite 201PCW
New York, NY 10038
Info 718-317-1961

NY residents must add sales tax. Write for further info.

CIRCLE 584 ON READER SERVICE CARD

Amortizer Plus™

MORE THAN 5000 SOLD!!

Calculate and print complete amortization schedules for any type of loan with this easy to use program. Features include:

- Balloon Payments
- Negative Amortization
- APR
- Rule of 78's
- Irregular Payments
- Leases
- Wrap Notes. "What if" scenarios are quick and easy.

IBM and Compatibles
VISA/ MC/ Amex

$99.95

Good Software Corp.
13601 Preston Rd. Suite 500W
Dallas, Texas 75240
(800) 272-GOOD

CIRCLE 460 ON READER SERVICE CARD

CATALOG

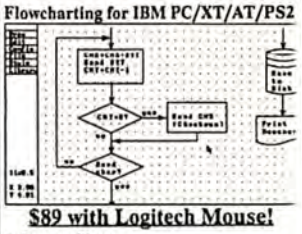
PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Flow Charting

TurboFlow $69

Flowcharting for IBM PC/XT/AT/PS2



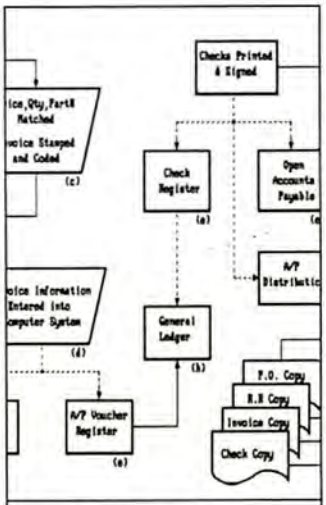
$89 with Logitech Mouse!

- Curves, ellipses
- Variable size symbols
- User defined library
- Paper size to 34" x 44"
- Pop-up icon menus
- Hercules mono, CGA, EGA
- Automatic PAN to scan drawing quickly
- IBM/EPSON, NEC, OKIDATA, LaserJet
- HP-GL, DM/PL, SweetP plotters

Daytron Electronics
610 S. Sherman #104, Richardson Tx 75081
Add s&h $4. Texas residents add 8% sales tax.

Money-back Guarantee
Order Today! 1-214-669-2137

CIRCLE 561 ON READER SERVICE CARD



Flow Charting II+
Where Ideas Take Shape

Flow Charting II+ will *amaze* you with its speed, power and simplicity.

- Update and print charts as fast as the situation changes
- See your revisions right away—no long wait for charts to be hand drawn
- Select 26 standard shapes; 10 text fonts
- Tutorial manual makes learning easy
- Runs on IBM or compatibles. Only $229.

For more information, see your local retailer or call 1-800-525-0082, Outside California 408-629-5376, California/International

81 Great Oaks Blvd., San Jose, CA 95119

PATTON & PATTON
Software Corporation

CIRCLE 529 ON READER SERVICE CARD

Graphics

35mm Slide From Your PC
COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your printouts behind. Use high-resolution color slides (up to 4000 line) at your next presentation. COMPUTER SLIDE EXPRESS $9/slide.
Visual Horizons
180 Metro Park
Rochester, NY 14623
716/424-5300

FORTRAN Graphics!
Now get complete graphics support on screen, printer or plotter. Grafmatic (EGA,Herc.), Plotmatic (HP, HI plotter), Printmatic (printer) give you 2-D & 3-D graphics support w/MS, Lahey or R/M FORTRAN. Optional font module too! $135 each. Discount for 2 or more programs.
Microcompatibles
301 Prelude Drive
Silver Spring, MD 20901
301/593-0683

RAINDROP™
FAST, flexible, easy to use, compact T-S-R utility to send screen graphics to your 9 or 24 pin dot matrix, ink jet or laser printer. Create quality b/w or color printer graphics from applications AND user written programs. Full 24 pin support. Many options. Complete driver library $39.95.
Rainbow Technologies
8106 St. David Court
Springfield, VA 22153
703/440-0064

REACH 1.1 MILLION BUYERS. ADVERTISE IN *The PC World Catalog*. CALL 800-435-7766
In CA: 800-435-7760

GRAFPLUS
Power Pack Your PrtSC Key!
Only $49.95

Grafplus™ turns any IBM or compatible graphics application into a powerful communicator by printing exactly what you have created on your computer screen.

- Link into Pagemaker or Ventura
- Scale the image to any size
- Print in color, black-on-white, white-on-black
- Print vertically or horizontally
- Work with virtually any bit-mapped dot matrix, laser, or inkjet printer

Jewell Technologies, Inc.
4740 44th Ave. S.W. Suite 203
Seattle, WA 98116
206-937-1081

CIRCLE 525 ON READER SERVICE CARD

ECONOMICAL FAMILY ORIENTED SOFTWARE

(for IBM or Compatibles)

Family Software Potpourri Group I $45
(a variety of useful general purpose programs, viz. a PC tutorial, a subject indexer, a sort/merge program, a program to help your family make decisions)

Family Software Potpourri Group II $45
(a collection of programs to help with the family finances, viz. a family budgeting program, a loan amortization program, a check and credit card register program)

Family Software Potpourri Group III $45
(a complete family business accounting system, knowledge of bookkeeping helpful)

Family Software Potpourri Group IV $95
(a complete genealogy system, pedigree charts, family group sheets, descendant charts and much more)

SAVE $20 by ordering groups I, II & III [illegible]

FAMware™
1580 East Dawn Drive • Salt Lake City, Utah 84121
(801) 943-6908 / (800) 327-9835

CIRCLE 571 ON READER SERVICE CARD

Health

Diet Wise–Energy Wise
Ideal for individuals interested in nutrition, fitness, weight control, or special diets. ENERGY WISE calculates calories used in exercise & daily activities. DIET WISE analyzes diets, recipes, & menus. Designed by Registered Dietitians. $39-$120. PC/MS-DOS. Also inquire about NUTRIPAK PROFESSIONAL version.
Nutritional Data Resources
PO Box 540
Willoughby, OH 44094
800/NDR-DIET, 216/951-6593

Analyze Diets, Menus &
so much more with The FOOD PROCESSOR II! This TOP-rated software has the best database of any system on the market today! Acclaimed by schools-colleges-hospitals-homes-fitness centers & business nationwide. 2400-3000 foods 30 nutrients. $250. IBM-Apple-Macintosh. CALL OR WRITE TODAY FOR FREE DEMO DISK!
ESHA Research
PO Box 13028
Salem, OR 97309
503/585-6242/7755

Home Use

FAMILY ROOTS™
Do it YOUR way! Huge variety & capacity for your family history. Makes pedigree & descendants charts, group sheets, individual sheets, indices, histories, address labels, searches, & much more. Free brochure & sample printouts. Satisfaction guaranteed. Any PC or compatible. $185. MC/Visa/AmEx welcome.
Quinsept
Box 216
Lexington, MA 02173
800/637-ROOT, 617/641-2930

ROOTS™

Genealogy Software to Make *Your* History

ROOTS III (new!).....$250.00
ROOTS II.....195.00

CALL TODAY FOR FREE CATALOG
(800)327-6687
In California, call (415)967-1900

COMMSOFT
2257 Old Middlefield Wy Mtn View CA [illegible]

CIRCLE 505 ON READER SERVICE CARD

Genealogical Computing
The exceptional content of *GC*'s special Eighth Anniversary issue (Vol. 8:1) provides in-depth reviews of revolutionary software: PAF 2.1, ROOTS III, LINEAGES, Word-Cruncher. William Dollarhide announces Genealogical Event Database. Major standards article to be published in Vol. 8:2. Annual subscription $25.
Ancestry, Inc.
PO Box 476
Salt Lake City, UT 84110-0476
800/531-1790

Inventory Control/ Management

"THE COLLECTOR"™
NEW RELEASE—April 88. Stamp, Coin, Doll, Train, Antique, Gun, you name it, Collectors (and your insurance co.) will love it. Holds up to 225,000 items, all sorted alph/numeric, with cost/cur val at touch of key. For PC/PCjr/XT/AT/PS2 or similar (256K DOS 2.0+). Write/call for free brochure, or $65 + $3 s/h. Visa/MC.
The Third Rail
3377 Cimarron Dr.
Santa Ynez, CA 93460
805/688-7370

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Mr. QuarterMaster
Features: receipts & issues updating; inventory, reorder usage and other reports; file maintenance; issue slips/invoices; reorder points adjusted automatically or manually. Price: $123. Manual alone with demo: $23. Specify stockroom or retail version. Also available: Sales reporting, P.O., Estimating & Multi-whse I.C. systems.
RJL Systems
106 New Haven Avenue
Milford, CT 06460
203/878-0376

Languages

Online JCL!
Reference IBM OS & VS Job Control Language online via an interactive JCL Manual! Selfpaced instruction! Nearly 250 Keywords & Acronyms! 300 Pages & Screens! Basics & Advanced Techniques with workshops. NEW! Two diskette drives or a hard disk. IBM PC & compatibles. $49.
DP Educational
6144 Sun Patterns Tr.
Fairfax Sta., VA 22039

Will-Planner™
Tutors you in estate-planning concepts & terms. Creates a comprehensive will & trust for your circumstances & state of residence. Designed by attorneys for laypersons. Personal Version uses 2 floppies or hard drive $79.95; Family Version uses hard drive $89.95 (plus $5 shipping, $10 foreign).
Noetic Technologies Corp.
PO Box 3085
Englewood, CO 80155
orders & info: 303/770-2380

PostWare Mailing System
Automate mail prep. Reduce postage by up to 5¢ per piece! PostWare assigns carrier route numbers, sorts by US Postal Service regs & prints labels in pkg. & sack mailing order. Sack tags, tray labels & mailing reports. Works w/*dBASE III*, *DataEase*, Smart, Power-Base & others. Also ASCII.
- 1st & 3rd Class-$195
- 2nd Class-$395
- Carrier Route-$300

PostalSoft
515 Division St.
LaCrosse, WI 54601-4544
800/831-6245, 608/784-3500

dFELLER Inventory
A business inventory program written in modifiable dBASE source code. The menu-driven program lets you locate items by inventory name or number. It keeps track of reorder points, vendors, average cost, & other info $150. dFELLER PLUS with Purchase Orders & History $200. Requires *dBASE II* or *III* or *III PLUS*.
Feller Associates
550 CR PPA, Route 3
Ishpeming, MI 49849
906/486-6024

LAHEY FORTRAN

If you demand the very best, then you should be using a Lahey PC Fortran Language System.

F77L-EM/32-Bit	**Programs up to 4 GB on your 80386**	**$895**
F77L-EM/16-Bit	**Programs up to 15 MB on your 80286**	**$695**
F77L	**"Editor's Choice" *PC Magazine***	**$477**
Lahey Personal	**Full 77 Standard, Degbugger, Linker**	**$ 95**

For porting or developing, there is no substitute for a Lahey Compiler. Call (800) 548-4778 today to discuss your programming needs.

Lahey

Lahey Computer Systems · P.O. Box 6091 · Incline Village, NV 89450
Tel: (702) 831-2500 · Fax (702) 831-8123 · Tlx: 9102401256

CIRCLE 552 ON READER SERVICE CARD

"The Mail Order Wizard
is one very powerful program. It offers a catalog business all the computing routines it needs-and then some!...gives new meaning to the hackneyed phrase, 'user friendly'... Written in Assembler, it operates with lightning speed... very serious software, a 'must see.'" *Catalog Age*. $970. Demo, $12.
The Haven Corporation
802 Madison, Dept. W
Evanston, IL 60202
800/782-8278, 312/869-3434

Stock-Master 4.0
This commercial grade, high performance inventory system for Mfgrs has Stock Status Rptg, Trend Analysis, Purchase Order Tracking, QC Rptg, Transaction History Detail Analysis, Multiple Whse Locations, Bill of Materials & Purchase Order Writing. On minis since 1978, expanded/priced for micros. Demo avail.
Applied Micro Business Systems
177-F Riverside Ave.
Newport, CA 92663
714/759-0582

Laser Fonts

$5 FONTS
HP compatible soft fonts for your laser printer. Dozens of type styles, logos, digitized images & custom fonts available.
- Fixed & Proportional
- Portrait & Landscape
- Regular-Bold-Italic-Italic Bold
- Point sizes-6 to 108

For FREE catalog, contact:
EAGLE SYSTEMS
PO Box 502
Moorpark, CA 93021
805/529-6992

Mailing List Programs

Pony Express XL 2000
For commercial & large lists. Fast machine code multisort. Prints labels 1-5 across, single line or user-defined format. Also CHESHIRE FORMAT. Records selected by user-defined codes, zips or zip ranges. Auto repeat for ease of record entry, corrections & deletions. Phone list option. Includes full function word processor. Merges w/most other word processors. $238. Economy ver. $98.50
Computech
975 Forest Ave.
Lakewood, NJ 08701
201/364-3005

DOCTOR DATA

"Just what the Doctor Ordered"

DOCTOR DATA Label™ is a Friendly, Menu-Driven Professional Mail Manager. Data files are dBASE III compatible. Prints bag labels & reports. Print 1-9 across on anything in any order. Bulk & CAR-RT SORT mailing. Set Filter using Equal, Not Equal, Within & Range operators. Turn "Fields" & "Carryover" ON or OFF for easy & fast data entry. Mail merge with built-in editor, duplicate checker, 1 Billion records per file, & much, much more: $79 + $3 S&H or limited 250 records per file demo: $3.

DOCTOR DATA SOFTWARE
P.O. Box 11368, Dept. W
Phoenix, AZ 85061-1368
(602) 246-8907

CIRCLE 575 ON READER SERVICE CARD

Math Breakthroughs Now
JOINED IN FILL 'N SAV™
- Latest forecast, stat. models joined in periodic inventory control model
- YOU SET fill rate goals
- FILL 'N SAV™ calculates order size, safety stock
- MAXIMIZE: turns, ROI, cash
- MINIMIZE: stock, cost, space
- $159 complete, $49 manual, $12 tech. descp., call for free brochure

Computer Applications Tech., Inc.
PO Box 30164
Bethesda, MD 20814
800/343-2952 or 301/657-4290

Legal

L-PLOT
A metes & bounds program to quickly plot on screen, calc. area & print plats from virtually any description, measurement or scale! Features include—data editing, screen labeling & ability to send data directly to word processor, etc. IBM/Comp w/MGA, CGA, EGA. $192.50. Visa/MC/Chk. $15 Demo. Free info.
LAN/SCAN, Inc.
PO Box 6863
Abilene, TX 79608
214/824-6419

Sapana's Mail Programs
- Mail-Track-I ($49.95)
- Mail-Track-II ($95)
- Mail-Track-III ($195)
- Mail-Track-II Plus ($195)
- Mail-Track-III Plus ($295)
- Mail-Bulk-Rate-II ($195)
- Mail-Bulk-Rate-III ($295)
- Mail-Second-Class-II ($295)
- Mail-Second-Class-III ($395)
- TrialDisk 5.25" ($2.95)
- TrialDisk 3.5" ($3.95)
- Free Catalog

Sapana Micro Software
1305 South Rouse-PCWD
Pittsburg, KANSAS 66762,
316/231-5023

ZIP DIRECTORY ON DISK

- ZIPLIST–Data file of 90,000 zip codes with city, state, county. Speed data entry. $245. 41,000 zips–$195.
- CLEAN-A-LIST–Program that finds and allows correction of address errors in mailing lists
- ASSIGN-A-ZIP–Street data files for 5-digit zip assignment. Includes zip and city.

All products on disk or tape.

1-800-431-2577

DCC DATA SERVICE, INC.
1200 18th St. N.W. Ste. 704
Wash., D.C. 20036 • 202-452-1419

CIRCLE 507 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

26 Mailing List Managers Compared:

FREE Poster-size 68 Point Comparison Chart

ProMark, the $249 integrated Mailing List Manager and Desktop Marketing Software, is compared point-by-point with PC Magazine's top 25

PLUS...

FREE ProMark Demo Disk **FREE**

See for yourself why users rate ProMark #1

In the U.S. or Canada Call:

1-800-663-4687

between 8-5 Pacific Standard Time

PROMARK
Software Inc.
Dealer inquiries invited

CIRCLE 538 ON READER SERVICE CARD

Lists & Labels

Mailing list software w/many extras. Menu-driven w/2 address lines, 2 ph.#s, 2 dates, 9-digit zip, codes, & comments. Pull your list of codes up on-screen! Hard-copy reports; on-screen browse. Combine/recall filters, design your labels, & analyze your lists. IBM/compats. $45. Free brochure.
ELSWARE
PO Box 9
Camarillo, CA 93011
800/422-2408

Maintenance Management

Maintenance & Inspection

An integrated maintenance management system, including parts inventory, with clients in Fortune 500 companies, utilities, hospitals, schools, manufacturing & service industries etc. The online system provides operational, planning & analytical reports such as work orders, schedules, skill & inventory requirements, budget reports & reports that summarize history of work performed.
Penguin Computer Consultants
PO Box 20485
San Jose, CA 95160
408/997-7703

Manufacturing

MINI MYKE

ENTRY LEVEL MANUFACTURING SYSTEM for make to order, make to stock, process & repetitive mfg. Fully integrated acctg/dist/mfg syst costs $5790. EASY to install & use—expands with options—grows to full MYTE MYKE MRPII system without loss of investment. Avail on PCs, Novell, Xenix, UNIX.
M & D Systems, Inc.
3885 N. Buffalo Rd.
Orchard Park, NY 14127
716/662-6611

Shop Floor Control

A stand-alone system for scheduling, monitoring & control of mfg. Includes routings, work orders, labor feedback, W/O & Job tracking, employee & work center perf., backward/forward scheduling, Capacity Planning, on-line WIP & historical data inquiry. Single/multi-user. Demo disk, instr. & manual $10.
Production Systems Inc.
526 South E St.
Santa Rosa, CA 95404
707/526-1294

ManuFACT™

Materials Management, BOM & PO $2250—Job Cost $1000. Used by private label mfgrs, Fortune 100 & job shops with sales of $2MM-$40MM. Multi user/lot location/co. Unit of Measure, "What if" & req. planning. Tracks standard/actual cost for labor/burden/material. WIP router. Cyclic count. Acctg avail. & much more.
Synergistic Systems, Inc.
115 Sumac St.
West Haven, CT 06516
203/932-5757

Manufacturing Inventory

Integrated Inventory Control, Bills of Material, & Purchase Orders with direct accounting interface, priced at only $995. Special money-back guarantee. Read the review in the 12/86 issue of *PC World*, pp. 246-251, or explore MISys yourself & print sample reports using our demo ($5 ppd).
Microcomputer Specialists, Inc.
PO Box 795
Woodstock, VT 05091
800/833-1500, 802/457-4600

MFG. Control System

A comprehensive system for repetitive or job shop type manufacturers consisting of: B/M, Inventory, Order Processing, Purchasing, Mat. Req. Planning MRP, MPS, Shop Floor Ctrl. & CRP, Cost devel., Job & W/O Costing, Accounting. 1 yr. warranty included. Train & consult avail. Compare our system & prices for best value.
Production Systems Inc.
526 South E St.
Santa Rosa, CA 95404
707/526-1294

Medical

Medical Systems w/ECS

All PPM products have electronic claims submission (ECS) to Medicare & commercial carriers, paper claims too.
*PC*CLAIM $89.95, claims only.
*PC*CLAIM w/ICD's, CPT's & HCPC codes $229.95.
*PC*CLAIM PLUS claims only w/patient file. Complete a claim in one minute $459.
Physicians Practice Management
350 East New York
Indianapolis, IN 46204
317/634-8080, 800/428-3515

Medical Systems w/ECS

*THRESHOLD™ $1,995 claims, A/R, patient billing. *THRESHOLD $3,995 claims, A/R, patient billing, complete practice mgt. statistics, analysis. *CLAIM*NET Nationwide claims clearinghouse. Full 100% credit on product upgrade. PC*CLAIM & PC*CLAIM PLUS both house 30-day $ back grts. IBM PC/XT/AT/comp., MS-DOS, 256K.
Physicians Practice Management
350 East New York
Indianapolis, IN 46204
317/634-8080, 800/428-3515

Medical/Dental Systems

Support for more than 130 machines. Featuring paper & electronic claims, patient billing, appointments, diagnostic data base, word processing, financial histories, payroll, accounts payable, & general ledger. Single & multi-user systems. Starting at $199.95. 2,400 Dealers.
CMA Micro Computer
55888 Yucca Trail #6
Yucca Valley, CA 92284
619/365-9718

Music

SongWright IV

Music Processor prints professional sheet music, songs, scores with text, chords, symbols. Compose, edit, copy, record, transcribe, play, transpose to any key. Bass/treble, multiple staves, all meters. MIDI optional. IBM/Epson/Star printers; CGA/Hercules graphics. $89.95. Send for free sample output.
SongWright Software
Route 1, Box 83
Lovettsville, VA 22080
703/822-9068

Project Management

$59 Gantt Miracle

PROTRACS offers easy project management at an affordable price. Track 400 tasks in every project by responsibility & priority. Produce 6 standard (& unlimited custom) reports, & 4 different Gantt charts in 2-month or annual formats. Windows, popups, custom calendar, swift sorting & searching, LAN compatible. Elegant, simple, very fast, & only $59.95.
Applied MicroSystems, Inc.
PO Box 832
Roswell, GA 30077
404/475-0832

Public Domain/ Shareware

Quality Public Domain

Hundreds of programs for the IBM PC & true compatibles, word processing, spreadsheets, data bases, communications & many other categories. Large selection of source code available. Write for free catalog today! Sorry, no charge cards.
PDQ Software
2272 Colorado Blvd. #1349
Los Angeles, CA 90041

SAVE 90% ON SOFTWARE!

Shareware programs compare favorably to commercial programs costing $200 and up! EZ Forms, PC Key Draw, Accounting, over 170 others only $6.95 or less per disk! Money-back guarantee. IBM PC, XT, AT, jr or compatibles.

SHAREWARE EXPRESS
32302 Camino Capistrano, Suite 204 P
P.O. Box 219
San Juan Capistrano, CA 92693-0219

FREE CATALOG
714/240-1322

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

California FREEWARE

Public Domain and Shareware Software for IBM and Compatibles, DOS 2.1 or higher Programs and Utilities to meet all your computing needs.

ADULTS ONLY!!
- ☐ **ADULTS ONLY/1 (147)**
- ☐ **STRIP POKER (148)** - Fun
- ☐ **XXX PM GRAPHICS (149)** - Printmaster Plus req.
- ☐ **XXX PRINTSHOP GRAPHICS(150)** - Printshop req.
- ☐ **BAD-BAD (269)** - Advent.
- ☐ **ASTRO (297)** -Arcade game.
- ☐ **NASTY GIRL (435)** - She is.
- ☐ **MAXINE (497)** - EGA a plus
- ☐ **XXX COLOR SHOW (496)** - ** Color graphics required.

BUSINESS
- ☐ **EZ-FORMS Rev. D15 (66)** - Menu driven forms generator.
- ☐ **EASY PROJECT V1.2 (440)** - Complete project mgmt sys.
- ☐ **PRO PC-ACCT V3.0 (526)** - Integrated G/L, A/R & A/P.
- ☐ **REAL ESTATE ANALYST (53)** - Menu driven.
- ☐ **CE - CHECKBOOK V3.1 (79)** - Checkbook program.
- ☐ **MR. BILL V3.2 (311 & 312)** - 12 disk set! Time & billing.
- ☐ **PC-PAYROLL V2.3 (464)** - Menu driven payroll system.
- ☐ **RENTAL PROPERTY (316)** - Keeps track of rental activity.
- ☐ **PARTS INVENTORY CONTROL (479)** - Track inventory
- ☐ **DOCKETMINDER V1.2 (446)** - Maintain law docket.
- ☐ **FINANCE MANAGER V4.0 (77)** - Accounting package.
- ☐ **SOAR V1.92 (449 & 450)** - 12 disk set! A/R program.

COMMUNICATIONS
- ☐ **RBBS BULLETIN BOARD V15.1 (290 - 292)** - 13 disk set!
- ☐ **PROCOMM V2.42 (53 & 54)** 12 disk set! Menu driven.
- ☐ **BOYAN VD5 - (467)** - Modem program w/ great reviews.

DATABASE
- ☐ **FILE EXPRESS V4.14 (33 & 34)** - 12 disk set! Menu driven.
- ☐ **WAMPUM V3.1B (37 & 38)** - 12 disk set! dBase III clone.
- ☐ **PC-FILE + V2.0 (493 - 495)** - 13 disk set! Full-featured DB.

EDUCATION
- ☐ **COMPOSER (3)** - Create, save, edit, play, & print.
- ☐ **LETTERFALL V1.1 (119)** - Improve your touch typing.
- ☐ **THE WORLD 3D (127)** - Display maps. CGA required.
- ☐ **FUNNELS & BUCKETS V 2.0 (130)** - Great game. Ages 5-10.
- ☐ **ERIN'S ABC'S (131)** - Basic required.
- ☐ **MATH-WHIZ (186)** - Teaches various operations.Basic req.
- ☐ **POLYGLOT V6.01 (139)** - Vocabulary. Grades 7 - college.

GAMES
- ☐ **SLEUTH V4.1 (69)** - Murder mystery game.
- ☐ **BLACKJACK (95)** - Advanced blackjack game.
- ☐ **MONOPOLY V6.7 (106)** - Just like board game. CGA req.
- ☐ **DUNGEONS & DRAGONS V1.1 (205)** Can you survive?
- ☐ **3D CHESS V1.01 (215)** - Excellent chess game.
- ☐ **SUPER PINBALL (212)** - 5 different games. CGA required.
- ☐ **WORDPLAY (367)** - Wheel of Fortune clone. CGA req.
- ☐ **DIG LEAGUE BASEBALL (344)**- Pick your team. CGA req.
- ☐ **MINIATURE GOLF (305)** - 18 hole golf course. CGA req.

GRAPHICS
- ☐ **FINGERPAINT V2.0 (282)** - Paint program; 6 font, 61 sizes.
- ☐ **CITY DESK V6.0 (197)** - Desktop publisher.
- ☐ **PRINTMASTER GRAPHICS (319)** - 3 libraries of graphics for PM Plus. Requires PM plus.
- ☐ **PRINTSHOP GRAPHICS (320)** - 3 more libraries of graphics. Requires PS.
- ☐ **DANCAD 3D V2.0B (424 & 425)**- 12 disk set! Adv. 2D/3D drafting program. 640k req.

PRINTER UTILITIES
- ☐ **LQ V3.1 (509)** - Produces high quality text on dot matrix.
- ☐ **PRINTPRO V1.2 (468)** Change printer operation.

SPREADSHEET
- ☐ **PC CALC + V 1.0 (537-539)** 13 disk set! - Spreadsheet prog.
- ☐ **LOTUS LEARNING SYSTEM (458)**- Beginning tutor for Lotus.
- ☐ **LOTUS 123 PROGRAMS (28 32)** - 15 disk set! Requires Lotus.
- ☐ **AS EASY AS V3.0 (302)** - Lotus clone.

UTILITIES
- ☐ **DOS HELP (253)** - Help screen for DOS. For DOS 3.XX.
- ☐ **DOS TUTORIAL V4.2 (256)** - Menu driven.
- ☐ **BEGINNERS (257)** - The basics of using most P D software.
- ☐ **AUTOMENU V4.01 (260)** - Access programs, batch files.

WORD PROCESSING
- ☐ **RELIANCE MAILING LIST V2.0 (161)** - Easy to use.
- ☐ **PC-WRITE V2.71 (9 & 10)** - 12 disk set! Full featured.
- ☐ **PC TYPE + (373 - 375)** - 13 disk set! A word processor.

NAME_____
ADDRESS_____
CITY_____ ST__ ZIP_____
PHONE (___)_____
# of 5.25" disks* ___ @ $2.99 = ___
Calif. Res. Sales Tax (6.5%) = ___
Shipping & Handling = 3.00
Orders shipped UPS Ground
TOTAL = $ _____
* NOTE: 2 disk sets are 2 @ $2.99 etc.
Mail order & check or money order to:

California FREEWARE
1466 Springline Dr. Dept W8
Palmdale, CA 93550
(805) 273-0300

Call or write for free catalog containing over 500 disks of quality software.
Hours M-F 9am - 5pm PST
5.25" media - $3.99 ea.

All COD orders placed before 1pm PST sent same day.
Sorry, no Credit Card Orders.

CIRCLE 544 ON READER SERVICE CARD

PUBLIC DOMAIN/SHAREWARE
- * 800 Disks/10,000 Pgms
- * LOWEST Prices !!!
- * 24 Hour Processing
- * Complete Catalog in 27 Diff. Categories
- * Send $1 for Catalog and Get $2 Back

CCS, INC.
309 RUSSO DRIVE
HAMDEN, CT. 06518
(203) 248-4241

CIRCLE 524 ON READER SERVICE CARD

Real Estate

• Property Mgt Plus/88 •
New version which looks up tenants & posts rent by Tenant Name. Prints.. Bank Deposit Slips, Rent Statements, & Automatic Checks. Reports.. Late Rents, Vacancies & Expired Leases. Posts Management Fees, Pays Owners & does 1099s. Saves up to 80% of accounting time & is the EASIEST system to use! Special pricing from $475.
Realty Software
133 Paseo de Granada
Redondo Beach, CA 90277
213/372-9419

Management & Analysis
• "Real Property Management" $395/$595 for residential & commercial properties & other bookkeeping. Flags delinquent tenants; prints budgets, checks, invoices & 1099s. No retyping of recurring data.
• "Real Analyzer" $195 for deciding when to buy, sell, exchange, or refinance.
Visa/MC. 30 day money back.
Real-Comp Inc.
PO Box 1210
Cupertino, CA 95015
408/996-1160

Property Managers
Two systems to match your exact property management needs. *Rental Manager* handles all tenant activities; features built-in general ledger. Flexibility allows multiple properties per owner. *Condo Manager* is designed for community associations. Handles member payments, charges, & generates accounting reports.
Coleman Business Systems
3654 Arcadian Dr.
Castro Valley, CA 94546
415/581-7125

Property Management
Comprehensive program for managing residential & commercial properties. Many management reports including operating statement, delinquent rent, lease expiration & transaction register. Provides check writing, check reconciliation, posting of late fees, recurring expenses–$495. Investment analysis-$245.
Yardi Systems, Inc.
930 Laguna St.
Santa Barbara, CA 93101
805/966-3666

Property Management
Since 1978 over 7,000 users of our software have found it comprehensive, flexible & easy to use. We offer systems to manage the following types of properties: COMMERCIAL/RESIDENTIAL/CONDOMINIUM/HOME OWNERS ASSOC./MINI-STORAGE FACILITIES. For more info & sample printouts call:
Realty Automation, Inc.
11365 Eastshore Drive
Hayden Lake, ID 83835
208/772-3259

CONDO+
PC SOFTWARE FOR PROFESSIONAL CONDO MANAGEMENT—Condo+, $229.95. Comprehensive, tracks occupants, fee billing/collections, health status & much more. MS/DOS, HARD DISK 512K. Easy to install. Excellent, detailed User's Manual. Color or mono. Non-technical. Full system demo disk $15/manual $35.
Atlantic Software House
PO Box 3187
Indialantic, FL 32903
407/724-4113

Sales/Marketing

LEADS & SALES+
NEWEST VERSION adds fast, easy-to-use AUTODIAL. Designed for business professionals, not computer experts, the system allows you to Sort, Select & Search lead/client records, provides mass mailing Labels & Merge Files, Lead Cards, Tickler List, Sales Reports, much more. $229.95/Demo $15/manual $35.
Atlantic Software House
PO Box 3187
Indialantic, FL 32903
407/724-4113

FREE! IBM SOFTWARE CATALOG
over 32 pages!

Best Bits & Bytes
P.O. Box 8245-W
Van Nuys, CA 91409

Toll Free — 24 Hrs.
1-800-245-BYTE
within California
1-818-781-9975

CIRCLE 576 ON READER SERVICE CARD

~~$1.00~~ **PER DISK 75¢**
20 TOP IBM PC-SIG DISKS (360K) ONLY $15 + $3 S&H

QubeCalc, EDRAW, AutoMenu, Math Tutor, PC-DOS Help, Baker's Dozen, Languages, EZ-Form, PC-Style, PackDisk, PC-Stock, KidGames, Best Games, Home Inventory, PC-Outline, Form Letters, ImagePrint, SideWriter, PC-Prompt, Best Utilities.

BRIGHT FUTURES Inc.
Dept. PCW
18 Iroquois Road
Enfield, CT 06082

Offer Expires Nov. 31, 1988
WRITE FOR FREE CATALOG or
CIRCLE 453 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

FOLLOW-UP
Software for Salespeople

Manage & improve your sales activities with *FOLLOW-UP*. Track prospects by area, dollars, products, salesperson or any other data that you enter. Fast and easy to use with on-line help at every point. Used by thousands of businesses of all types & sizes.

- Reminds you who to contact
- Shows history of previous calls
- Keeps appointment calendars
- Keeps lists of other things to do
- Provides detailed sales forecasts.
- Has a word processor for letters or works with your present one
- Prints form letters & mailing labels
- Produces a wide range of reports
- Imports data from other programs
- Merges data between computers
- Data fields that you can name for your type of business
- For portable and desktop PC's
- Designed for use by salespeople, not computer experts.

$179.95

For more information call:

The XYCAD Group
1577 St. Clair Ave.
Cleveland, Oh 44114
800-428-8457
In Ohio (216) 589-5788

Security

HANDS OFF THE PROGRAM®
PC SECURITY

HANDS OFF THE PROGRAM is an all software, privilege based, system security utility that prevents unauthorized access of your PC's subdirectories, files and disk drives.

HANDS OFF THE PROGRAM provides a sophisticated technique to separate up to 64 users of a PC, by privilege, into their own separate areas on the hard disk. Users may access only their own areas and any other area protected with a lower privilege.

HANDS OFF THE PROGRAM protects files on your hard disk by preventing unauthorized users from modifying the DOS file attributes (Read Only, Hidden, System). For example, use the READ ONLY attribute to prevent virus programs from invading your system.

HANDS OFF THE PROGRAM restricts access to your hard disk via "disk locking". A "locked" hard disk may not be booted, accessed by applications software or formatted via the DOS FORMAT command until it is "unlocked".

HANDS OFF THE PROGRAM incorporates advanced security techniques on PC's running PC-DOS V3.0 or higher. The DOS FORMAT of Drive C is prevented while the PC is in use, the security manager is protected against Control Break and a boot from floppy results in the automatic locking of Drive C.

HANDS OFF THE PROGRAM also provides:

- Disk Encryption
- User Access Reporting
- Stops Common Viruses
- Mailbox
- Read Only and Execute Only privileges by user
- Auto Installation

Price **$89.95**
add 3.75—shipping
Check, Money Order, VISA, MC accepted.
Systems Consulting Inc.
412-963-1624
Box 111209, Pittsburgh, PA 15238-0609

CIRCLE 567 ON READER SERVICE CARD

The world's leading software manufacturers depend on Softguard copy protection systems. Your FREE DISKETTE introduces you to SuperLock™ – invisible copy protection for IBM-PC (and compatibles) and Macintosh.

- Hard disk support
- No source code changes
- Customized versions
- LAN support
- New upgrades available

(408) 773-9680

SOFTGUARD SYSTEMS INC.
710 Lakeway, Suite 200
Sunnyvale, California 94086
FAX (408) 773-1405

COPY PROTECTION

SOFTGUARD

MAILSAFE™

A software implementation of the RSA public-key cryptosystem for MS-DOS.

- Secure Messaging without secret sharing
- User key generation
- RSA Digital Signature™ - User/file authentication
- RSA Digital Envelope™ - secure data privacy
- Local file encryption
- Configurable for most E-MAIL Systems
- Command Line version available

$250 per copy/$350 int'l. Quantity discounts. Special prices for government and education markets. The RSA public-key cryptosystem is protected by US patent 4,405,829.

RSA DATA SECURITY, INC.
10 Twin Dolphin Dr • Redwood City, CA 94065
415/595-8782

CIRCLE 543 ON READER SERVICE CARD

EVERLOCK

COPY PROTECTION

Designed for user-transparency, clone compatibility & strength. It features:

- no need for damaged media or I/O plugs
- supports all Hard & Floppy disk formats
- file-server networks supported
- variable number of installs (0-99)
- create demos with remote unlock option
- allows protected upgrades by modem/BBS
- limit program use by date or count

$195 Starter Kit or $495 with NO meter counts. Free info & demo disk available

Az-Tech Software, Inc.
305 East Franklin
Richmond, MO 64085
(800) 227-0644 (816) 776-2700

CIRCLE 593 ON READER SERVICE CARD

Statistics

NEW VERSION **StatPac Gold**

Award Winning Statistics And Forecasting Package

- Complete data management
- Basic and advanced statistics
- Tables, windows and graphics
- Utility program library

Call now for a free brochure
1-800-328-4907

WALONICK ASSOCIATES
The PC Statistics Pros
6500 Nicollet Ave S., Minneapolis, MN 55423
(612) 866-9022

CIRCLE 537 ON READER SERVICE CARD

SOLO
NEW from BMDP. Menus & fill in the blank panals make SOLO so easy & so flexible. At $149, SOLO offers the best stand-alone solution for 3D rotational graphics, spreadsheet data entry, all the standard statistical procedures, & much more. Free suppt. Guaranteed. Call for details & order today.
BMDP Statistical Software, Inc.
1440 Sepulveda Blvd. #316
Los Angeles, CA 90025
213/479-7799, Fax: 213/312-0161

NCSS-5.0
ALL NEW spreadsheet style. Multiple & stepwise regression, ANOVA, time series, discriminant, factor, cluster, principal components, t-tests, contingency table, nonparametrics. Easy interface to Lotus, *dBASE*, etc. Sort, join, merge data base. $99. Visa/MC.
NCSS-PC
865 East 400 North
Kaysville, UT 84037
801/546-0445

StatPlan III
Easiest to use statistics program available. Complete range of statistics: curve fitting, crosstabs, correlation, multiple regression, t-tests, time-series analysis, etc. Graphics with printer/plotter output. Capable of handling up to 50,000 data points. Interfaces with Lotus files. Demo disk available. $179.
The Futures Group
76 Eastern Blvd.
Glastonbury, CT 06033
203/633-3501

STATISTIX II
Comprehensive, powerful and incredibly easy-to-use. Full screen editor, transformations, linear models (ANOVA, regression, logit, PCA, etc), ARIMA, most standard stat procedures. Clear, well organized documentation. Satisfaction guaranteed. $169 PC DOS, $99 Apple II.
NH Analytical Software
PO Box 13204
Roseville, MN 55113
612/631-2852

Forecasting is EASY
with PRO*CAST 2.0. All you need to know is your past history. Complete time series analysis from linear trend to Box-Jenkins. Auto/manual modes. Built-in editor. Reads .WKS & ASCII. Great graphics! Not copy protected. $295 with 30-day money back guarantee. Demo $10.
Fleming Software
PO Box 528
Oakton, VA 22124
703/591-6451

STATMATE/PLUS—$35
STATMATE/PLUS version 1.3 for the PC is a proven & full featured statistical package for only $35. Complete package on 3 disks, with a 70+page user's guide. Nonlinear, stepwise & multiple regression + graphics, xtabs & more. Great reviews. No cards.
The Software Hill
1857 Apple Tree Lane
Mountain View, CA 94040
415/969-4233

MINITAB'S a PC of cake!

MINITAB features intuitive commands for comprehensive data analysis. Includes basic statistics • regression • time series • tabulation • ANOVA • plots • histograms • much more. DOS based version includes LOTUS interface, hi-res graphics, no copy protection. Used in over 60% of Fortune 50 companies. For free brochure call 814/238-3280.

MINITAB
STATISTICAL SOFTWARE

Minitab, Inc.
3081 Enterprise Dr., State College, PA 16801

CIRCLE 566 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

High performance STATISTICAL SYSTEM

Limited time price $149.

STATS+

A powerful, elegant, and super-fast statistical package integrated with complete data management and dynamic graphs. Comprehensive selection of descriptive, inferential, and exploratory statistics with forecasting. STATS+ features intelligent, two-way interfaces to data from Lotus, Symphony, dBIII+, and other programs. **For more info look for our ads in most computer journals, ask your dealer, or contact StatSoft.** Price $245 (+$5 ship/handl).

StatSoft

2325 E. 13th St., Tulsa, OK 74104
(918) 583-4149

Overseas offices: **StatSoft of Europe** (Hamburg, FRG), ph: 040/4200347; **StatSoft UK** (London, UK), ph.: 07072 71166; **Hearne Software** (Melbourne, Australia), ph.: 613-497-4276

CIRCLE 520 ON READER SERVICE CARD

Taxes

FOR LOTUS **StatPackets™**

Create Your Own Statistics And Forecasting Package

- Choose from 23 separate routines, $24.95 each
- Easy to learn and use
- Powerful programs with graphics

Call now for a free brochure
1-800-328-4907

WALONICK ASSOCIATES
The PC Statistics Pros
6500 Nicollet Ave. S., Minneapolis, MN 55423
(612) 866-9022

CIRCLE 451 ON READER SERVICE CARD

W-2 & 1099 on Floppy

The MAG collection of programs make an IRS/SSA format floppy from a data entry screen or imported ASCII file. Includes manual & application forms.

- Used nationwide
- Menus, user friendly
- Step-by-step data entry
- Prints W-2 forms
- Free phone support
- PC compatible
- Ask about 1099 MAG

Illinois Business Machines Inc.
Dept. PC, 1403 Box 310 Troy Rd.
Edwardsville, IL 62025
618/692-6060

Surveys

The Survey System

A complete, easy-to-learn package for the entry, editing, processing & presentation of questionnaire data. Produces banner format crosstabs & related tables, statistics (incl. regression) & bar charts. Also codes & reports open-ends. All reports are camera-ready. CRT interviewing option available.

Creative Research Systems
15 Lone Oak Ctr., Dept. W
Petaluma, CA 94952
707/765-1001

Survey Mate

The integrated survey package: fast & accurate data entry with automatic values, range, logic checks, age calc, verification, verbatim entry/report for open-ends. Frequencies, Recoding, Crosstabs, Regression, ASCII file export, up to 1,000 fields. Users in 38 countries, $145, 60 day Money-back Guarantee.

Henry Elkins & Assoc. Inc.
15 Willow Court
Bronxville, NY 10708
914/961-7375, orders: 800/622-4070, 800/942-7317 (IL)

FORECAST 1988 TAXES

Start with 1987 return, make changes for 1988, compute 1988 return. New tax law changes & 1988 tax tables. 228 page User Guide & Tax Reference manual. For IBM/compatible personal computers, DOS 2.0+, 256K, 5.25" disk. $24.95 + $3 s/h. MA add $1.25 tax. MC/VISA/CHK/MO

Quality Business Systems
PO Box 805
Hudson, MA 01749
800/225-5800

W2TYPE/1099TYPE

- Multi-employer W2's; 1099-INT, MISC, S; 1098
- Continuous forms-W2's, 1 or 2-wide; 1-wide 1099's
- HP laser forms
- Magnetic media option included
- Written in GWBASIC for MS DOS, diskette or hard disk
- $149.95-specify 5 1/4" or 3 1/2"

Program Systems, Inc.
1820 First Avenue S., #D1-Irondale
Birmingham, AL 35210-1533
800/451-1689, 205/956-9436

W2 & 1099 on Diskette

Our third year of 100% error-free IRS/SSA compliance. Very easy to learn & use! W2s & all 1099s. Fast data input—OR—import any *dBASE*, Lotus, or ASCII file! Prints on any forms—creates IRS ready diskettes. State formats available. Free phone support. $79.

Newport Wave Software
10 Savannah
Irvine, CA 92720
714/544-1099

Federal & State returns on single disk—Only $79.95. Easy to use. Calculates automatically, performs complex "What if" options, prints IRS-approved forms. 25 States available. Requires Lotus 1-2-3 or compatible spreadsheets. VISA/MC. $4 s/h chg. Also available Professional package-$119., Tax Planner-$79.95, Corporate-$149., S-Corporations-$149.

Park Technologies, Inc.
P.O. Box 1317
Clifton Park, NY 12065
518/877-5881 or 800/423-3189 outside NY

TaxEase SYSTEM
TAX PREPARATION SOFTWARE

CIRCLE 459 ON READER SERVICE CARD

Terminal Emulation

Terminal Emulation

EM220 VT220 and VT102 emulator. Includes file transfer, screen scroll back, and many other features.

EM4105 TEK 4105/4010 Color graphics emulator with VT220 emulation. Supports EGA/VGA, high resolution hardcopy, pan/zoom, and EM220 features.

■ ■ ■ ***Diversified Computer Systems, Inc.***
3775 Iris Avenue, Suite 1B
Boulder, Colorado 80301 (303) 447-9251

Trademarks: VT 102, VT 220 — Digital Equipment Corp., Tektronix — Tektronix Inc.

CIRCLE 531 ON READER SERVICE CARD

Micro to Mainframe Made Manageable

Send for information on 4105, 4107, and 4115 TEKTRONIX Terminal emulation software for your PC or PS/2 from the emulation leader—

GRAFPOINT™
1485 Saratoga Avenue
San Jose, CA 95129
(800) 426-2230/
CA (408) 446-1919

CIRCLE 509 ON READER SERVICE CARD

Time Management

Employee Scheduling

WHO WORKS WHEN—Vers. 1.1. Retail price $895, order today $479! Matches workload to employee requests. Schedules employees on multiple shifts, locations, depts., rotations for up to 6 wks. Make changes & re-schedule in seconds. Complete w/doc., on-line help, tech. support & 30 day money back. Visa/MC.

Newport Systems
Box 3705
Bellevue, WA 89009
800/782-1233, 206/451-0537

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Utilities

E-X-T-R-A™ — **A Menu System to Manage Memory Resident Programs**

- Run up to 26 TSRs - using only the memory of the largest TSR
- Single hot key command accesses **ALL** TSRs
- Create your own TSR menu and auto install instantly from EXTRA.s program list
- Toll-free technical support hotline
- From the creators of Direct Access
- **$99**

P.O. Box 1104
Eau Claire, WI 54702
Call Toll-Free
1-800-242-6368
for Dealer Nearest You

DELTA TECHNOLOGY INTERNATIONAL

CIRCLE 530 ON READER SERVICE CARD

AT's DON'T NEED 360KB DRIVES

The 1.2MB drive has long been known to **READ** but **NOT** reliably **WRITE** on 360KB floppies. With **"CPYAT2PC"** 1.2MB drives **CAN** reliably **WRITE** 360KB floppies saving a slot for a second hard disk or backup tape. **"CPYAT2PC"** (Not Copy Protected) offers the preferable **SOFTWARE SOLUTION.**

- **NO** software or hardware modification
- A 360K drive is **NOT** required
- **"CPYAT2PC"** program resides on hard disk
- Runs on IBM PC/AT and COMPATIBLES i.e. Compaq Deskpro 286/386/III, AT&T 6300+, HP Vectra, Sperry PC/IT, Tandy 3000

Only $79.00 + $4.00 S/H VISA, MC, COD, UPS-B/R
ORDER TOLL FREE 1-800-523-8777
TELEX EZLINK 62873089
Dealer Inquiries Invited
VISA* master charge
MICROBRIDGE COMPUTERS
655 Skyway #125 • San Carlos, CA 94070
CA 415-593-8777 • NY 212-334-1858
FAX #415-593-7675

CIRCLE 513 ON READER SERVICE CARD

Opt-Tech Sort/Merge 3.0

Extremely fast Sort/Merge program. Run as a DOS command or CALL as a subroutine. Unlimited filesizes, most languages, datatypes & filetypes supported including Btrieve & dBASE. Advanced features include record selection, record reformatting & much more! Call or write for more info. MS-DOS $149, Xenix $249.
Opt-Tech Data Processing
PO Box 678
Zephyr Cove, NV 89448
702/588-3737

BREAK 640K!

Why buy expensive boards? VRAM™ gives your PC/XT/AT or PS/2 8 megabytes of memory by turning disk space into expanded memory! Use extended memory for expanded memory. Create VERY LARGE worksheets. FAST. Automatic. Easy to use. 640K not required. Money back guarantee. $49+$3 s/h.
Biologic
11982 Coverstone Cir./Suite 1622
Manassas, VA 22110
703-368-2949 (fax 703-361-8251)

IBM Uses CP/M & Apple!

"The best CP/M to DOS converter" *PC* mag. 4/85. UniForm PC transfers files/formats/reads & writes DIRECTLY TO 200 CP/M disk formats on your IBM PC, XT, AT (also 96 TPI & 8"). Use normal DOS commands. $62.95 + $3 s/h. By Micro Solutions. NEW! MatchPoint card copies Apple DOS & CP/M files to IBM. BOTH products at $185 + $3 s/h. Dealers invited.
Blue Heron
1108 S. Second St.
DeKalb, IL 60115
815/758-2355

DISKPACK™

No.1 backup software. 10 Megs onto 2 floppies in 4 min! Compresses files. Copies to any DOS device (incl. tape). All other fast backup programs bypass DOS & are unreliable & don't work w/many clones. Please compare. Nothing else even comes close. Money bacck guarantee. $89+$3 s&h.
Biologic
11982 Coverstone Cir. Suite 1622
Manassas, VA 22110
703/368-2949 fax:703/361-8251

Ammunition to conquer your biggest problems!

- The **Virtual Expanded Memory Manager** provides your EMS applications with up to thirty-two megabytes of LIM EMS 4.0 expanded memory
- It turns PC/AT or PS/2 extended memory into expanded memory
- It turns hard disk storage into expanded memory
- It's compatible with most EMS applications including 1-2-3
- *Only $89.95. 30-day money-back guarantee.*

Fort's Software
P.O. Box 1295
Loveland, CO 80539
(303) 663-5629

CIRCLE 551 ON READER SERVICE CARD

YORDOS

CUSTOMIZE & ENHANCE DOS!!

- Abbreviate/re-name DOS commands.
- Edit/execute any text on screen.
- Assign function key macros.
- Re-display last 10 commands.
- Automatic backups when erasing.
- Run automatic jobs by data/time.
- Keep an audit trail of commands.

$24.95 inc s/h. Checks please.
Tusk Software
P.O. Box 1911
Wakefield, MA 01880
617/245-1164

PCjr Help!

Jr Power Pack:
Disk full of software by PCjr experts to improve the compatibility and performance of your PCjr.

PCjr Compatibility Disk:
Tips on over 70C popular software titles and how to make them work on your PCjr.

Order both above disks $18 or one disk $9, and receive a free copy of jr Newsletter too!

*** Moneyback Guarantee ***
Send to jr Newsletter, Box 163-W, Southbury, CT 06488

Word Processing

PC-Write™ Ver. 2.71

Fast, full featured word processor, with spell check, screen clip, mail-merge, split screen, macros. Easy to use. Supports 400 printers. Software, User Guide, & Tutorial on 2 disks for $16. Try it, then register for $89 and get User Manual, 1 year support, newsletter & 2 upgrades. 90-day guarantee. Visa/MC. CALL TODAY!
Quicksoft
219 First N. #224-PWOC
Seattle, WA 98109
800/888-8088

Word For Word

Converts documents, two-ways, between any of 12 word processors & 3 communication formats: *WordStar, WordPerfect, MultiMate, OfficeWriter, Volkswriter, PFS, Writing Asst, Microsoft Word, XyWrite, DisplayWrite* (DCA/RFT), "Smart" ASCII, EBCDIC. Preserves all formatting. $149. LAN version avail.
Mastersoft, Inc.
4621 N. 16th St., Ste. A-108
Phoenix, AZ 85016;
Orders: 800/624-6107, ext 102; Info: 602/277-0900

Farsi/Greek/Arabic

Russian Hebrew, all Euro. Scand. plus either Hindi, Punjabi, Bengali, Gujarati, Tamil, Thai, Korean, Viet, or IPA. Full-featured word processor supports on-screen foreign characters & NLQ printing w/no hardware modifications. Incl. Font Editor. $355 matrix; $150 add'l laser; $19 demo. Req. PC, 640K, graphics. 30 day $ back grt.
Gamma Productions, Inc.
710 Wilshire Blvd. #609
Santa Monica, CA 90401
213/394-8622

PLACE YOUR AD IN *The PC World Catalog* TODAY.
800-435-7766
In CA: 800-435-7760

PRODUCTS FEATURED IN THIS ISSUE

Reader Service Number

Accounting

601 Back to Basics: Professional, Peachtree Software, page 94

602 DacEasy Accounting 3.0, Dac Software, page 100, 188

603 DacEasy Graph + Mate 3.0, Dac Software, page 100

604 DacEasy Payroll 3.0, Dac Software, page 100

Add-On Board

605 286 Express, Tandy Corp./Radio Shack, page 223

606 32-bit RAM Board, Hauppauge Computer Works, page 226

607 AboveBoard, Intel, page 186

608 ALL Chargecard, ALL Computers, page 229

609 AMI 386 AT Mark 2 Motherboard, American Megatrends, page 96

610 The Complete Fax, The Complete PC, page 123

611 Fax Partner, Panasonic Industrial Co., page 127

612 GammaFax, GammaLink, page 126

613 IBM PS/2 80286 Expanded Memory Adapter, IBM, page 229

614 ImageCard, Ricoh Corp., page 128

615 JT Fax, Quadram, page 125

616 Mach20, Microsoft, page 136

617 MFAX96, Microtek Lab, page 128

618 pc-Fax, E.I.T., page 129

Reader Service Number

619 Token-Ring, IBM, page 186

620 Vega VGA, Video-7, page 185

621 V-RAM VGA, Video-7, page 94

CAD/CAM

622 AutoCAD, AutoDesk, page 188

Communications

623 10Net Plus, 10Net Communications, page 112

624 Carbon Copy Plus 5.0, Meridian Technology, page 118

625 Close-Up 3.0A, Norton-Lambert Corp., page 117

626 Co-Compute 2.1, Harmony Technology Assoc., page 120

627 Co/Session 3.0, Triton Technologies, page 119

628 ProComm, Datastorm Technologies, page 186

Computer System

629 Compaq Deskpro 386/20, Compaq Computer Corp., page 185

630 Compaq Deskpro 386/25, Compaq Computer Corp., page 108

631 Compaq Deskpro 386S, Compaq Computer Corp., page 108

632 Compaq Portable 386, Compaq Computer Corp., page 185

633 Dell 220, Dell Computer Corp., page 134

634 IBM PS/2 Model 50 Z, IBM, page 108

635 IBM PS/2 Model 70-121, IBM, page 108

636 IBM PS/2 Model 80, IBM, page 186

637 STEP 386/25, Everex Systems, page 87

638 T3100, Toshiba America, page 185

Reader Service Number

Data Base

639 DataPerfect 2.0, WordPerfect Corp., page 172

640 dBASE III Plus, Ashton-Tate, page 186

641 D the Data Language, Caltex Software, page 88

642 PicturePower, PictureWare, page 90

643 Q&A, Symantec, page 187

644 R:base for DOS Runtime, Microrim, page 96

Desktop Publishing

645 PageMaker 3.0, Aldus Corp., page 156

646 PFS: First Publisher 2.0, Software Publishing Corp., page 98

647 Ventura Publisher, Xerox Desktop Software, page 187

648 Xerox Ventura Publisher 2.0, Xerox Desktop Software, page 82

Development Tool

649 OS/2 Programmer's Toolkit, Microsoft, page 242

Disk Drive

650 Hardcard 40, Plus Development Corp., page 186

651 MS 355B, Mitsubishi Electronics America, page 224

652 PS25/20i, Western Digital, page 232

Display

653 NEC MonoGraph, NEC Home Electronics (U.S.A.), page 148

654 NEC MultiSync II, NEC Home Electronics (U.S.A.), page 185

Financial

655 Andrew Tobias' Managing Your Money, MECA Ventures, page 188

Reader Service Number

Game

656 Flight Simulator, Microsoft, page 187

Graphics

657 Draw Applause 1.0, Ashton-Tate Graphics Products, page 158

658 Harvard Graphics, Software Publishing Corp., page 187

659 Publisher's Paintbrush, Z-Soft, page 188

Information Services

660 American Bar Association (AMBAR), American Bar Association Information Services, page 202

661 Andrew Seybold's Outlook on Professional Computing, Infotechnology Publishing Corp., page 201

662 AP Online, The Associated Press, page 202

663 Aviation Safety Institute, Aviation Safety Institute, page 200

664 Bizdate, Source Telecomputing, page 201

665 Books In Print, R.R. Bowker Co., page 201

666 BRS Search, BRS Colleague, BRS After Dark; BRS Information Technologies; page 198

667 Business Periodicals Index, The H.W. Wilson Co., page 200

668 Business Software Database, Information Sources, page 201

669 Career Placement Registry, Career Placement Registry, page 201

670 CENDATA, U.S. Census Bureau, page 200

671 Citibank Global Report, Citicorp, page 201

672 CompuServe, CompuServe, page 197

673 Daily Report For Executives, Bureau of National Affairs, page 200

674 Defense Daily, Phillips Publishing, page 200

Get more information—circle the appropriate number on the reader service card.

Reader Service Number

675 Delphi, General Videotex, page 197

676 Dialcom Services, Dialcom, page 197

677 Dialog, Dialog Information Services, page 199

678 Dow Jones News/Retrieval, Dow Jones and Co., page 199

679 Dun's Market Identifiers, Dun's Marketing Services, page 200

680 EasyLink Service, Western Union Telegraph Co., page 197

681 EasyNet, Telebase Systems, page 199

682 Encyclopaedia Britannica, Encyclopaedia Britannica, page 202

683 Forbes 500 Annual Directory, Forbes, page 200

684 GEnie, General Electric Information Services Co., page 198

685 Harvard Business Review/On Line, John Wiley & Sons, page 201

686 Insurance Databases, West Publishing Co., page 202

687 Insurance Periodicals Index, NILS Publishing Co., page 202

688 International Trade Reporter, Bureau of National Affairs, page 202

689 Lexis, Mead Data Central, page 199

690 Microcomputer Index, Database Services, page 201

691 Newsbytes, Newsbytes News Service, page 201

692 NewsNet, NewsNet, page 199

Reader Service Number

693 Nexis, Mead Data Central, page 199

694 The New York Times, The New York Times, page 202

695 PHINet, Prentice Hall Information Network, page 202

696 The Readers' Guide to Periodical Literature, The H.W. Wilson Co., page 202

697 SEC Online, SEC Online, page 201

698 The Source, Source Telecomputing, page 198

699 Standard & Poor's News On Line, Standard & Poor's Corp., page 201

700 The Tax Directory, Tax Analysts, page 202

701 Trade and Industry Index, Information Access Corp., page 202

702 United States Employment Opportunities—The Computer Field, Washington Research Associates, page 201

703 Westlaw, West Publishing Co., page 200

Input Device

704 Microsoft Mouse, Microsoft, page 185

Integrated Software

705 Symphony, Lotus Development Corp., page 187

LAN Software

706 Netware, Novell, page 188

Language

707 BASIC Compiler 6.0, Microsoft, page 242

708 C Compiler 5.1, Microsoft, page 242

709 FORTRAN Compiler 4.1, Microsoft, page 242

Reader Service Number

710 Macro Assembler 5.1, Microsoft, page 242

711 Pascal Compiler 4.0, Microsoft, page 242

712 QuickBASIC, Microsoft, page 187

713 Turbo Prolog 2.0, Borland Int'l, page 102

Miscellaneous

714 QEMM 50/60, Quarterdeck Office Systems, page 229

Modem

715 Smartmodem 2400, Hayes Microcomputer Products, page 185

716 Smartmodem 9600, Hayes Microcomputer Products, page 94

Operating System/ Environment

717 Music/386, Bristol Information Systems, page 90

718 Microsoft Windows, Microsoft, page 187

Printer

719 Epson LQ-2500, Epson America, page 185

720 ErgoPrint 610, BDT Products, page 87

721 HP LaserJet Series II, Hewlett-Packard, page 185

722 Xerox 4020, Xerox Corp., page 144

Scanner

723 ScanMan, Logitech, page 98

Spreadsheet

724 1-2-3, Lotus Development Corp., page 186, 188

725 Excel, Microsoft, page 188

Reader Service Number

Statistics

726 Forecast Pro, Business Forecast Systems, page 176

Tax

727 Turbo Tax, ChipSoft, page 188

Utility

728 Forget-Me-Not, Sterling Castle, page 98

729 Hummingbird Browser, Cauldron, page 98

730 Norton Commander 2.0, Peter Norton Computing, page 100

731 Norton Utilities, Peter Norton Computing, page 186

732 Screen Extender, Stairway Software, page 92

733 SideKick, Borland Int'l, page 187

734 Tree86 2.0, The Aldridge Co., page 102

735 WordPerfect Library, WordPerfect Corp., page 188

736 XtreeNet, Executive Systems, page 102

Word Processing

737 Manuscript 2.0, Lotus Development Corp., page 164

738 WordPerfect, WordPerfect Corp., page 186

ADVERTISERS PRODUCT INDEX

Get more information—circle the appropriate number on the reader service card.

Reader Service Number

HARDWARE

Boards/Cards/Chips

52 American Data Technology, page 44
53 AST Research, page 179
302 ATI Technologies, page 228
5 Digital Electronics Corp., page 217
272 Intel Corp., page 19
168 Quadram, page 255
221 Renegade Technologies, pages 150-151
277 Video 7, page 50

Communications

131 Acer Technologies, page 64
44 Complete PC, The, page 38
143 Intel Corp., pages 132-133
11 Ven-Tel, page C4

Computers

49 Acer Technologies, page 41
74 Dell Computer Corp., pages 104-105, 106-107
253 FIVESTAR Computers, pages 24-25
89 Hewlett Packard, pages 62-63
197 Tandy/Radio Shack, page 37
— Toshiba America, Inc., pages 80-81
216 Wells American, page 15
273 Yamaha Music Corp., page 8
290 Zenith Data Systems, page 141

Hardware Desktop Publishing

255 F & W Communications, page 313

Input Devices

17 Caere, pages 42-43

LAN

199 Itron, page 245
77 Software Link, The, pages 30-31

Monitors/Displays

255 F & W Communications, page 313
— Magnavox, page 99
232 Mitsubishi, pages 60-61
97 Sigma Designs, page 28

Other Peripherals

268 Para Systems, Inc., page 93

Printers

179 Acer Technologies, page 145
23 Blaser Industries, page 153
— Epson, pages 53, 54-55
26 Hewlett Packard, page 73
39 Hewlett Packard, page 75
102 Laser Connection, page 23
191 Mitsubishi, page 48
— NEC Information Systems, pages 9, 236
— Texas Instruments, pages 91, 137

Scanners/Digitizers

110 Microtek End Users, page 233
111 Microtek Dealers, page 233

Storage Devices

254 Core, Int'l., page 49
244 Everex, page 11
263 Maynard Electronics, page 58
141 Plus Development Corp., pages 180-181
257 3M, pages 34, 35
124 3M, pages 138-139

SOFTWARE

Accounting Financial

42 Computer Associates, page 131
127 Cougar Mountain Software, page 254
— Dac Software, Inc., page 163
— Intuit, page 95
247 Lord Publishing, page 221
252 Macola, page 89
130 Parson's Technology, page 287
144 Peachtree Software, page 103
— Sourcemate Information Systems, Inc., page 247

CAD/CAM

306 American Small Business Computers, page 33
— Micrografx, page 20

Communications

21 Borland, Int'l., pages C2,p1
279 Datastorm Technologies, Inc., page 32

Database Management

— Dac Software, Inc., page 240
55 Data Access Corp., page 97
259 Information Builders, Inc., page 171
— Oracle, page 12
256 Persoft, page 203
167 Revelation Technologies, page 18
108 Symantec, page 248

Desk Top Publishing

266 Digital Research, Inc., page 46
113 NBI, page 222
82 Unison World, page 159
206 Z-Soft, page 101

Educational

66 Big Blue Disk, page 17

Entertainment

66 Big Blue Disk, page 17
36 Buena Vista Software, page 237

Graphics

79 Haventree Software, page 253
— Software Publishing, page 10
69 Spinnaker Software, page 225

Integrated Software

— Lotus Development, page 51
25 Spinnaker Software, page 227

Language

159 Quarterdeck Office Systems, page 45

Management

84 Living Videotext, page 165

Other

20 Bible Research Systems, page 44
9 Newport Systems, page 52

Spreadsheets/Templates/Forms

87 Borland, Int'l., page 7
— Computer Associates, pages 65-70
181 Concentric Data Systems, page 239
247 Lord Publishing, page 221
— Microsoft, pages 56-57

Utilities

21 Borland, Int'l., pages C2,p1
155 Central Point Software, pages 26-27
181 Concentric Data Systems, page 239
— Micrologic, page 231
218 Publishing Technologies, page 36
203 Sterling Castle, page 77
206 Z-Soft, page 101

Word Processing/Aids

150 Addison Wesley, page 243
88 Borland, Int'l., page 5
149 Psyborne, Inc., page 235
265 Quicksoft, page 214
175 WordPerfect, page 173

MISCELLANEOUS

Computer Accessories

— Anthro Corp., page 40
98 Kensington Microware, Ltd., page C3

Mail Order

— Advanced Computer Products, page 298
— Arlington Computer Products, pages 300-301
24 Bulldog Computer Products, pages 84-85
4 Compuclassics, page 299
72 Compusave, page 294
164 Computer Brokers, page 311
213 Computer Direct, Inc., pages 154-155
200 Computer Discount Warehouse, pages 304-305
116 Computer Mail Order, pages 212-213
224 Direct Micro, page 256
249 Discount Micro Products, pages 204-205
240 Fast Micro, page 286
227 Gateway 2000, page 310

PC WORLD

FREE PRODUCT INFORMATION

Circle the number(s) for free information.

Please print or type all information.

Name _____ Title _____

Company _____

Address _____ City _____

State, Zip _____ (zip code needed to ensure delivery) Phone: Area code/Number _____

☐ Check this box and fill in the appropriate information to subscribe to *PC World*. You will be billed $19.97 for a 1-year (12-issue) subscription (U.S. only).

(1-450)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450

CATALOG INFORMATION

451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

FEATURED PRODUCTS

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750

Expires 2/17/89 **S1** OCTOBER 1988

PC WORLD

FREE PRODUCT INFORMATION

Circle the number(s) for free information.

Please print or type all information.

Name _____ Title _____

Company _____

Address _____ City _____

State, Zip _____ (zip code needed to ensure delivery) Phone: Area code/Number _____

☐ Check this box and fill in the appropriate information to subscribe to *PC World*. You will be billed $19.97 for a 1-year (12-issue) subscription (U.S. only).

(1-450)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450

CATALOG INFORMATION

451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

FEATURED PRODUCTS

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750

Expires 2/17/89 **S2** OCTOBER 1988

PC WORLD

FREE PRODUCT INFORMATION

Circle the number(s) for free information.

Please print or type all information.

Name _____ Title _____

Company _____

Address _____ City _____

State, Zip _____ (zip code needed to ensure delivery) Phone: Area code/Number _____

☐ Check this box and fill in the appropriate information to subscribe to *PC World*. You will be billed $19.97 for a 1-year (12-issue) subscription (U.S. only).

(1-450)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450

CATALOG INFORMATION

451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

FEATURED PRODUCTS

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750

Expires 2/17/89 **S3** OCTOBER 1988

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 215 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Reader Service Department
P.O. Box 5299
Pittsfield, MA 01203-9906

Reader Service Number

122 Great Western Technology, page 296
313 Hard Drives, Int'l., page 291
59 Inmac, page 252
241 Kellen Distributing, page 290
41 Kenosha Computer Products, page 308
270 Lyco Computer, pages 288-289
— MICROBEST, page 293
8 Microware Technology, page 294
65 Montgomery Grant, page 312
132 Nitro Micro, page 303
— PC Connection, pages 166-169
135 PC Network, The New, pages 306-307
264 Perry Computers, page 296
125 RP Systems, page 297
81 707 Computer Sales, page 309
223 SF Micro, page 292
27 Scottsdale Systems, page 302
283 Shamrock, page 295
— Softline, page 177
22 Software Add-Ons, page 296
178 Telemart, pages 146-147
207 Tussey Computer Products, pages 160-161
243 Warehouse Data Products, page 257

On Line Services

28 Compuserve, page 143
— Dow Jones/News Retrieval, page 251

Other

— NSTL, pages 142, 174-175

Security

31 Secure-It, Inc., page 52

Supplies

60 Diskette Connection, page 236
54 Sony Corp. of America, page 149

BACK ISSUES

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

Simply enclose payment, specify the issues and quantity you desire and send to:

PC WORLD
Back Issue Department
144 Townsend Street
San Francisco, CA 94107

Sorry, phone or credit card orders cannot be accepted.

Margaret O'Reilly
Publisher

Mark Glasner
Director of Advertising Sales
(415/978-3178)

Northwest
Sharon Van Leuven *(Western Advertising Mgr.)*
(415/243-0500)
Northern California *(San Francisco)*
Natalie Wood (415/243-0500)
Northern California *(San Jose)*
Virginia Pohlman (415/243-0500)
Southern California *(Los Angeles)*
Vivian Ritondale (Southwest Advertising Mgr.) (213/312-8008)
Southern California *(Orange County)*
Lilly McFadden (213/312-8008)
Southern California *(San Diego/Southwest)*
Christine Kopec
Texas
Deborah Goldsmith
(214/233-3492)
New England *(Boston)*
Bob Ostrow (617/879-0700)
Midwest *(N. Chicago)*
Robert Diftler (312/827-4477)
Eastern Midwest *(S. Chicago)*
Jill Burrow (312/827-4477)
Manhattan
Jeff Edman (Eastern Advertising Mgr.) (201/967-1350)
Mid-Atlantic
Steve Lincoln (201/967-1350)
Southeast *(Atlanta)*
Judy Sutter (404/394-0758)

PC World Catalog
Eric Cressy, Deborah Tarantino
(800/435-7760 in Calif.;
800/435-7766 outside Calif.)

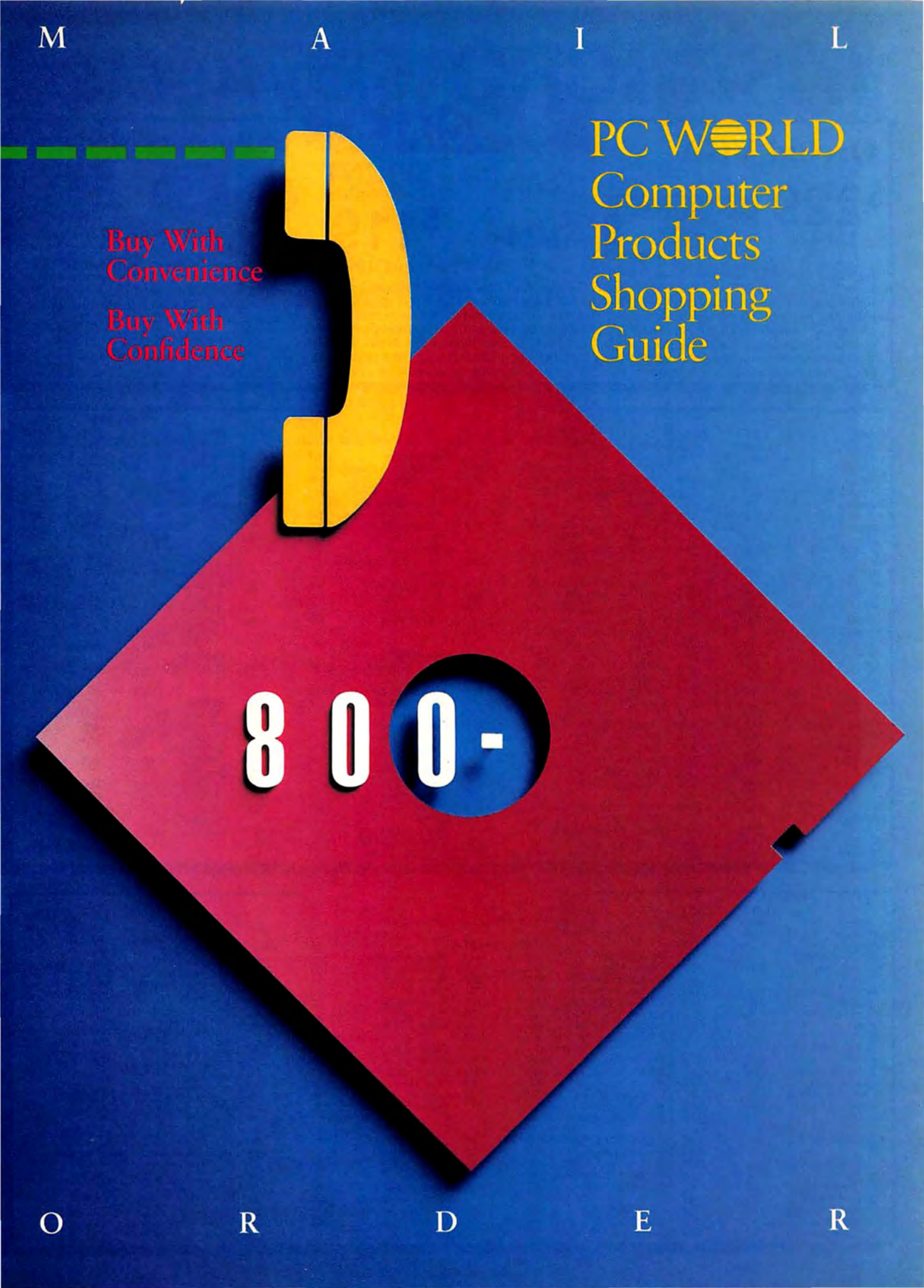
IDG Communications International Marketing Services (617/879-0700, 415/424-8844)

Independent Advertising Representatives
United Kingdom
Beere Hobson & Associates, Kenilworth, Warwickshire (011/44 1 926 512424), London (011/44 1 278 0022)
Taiwan ACE MEDIA Agency Co., Ltd., Taipei (011/866 2 721 4302)
Japan IDG Communications/ Japan, Tokyo (011/ 81 3 403 8515)
France IDG Communications/ France, Neuilly-sur-Seine (011/33 1 47 47 12 72)

ADVERTISERS INDEX

Get more information—circle the appropriate number on the reader service card.

Reader Service Number		
49	Acer Technologies,	page 41
179	Acer Technologies,	page 145
131	Acer Technologies,	page 64
150	Addison Wesley,	page 243
—	Advanced Computer Products,	page 298
52	American Data Technology,	page 44
306	American Small Business Computers,	page 33
—	Anthro Corp.,	page 40
—	Arlington Computer Products,	pages 300-301
53	AST Research,	page 179
302	ATI Technologies,	page 228
20	Bible Research Systems,	page 44
66	Big Blue Disk,	page 17
23	Blaser Industries,	page 153
87	Borland, Int'l.,	page 7
88	Borland, Int'l.,	page 5
21	Borland, Int'l.,	pages C2, 1
36	Buena Vista Software,	page 237
24	Bulldog Computer Products,	pages 84-85
17	Caere,	pages 42-43
155	Central Point Software,	pages 26-27
44	Complete PC, The,	page 38
4	Compuclassics,	page 299
72	Compusave,	page 294
28	Compuserve,	page 143
—	Computer Associates,	pages 65-70
42	Computer Associates,	page 131
164	Computer Brokers,	page 311
213	Computer Direct, Inc.,	pages 154-155
200	Computer Discount Warehouse,	pages 304-305
116	Computer Mail Order,	pages 212-213
181	Concentric Data Systems,	page 239
254	Core, Int'l.,	page 49
127	Cougar Mountain Software,	page 254
—	Dac Software, Inc.,	pages 163, 240
55	Data Access Corp.,	page 97
279	Datastorm Technologies, Inc.,	page 32
74	Dell Computer Corp.,	pages 104-105, 106-107
5	Digital Electronics Corp.,	page 217
266	Digital Research, Inc.,	page 46
224	Direct Micro,	page 256
249	Discount Micro Products,	pages 204-205
60	Diskette Connection,	page 236
—	Dow Jones/News Retrieval,	page 251
—	Epson,	pages 53, 54-55
244	Everex,	page 11
255	F & W Communications,	page 313
240	Fast Micro,	page 286
253	FIVESTAR Computers,	pages 24-25
227	Gateway 2000,	page 310
122	Great Western Technology,	page 296
313	Hard Drives, Int'l.,	page 291
79	Haventree Software,	page 253
39	Hewlett Packard,	page 75
89	Hewlett Packard,	pages 62-63
26	Hewlett Packard,	page 73
259	Information Builders, Inc.,	page 171
59	Inmac,	page 252
143	Intel Corp.,	pages 132-133
272	Intel Corp.,	page 19
—	Intuit,	page 95
199	Itron,	page 245
241	Kellen Distributing,	page 290
41	Kenosha Computer Products,	page 308
98	Kensington Microware, Ltd.,	page C3
102	Laser Connection,	page 23
84	Living Videotext,	page 165
247	Lord Publishing,	page 221
—	Lotus Development,	page 51
270	Lyco Computer,	pages 288-289
252	Macola,	page 89
—	Magnavox,	page 99
263	Maynard Electronics,	page 58
—	MICROBEST,	page 293
—	Micrografx,	page 20
—	Micrologic,	page 231
—	Microsoft,	pages 56-57
110	Microtek End Users,	page 233
111	Microtek Dealers,	page 233
8	Microware Technology,	page 294
191	Mitsubishi,	page 48
232	Mitsubishi,	pages 60-61
65	Montgomery Grant,	page 312
113	NBI,	page 222
—	NEC Information Systems,	pages 9, 236
9	Newport Systems,	page 52
132	Nitro Micro,	page 303
—	NSTL,	pages 142, 174-175
—	Oracle,	page 12
268	Para Systems, Inc.,	page 93
130	Parson's Technology,	page 287
—	PC Connection,	pages 166-169
135	PC Network, The New,	pages 306-307
144	Peachtree Software,	page 103
264	Perry Computers,	page 296
256	Persoft,	page 203
141	Plus Development Corp.,	pages 180-181
149	Psyborne, Inc.,	page 235
218	Publishing Technologies,	page 36
168	Quadram,	page 255
159	Quarterdeck Office Systems,	page 45
265	Quicksoft,	page 214
221	Renegade Technologies,	pages 150-151
167	Revelation Technologies,	page 18
125	RP Systems,	page 297
81	707 Computer Sales,	page 309
27	Scottsdale Systems,	page 302
31	Secure-It, Inc.,	page 52
223	SF Micro,	page 292
283	Shamrock,	page 295
97	Sigma Designs,	page 28
—	Softline,	page 177
22	Software Add-Ons,	page 296
77	Software Link, The,	pages 30-31
—	Software Publishing,	page 10
54	Sony Corp. of America,	page 149
—	Sourcemate Information Systems, Inc.,	page 247
69	Spinnaker Software,	page 225
25	Spinnaker Software,	page 227
203	Sterling Castle,	page 77
108	Symantec,	page 248
257	3M,	pages 34, 35
124	3M,	pages 138-139
197	Tandy/Radio Shack,	page 37
178	Telemart,	pages 146-147
—	Texas Instruments,	pages 91, 137
—	Toshiba America, Inc.,	pages 80-81
207	Tussey Computer Products,	pages 160-161
82	Unison World,	page 159
11	Ven-Tel,	page C4
277	Video 7,	page 50
243	Warehouse Data Products,	page 257
216	Wells American,	page 15
175	WordPerfect,	page 173
273	Yamaha Music Corp.,	page 8
290	Zenith Data Systems,	page 141
206	Z-Soft,	page 101


M A I L
PC WORLD
Computer
Products
Shopping
Guide
Buy With
Convenience
Buy With
Confidence
800-
O R D E R

FASTMICRO

ORDER LINE: 1-800-441-FAST

SPECIALS

Orchid VGA

$229
List $445

This brand new VGA board from Orchid is a winner. It provides VGA, EGA, CGA and MCGA register level compatibility and has hardware capabilities for zooming, horizontal panning and vertical scrolling. It has three 132 column modes and has a RAM loadable character generator. You can save on all the popular Orchid products when you order from us.

SPRINT by Borland

$119
List $199

Give up your tired old word processing software, Sprint is finally here! It is ideal for new and power users alike. Sprint features awesome speed, page preview, thesaurus, hyphenation, multiple font support, and so much more. It is the only product that acts like other word processors so everyone in the office can use it.

USRobotics Modems

These modems offer modern technology at affordable prices. These models feature AT command set and S-register level compatibility. They have line output jacks and speaker volume controls. Internal or external, 1200 or 2400 baud, we have USRobotics quality for less!

Model	1200	2400
Internal	$69	$129
External	$89	$149

HARDWARE

PRINTERS

	LIST	FAST
Citizen		
120D	229	145
180D	259	165
MSP40-55		Call
Tribute 124	699	449
Tribute 224	949	599
Diconix		
150P	499	299
Epson		Call
Fujitsu		
DL3400	995	549
NEC		
P2200	569	349
P5200	799	509
P5300	1049	669
P5XL	1295	Call
LC890	4799	Call
Okidata		
182 Plus	319	219
292	539	349
320	499	329
390	699	469
393	1399	915
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	195
KXP1592	699	389
KXP1595	749	419
KXP1524	949	519
Star		
NX1000	289	179
NX2400	499	339
NB2410	699	449
Toshiba		
P321SL	749	467
P341SL	999	649
P351SX	1499	929

BOARDS

	LIST	FAST
AST		
Hot Shot 286	645	339
Six Pak Plus	210	119
Others		Call
ATI		
VIP VGA	449	259
Everex		
1200B Int Modem	149	73
2400B Int Modem	249	149
Genoa		
Super EGA Hi-Res+	399	175
Super VGA #5100	445	239
VGA Hi-Res #5200	645	359
Hercules		
Graphic Card +	299	169
Intel		
8087-2	250	149
80287-8	410	249
80287-10	480	287
Above Board 286	645	359
Orchid		
VGA	399	229
Designer VGA	545	299
Tiny Turbo 286	445	269
Twin Turbo 12mhz	645	379
Paradise		
Basic EGA	199	Call
Autoswitch 480	349	Call
VGA Plus	399	259
VGA Professional	599	369
5 Pack 0K	129	59
Practical Peripherals		
1200B Int Modem	99	65
2400B Int Modem	199	149
Prometheus		
Promodem 1200B	119	73
Promodem 2400B	199	129
Promodem 2400G	249	159
The Complete PC		
Answering Machine	349	219
Complete FAX	499	319
Hand Scanner	249	159
USRobotics		
See prices listed above		
Video 7		
Fast Write VGA	549	329
Vega Deluxe	379	179
Vega VGA	499	259
V-RAM VGA	799	489

LAPTOPS

	LIST	FAST
Mitsubishi		
MP-286L 20mb	3995	2495
NEC		
Multispeed EL II	2295	1449
Multispeed HD	3695	2249
Sharp		Call
Samsung		Call
Toshiba		
T1000	1249	769
T1200F	2399	1599
T1200H	3499	2299
T3100/20	4699	2995
T3200	5799	3695
T5100	7499	Call
Zenith		
SuperSport Dual	2399	1599
SuperSport 20mb	3599	2399
SuperSport 286	4999	Call

MONITORS

	LIST	FAST
Amdek		
1280	999	669
210A	129	89
310A *Limited Offer!*	230	75
722 EGA	799	439
Magnavox		Call
Mistubishi		
1409 RGB	399	259
1410 EGA	599	399
Diamond Scan 1381	799	489
NEC		
Multisync II	899	Call
Multisync GS	279	189
Princeton		
Max15	389	189
Ultrasync	849	Call
Sony		
1302 Multiscan	995	659
1303 Multiscan	825	499
Thomson		Call
Zenith 1490	999	599

DISK DRIVES

	LIST	FAST
Fujitsu		
360K Floppy	119	77
720K 3.5" Floppy	149	87
1.2MB 5.25" Floppy	149	87
Miniscribe		
40MB AT #3650	499	319
Seagate		
20MB XT Kit #225	599	267
30MB XT Kit #238	699	287
30MB AT #138	599	299
40MB AT #251	899	349
80MB AT #4096	1199	599

Call On Non-Listed Items

SOFTWARE

Database

	LIST	FAST
Clipper	699	359
DataEase	600	359
dBase III+	699	359
dBXL Diamond	199	105
Foxbase Plus	395	185
Paradox	725	399
Quartz	795	449
RapidFile	295	179
Rbase for DOS	700	419
Reflex	150	84
Q & A	349	179

Desktop Publishing

Byline	295	175
GEM Desktop Pub.	299	169
Pagemaker 3.0	795	Call
PFS:First Publisher	99	55
Publisher's Paintbrush	285	149
Ventura	895	479

Financial

Bedford Integr. Acct.	249	149
BPI		Call
Computer Associates		Call
DAC 3.0	99	59
DAC Payroll 3.0	99	59
Dollars & Sense	179	99
In-House Accountant	199	109
Managing Your Money	199	117
Peachtree Complete	199	149

Graphics

	LIST	FAST
Boeing Graph	395	199
Deluxe Paint II	105	67
Draw Applause	495	269
Freelance Plus	495	Call
GEM Draw Plus	299	165
Generic CADD	99	50
Harvard Graphics	495	Call
PrintMaster Plus	60	27

Integrated

First Choice	149	77
Smart System	895	427
Works	149	89
Windows 286	99	59
Windows 386	195	117
WordPerfect Exec.	249	117

Mice

Logitech C7 Serial/Bus	119	65
Logitech HiRes	150	83
Microsoft Serial/Bus	150	95
Microsoft W/ Windows	200	129
PC Mouse	149	89

Power Protection

Curtis Ruby Plus	115	59
Datasheild 85	90	50
Datasheild 100	99	57

Programming

	LIST	FAST
Macro Assembler	150	89
Norton Guides	100	58
Turbo Basic	99	58
Turbo C	99	58
Turbo Pascal	99	58
Quick Basic	99	59
Quick C	99	59

Spreadsheets

Excel	495	Call
Lotus	495	Call
Lucid 3-D	149	85
Plan Perfect	395	189
Quattro	248	119
Worksheet Utilties	100	55

Utilities

CoreFast	149	87
Desklink	170	95
Desqview	130	73
Fastback Plus	189	87
Formtool	95	54
Laplink Plus	140	77
Norton Advanced	149	74
PC Tools Deluxe	80	36
Sidekick Plus	195	119
XTree	70	34

Word Processors

	LIST	FAST
Easy Extra	99	55
GEM First Word Plus	199	117
Grammatik III	89	49
Manuscript	495	Call
Multimate Adv. II	565	247
Professional Write	199	105
Rightwriter	95	49
Sprint	195	119
Q & A Write	199	119
Webster's Writer	100	59
Word	450	Call
Word Perfect	495	Call
Word Perfect Library	129	59
WordStar	350	Call

Call On Non-Listed Items

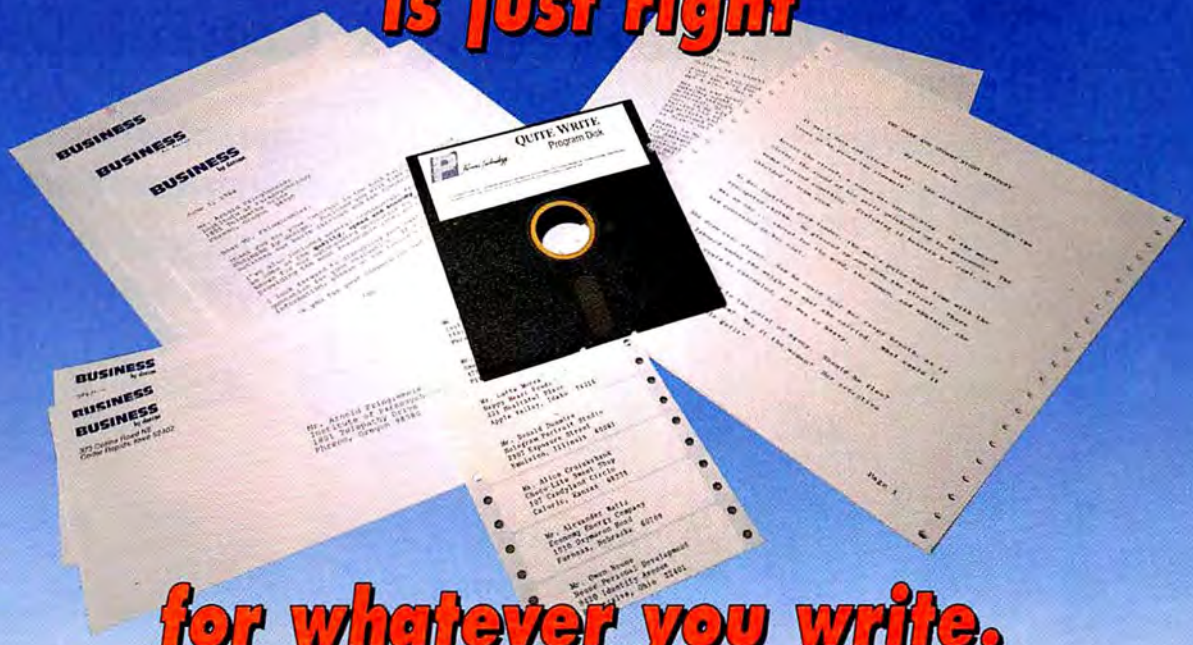
TERMS: No Charge for Visa or MasterCard. Shipping Charge: 3% (Min. $4). Product warranties, offers & claims are handled by the manufacturer. All returns are subject to 15% restocking fee, call for RA number. COD's add 5%, restrictions apply. Personal/company checks delay shipping. Compatibility not guaranteed. Prices/availablity subject to change. AZ orders add 6.7% tax.

For your protection, we check for stolen credit cards.

Mailing Address:
3721 E. Grove St., Phoenix, AZ 85040
To place orders only call: 800-441-3278
To check on an order call: 602-437-8975
For technical support call: 602-437-0300
FAX Line: 602-437-8622

Circle 240 on reader service card

QUITE WRITE
is just right



for whatever you write.

Introducing QUITE WRITE! *From the creators of* MONEYCOUNTS® *5.0, the popular home and business money management program.*

You can pay a lot more for a word processing program, or a little less. But feature for feature, QUITE WRITE *offers value that's tough to find in any other software — especially at this low price —* **$29.00 including printed manual & tutorial.**

QUITE WRITE *has just about every word processing capability you'll ever need at home or in the office, and it's affordable and easy to use. Here are just a few of the many efficient features* QUITE WRITE *offers —*

Autosave option — *Saves your work automatically at time intervals you set.*
Pop-up menus — *Easy to follow menus guide you through the entire program. Delay feature allows expert users to avoid menus entirely.*
On-line help — *Context sensitive help is always available.*
Large capacity — *The size of your document is only limited by the memory of your computer.*
Cut and paste capabilities — *Text can be easily cut or copied from one location to another.*
Windowing — *Work on two documents at the same time. Text can be moved from one to another.*
Built in support for 44 different printers — *Plus, a customization feature for almost any type of printer.*
Font commands — *Supports boldface, underline, italics, superscript, subscript and custom type styles available with your printer.*
Powerful command macros — *Record and playback keystrokes — enables you to customize* QUITE WRITE *to your needs.*
Headers and footers — *With automatic page numbering and page one suppression.*
Search and replace — *Changes all or selected occurrences.*
Built in 90,000 word spelling checker — *It's easy to add your own special words.*
Printer spooling — *You can continue editing your documents while printing takes place.*
Mail merge feature — *Prepares personalized letters, labels, other forms and documents from mail merge data bases created using* QUITE WRITE, *dBase* and MONEYCOUNTS 5.0 ** Mail List Manager.*
Monitor flexibility — *Supports color and monochrome monitors. Colors can be configured to your tastes.*

**dBase is a registered trademark of Ashton-Tate Corp.*
*** MONEYCOUNTS is a registered trademark of Parsons Technology*

Same Day Shipping

VISA, MASTERCARD & C.O.D. ORDERS CALL

1-800-223-6925

(In Canada, call 319/395-7300)

Parsons Technology®

375 Collins Road N.E.
Cedar Rapids, Iowa 52402

Circle 130 on reader service card

Parsons Technology®

Dept. W
375 Collins Road NE
Cedar Rapids, Iowa 52402

QUITE WRITE

$29 + $5 shipping

NAME _____

ADDRESS _____

CITY _____

STATE/ZIP _____ PHONE _____

CHECK ☐ MONEY ORDER ☐ VISA ☐ MASTERCARD ☐

CARD # _____ EXP. DATE _____

No. of Copies	Product	Price Each	Total
	QUITE WRITE (needs IBM or compatible computer, requires 192k, 1 disk drive, DOS 2.0 or later)	$29.00	
	Shipping & Handling	$5.00	$5.00
	TOTAL AMOUNT		$

Lyco Computer

Marketing & Consultants

Since 1981

Air orders processed within 24 hours.

Lyco Means Total Service.

Mark "Mac" Bowser, Sales Manager

I would personally like to thank all of our past customers for helping to make Lyco Computer one of the largest mail order companies and a leader in the industry. Also, I would like to extend my personal invitation to all computer enthusiasts who have not experienced the services that we provide. Please call our trained sales staff at our toll-free number to inquire about our diverse product line and weekly specials.

First and foremost our philosophy is to keep abreast of the changing market so that we can provide you with not only factory-fresh merchandise but also the newest models offered by the manufacturers at the absolute best possible prices. We offer the widest selection of computer hardware, software and accessories.

Feel free to call Lyco if you want to know more about a particular item. I can't stress enough that our toll-free number is not just for orders. Many companies have a toll-free number for ordering, but if you just want to ask a question about a product, you have to make a toll call. Not at Lyco. Our trained sales staff is knowledgeable about all the products we stock and is happy to answer any questions you may have. We will do our best to make sure that the product you select will fit your application. We also have Saturday hours — one more reason to call us for all your computer needs.

Once you've placed your order with Lyco, we don't forget about you. Our friendly, professional customer service representatives will find answers to your questions about the status of an order, warranties, product availability, or prices.

Lyco Computer stocks a multimillion dollar inventory of factory-fresh merchandise. Chances are we have exactly what you want right in our warehouse. And that means you'll get it fast. In fact, orders are normally shipped within 24 hours. Free shipping on prepaid orders over $50, and there is no deposit required on C.O.D. orders. Air freight or UPS Blue/Red Label shipping is available, too. And all products carry the full manufacturers' warranties.

I can't see why anyone would shop anywhere else. Selection from our huge in-stock inventory, best price, service that can't be beat—we've got it all here at Lyco Computer.

CALL TOLL-FREE: 1-800-233-8760
New PA Wats: 1-800-233-8760
Outside Continental US Call: **1-717-494-1030**

Hours. 9AM to 8PM, Mon. - Thurs.
9AM to 6PM, Friday — 10AM to 6PM, Saturday

For Customer Service, call 1-717-494-1670,
9AM to 5PM, Mon. - Fri.
Or write: Lyco Computer, Inc.
P.O. Box 5088, Jersey Shore, PA 17740

VISA MasterCard

PLEASE NOTE: • full manufacturers' warranties • no sales tax outside PA • prices show 4% cash discount; add 4% for credit cards • APO, FPO, international: add $5 plus 3% for priority • 4-week clearance on personal checks • we check for credit card theft • sorry, compatibility not guaranteed • return authorization required • due to new product guarantee, return restrictions apply • price/availability subject to change • prepaid orders under $50 in Continental US, add $3.00

LASER Desktop PC — $569.95

- Dual Speed 4.77-8 Mhz
- 256K Std.
- Built-in ColorCard
- 8 Expansion Slots
- Can Expand to 2 Floppy + 2 Hard Drives!
- Green, Amber & Color Monitors Available

LASER COMPACT XT — ONLY $469.95

- IBM PC XT Compatible
- 4.77 - 8.00 Mhz Super Turbo Clock Speed
- Built in 5 1/4 Drive
- Built-in RGB Video Output
- Parallel Printer Port
- Serial RS232
- Joystick/Game Port

SHARP PC-4501 Laptop — $679.95

mono system — HEADSTART — $799.95

- Ready to plug in and use
- 512K RAM
- 2 360K Drives
- Includes $500 worth of free software

(Mono Monitor Included)

NEW! Seagate ST138R 30 Meg Internally Mounted Card — $335.95

- Premounted on its own Controller Card
- EZ Slot Installation (app. 10 min.)

20-30-49 meg drives available!

MITSUBISHI ELECTRONICS 286AT — $1239.95

- 640K expandable to 5.5 MB
- 6MHz/1 wait
- 6I/0 slots

Seagate HARDWARE

5.25" Half Heights

ST225 20 meg 65msec MFM	$215.95
ST225N 20 meg SCSI	$289.95
ST238R 30 meg RLL	$229.95
ST251 40 meg 40 msec MFM	$345.95
ST251-1 40 meg 28 msec MFM	$429.95
ST277R 65 meg 40 msec RLL	$389.95

3.5"

ST125 20 meg 40 msec MFM	$235.95
ST125N 20 meg SCSI	$299.95
ST138R 30 meg RLL	$249.95
ST138N 30 meg SCSI	$329.95
ST157R 49 meg RLL	$399.95
ST157N 48 meg SCSI	$439.95

Seagate Internal Cards

ST125 20 meg Internal Card	$299.95
ST157R 49 meg Internal Card	$485.95

Controllers

MFM Controller (XT)	$55.95
RLL Controller (XT)	$64.95

Call for kit pricing and specials

Ask about our Seagate Paired Solutions!

PC COMPATIBLE HARDWARE

Laser Compact XTE 640K	$549.95
Laser Desktop Turbo XT 640K	$599.95
Blue Chip Popular	$549.95
Vendex Headstart Color	$989.95
Vendex Headstart Mono	$CALL
Vendex Headstart 888 LTD Color	$1599.95
Sharp PC 4501	$679.95
Sharp PC 4502	$1239.95
Zucker CGA ColorCard	$89.95
BCC CG ColorCard	$94.99
Laser EGA + 4 Card	$129.95
ATI Graphics Solution	$129.95
ATI EGA Wonder	199.95
ATI VIP	$299.95
Kraft PC Joystick Card	$27.95

Join The Thousands Who Shop and Save at Lyco Computer!

1-800-233-8760

EPSON LX-800

*180 CPS Draft
*30 CPS NLQ
*80 Column

$184.95

Star Micronics NB2410

- 24 Pin High Quality Printing
- 216 cps Draft
- 72 cps Letter Quality

$369.95

Panasonic Office Automation

KXP4450 Laser Partner

$1649.95

- Incredible 11 Pages per Minute
- 2 Letterize Cassettes Std.
- 300 dpi Resolution
- 5 Printer Emulation Modes
- 512K RAM Std.
- 5000 Page per Month

PRINTERS

Epson

LX800	$184.95
FX850	$339.95
FX1050	$424.95
EX800	$434.95
LQ500	$339.95
LQ2500	$789.95
GQ3500	$LOW
LQ850	$525.95
LQ1050	$699.95

Citizen

120 D	$144.95
180 D	$159.95
MSP-40	$279.95
MSP-15E	$309.95
MSP-50	$369.95
MSP-45	$399.95
MSP-55	$469.95
Premiere 35	$445.95
Tribute 224	$539.95
Tribute 124	$439.95

STAR

NX-1000	$169.95*
NX-1000C	$169.95
NX-1000 Color	$225.95
NX-1000C Color	$229.95
NX-15	$289.95
NR-10	$319.95
NR-15	$419.95
NB-15 24 Pin	$669.95
NX-2400	$309.95
NB24-10 24 Pin	$369.95
NB24-15 24 Pin	$545.95
Laser 8	$1759.95
ND-15	$349.95
NL-10	$149.95

*w cable purchase

Toshiba

321SL	$489.95
341 SL	$659.95
P351 Model II	$899.95
351 SX 400 cps	$979.95

Seikosha

SP 180Ai	$125.95*
SP 180VC	$125.95*
SP 1000VC	$139.95
SP 1000AP	$159.95
SP 1200VC	$149.95
SP 1200Ai	$159.95
SP 1200AS RS232	$159.95
SL 80Ai	$289.95
MP5420FA	$999.95
SP Series Ribbon	$7.95
SK3000 Ai	$339.95
SK3005 Ai	$419.95
SPB 10	$CALL
SL 130Ai	$599.95

*Quantities Limited

Attention Educational Institutions:

If you are not currently using our educational service program, please call our representatives for details.

Okidata

Okimate 20	$129.95
Okimate 20 w/cart	$189.95
120	$189.95
180	$219.95
182	$209.95
182 +	$225.95
183	$239.95
192 +	$339.95
193 +	$439.95
292 w/interface	$449.95
293 w/interface	$585.95
294 w/interface	$789.95
393	$955.95
Laser 6	$CALL
390	$479.95
391	$649.95
320	$345.95
321	$445.95

Interfacing available for IBM C 64, Apple and Atari

Panasonic

1080i Model II	$159.95
1091i Model II	$189.95
1092i	$309.95
1592	$375.95
1595	$419.95
3131	$289.95
3151	$459.95
KXP 4450 Laser	$1649.95
1524 24 Pin	$529.95
Fax Partner	$579.95
Optical Scanner	$859.95

Brother

M1109	$159.95
M1509	$335.95
M1709	$459.95
Twinwriter 6 Dot & Daisy	$899.95
M1724L	$619.95
HR20	$345.95
HR40	$559.95
HR60	$649.95

CITIZEN MSP-40

*200 CPS Draft
*40 CPS NLQ
*Graphics

$279.95

SEIKOSHA 5420 FA

- 420 cps Draft
- 104 cps NLQ
- Friction/tractor feed
- 2-Year Warranty

$999.95

Panasonic Office Automation

1092i

- 240 cps
- 48 cps NLQ
- Adjustable Push Tractor

$309.95

Monitors

Thomson:

230 Amber TTL/12"	$69.95*
4120 CGA	$199.95
GB 100	$119.95*
GB 200 Super Card	$169.95*

*Quantities Limited

NEC

Multisync II	$589.95

Blue Chip:

BCM 12" Green TTL	$54.95
BCM 12" Amber TTL	$69.95

Magnavox:

BM7652	$79.95
BM7622	$79.95
7BM-613	$79.95
7BM-623	$79.95

Monitors

Magnavox:

CM8502	$179.95
CM8505	$199.95
9CM-053	$339.95
CM8762	$239.95
8CM-515	$259.95
CM9043	$CALL
8CM-873	$499.95

Printer Paper

1000 sheet laser	$16.95
1000 mailing labels	$8.95
200 sheet OKI 20	$8.95
Transparent Labels	$4.95
Banner Paper 45' Roll	$10.95

Modems

Avatex:

1200e	$65.95*
1200i PC Card	$65.95
1200hc Modem	$89.95
2400	$149.95
2400i PC Card	$139.95

*w/cable purchase

Hayes:

Smartmodem 300	$139.95
Smartmodem 1200	$279.95
Smartmodem 2400	$419.95

US ROBOTICS:

Sportster 1200PC	$109.95
Courier 2400	$299.95
Courier 2400e	$329.95
Courier 2400PS	$259.95
Courier 9600 MST	$619.95

MODEM SPECIAL!

Avatex™ 2400

$149.95

The fastest, most advanced Avatex modem yet. The Avatex 2400 is truly an example of the next generation in high performance. You get the full range of options and impeccable transmission accuracy offered by the Avatex 1200hc—plus twice the data transmission speed.

DEALER INQUIRIES INVITED

Circle 270 on reader service card

KELLEN DISTRIBUTING

SOFTWARE

Accounting

DAC Easy 3.0.....$64.95
DAC Easy Bonus Pack.....$118.95
ACC-PAC BPI...ea.....$252.95
Timeslips III.....$124.95
One Write 2.01...ea.....$129.95
Peachtree Comp.II.....$156.95
Quicken.....$36.95
Compulaw Client Mgt. Sys.....$524.95
Compulaw Adv. Billing Sys.....$719.95

Word Processing

WordPerfect 5.0.....$229.95
WordPerfect 5.0 Network.....$359.95
Multimate Advantage II.....$264.95
Microsoft Word.....$206.95
GrandView.....$169.95
Wordstar 2000 Rel 3.....$224.95
PFS: Professional Write.....$116.95
Choice Words.....$63.95
Webster New World Combo.....$59.95
Black's Law Dictionary.....$58.95
Grammatik III.....$58.95
Right Writer.....$58.95
Form Tool w/Hits.....$62.95

Database

dBASE III Plus 1.1.....$369.95
R:BASE for DOS.....$449.95
Clipper.....$409.95
PFS:Professional File.....$139.95
dBXL Diamond.....$114.95
Paradox.....$412.95
Q & A.....$197.95
FoxBASE+.....$194.95
FoxBASE+ Unltd. Runtime...$249.95
DataPerfect.....$289.95
R:BASE for OS/2.....$539.95
Open Access II 2.1.....$397.95

Financial Planning

Howard Tax Preparer.....$169.95
Managing Your Money 4.0.....$124.95
Dollars & Sense.....$109.95
Sales Generator Plus.....$189.95

Spreadsheet

Lotus 123 2.01.....$297.95
Lotus Freelance Plus.....$293.95
Lotus HAL.....$94.95
Lotus Metro.....$62.95
Microsoft Excel.....$299.95
PFS:Professional Plan.....$72.95
QUATTRO.....$144.95
Supercalc 5.....$309.95

Integrated Software

Framework III.....$444.95
Symphony 2.0.....$439.95
PFS:First Choice.....$88.95
Microsoft Works.....$107.95
Smart System Spell Checker...$59.95
Eight-in-One.....$39.95

Communications

Carbon Copy Plus.....$107.95
Crosstalk Mark IV.....$119.95
Mirror II.....$42.95

Project Management

Harvard Tot Project Mgr II..$349.95
Microsoft Project 4.0.....$309.95
Super Project Expert.....$409.95
Timeline 3.0.....$352.95
Timeline Graphics.....$121.95

Graphics & Publishing

Harvard Graphics 2.1.....$272.95
PFS: First Publisher 2.0.....$76.95
Autosketch Std.....$54.95
Autosketch Enhanced.....$64.95
Publish-It!.....$123.95
By Line.....$189.95
Aldus Pagemaker 3.0.....$504.95
Ventura Publisher 2.0.....$524.95
Graph-in-the-Box 2.0.....$59.95
Newsroom Pro.....$51.95
Design CAD/CAD 3D.....$153.95
Publisher's Paintbrush.....$139.95
Rix EGA Paint.....$69.95
Rix Colorix VGA Paint.....$114.95

Utilities & Languages

Turbo Pascal 4.0.....$61.95
Turbo C.....$61.95
Microsoft C 5.1.....$284.95
Microsoft Windows 2.1.....$61.95
Microsoft Quick C.....$62.95
Microsoft Quick Basic.....$62.95
MS Macro Assembler 5.1.....$94.95
DiskTechnician Pro.....$72.95
Fast Back Plus.....$97.95
Desqview 2.01.....$77.95
Norton Utilities Advanced.....$78.95
Sideways 3.2.....$43.95
Ram Lord 2.1C.....$52.95
Above Disk 1.03A.....$54.95
GOfer.....$42.95
PC Tools Deluxe 4.2.....$42.95
Copy Option Board Deluxe...$119.95
Brooklyn Bridge 2.0.....$79.95
X-Tree Pro.....$68.95
Direct Access.....$54.95
Lap Link Plus.....$82.95
Disk Optimizer 4.0.....$44.95
SpeedStor Universal.....$44.95

HARDWARE

Toshiba 1200HB/20MB.....$2,495.00
Toshiba 5100/386/40MB...$4,995.00
NEC Multispeed HD.....$2,345.00
XT 8MgHz 20MB/Amdek 410A DOS 3.2/Ser-Par Ports/Clock.....$995.00

Graphics Cards

ATI EGA Wonder Enh.....$CALL
ATI VIP VGA.....$264.95
Paradise VGA Pro.....$386.95
Video7 Vega VGA.....$279.95
Video7 V-RAM VGA.....$504.95
Sigma VGA/X 16 Bit.....$424.95
Sigma VGA/H 8 Bit.....$269.95
STB VGA Extra EM-512K.....$394.95
Mono Graphics Card.....$64.95

Disk & Tape Drives

Archive 60MB Int/Ext. Kit...$629.95
Archive 40MB Int.....$319.95
Archive 40MB Ext. Kit.....$429.95
Seagate ST225 w/Cont.....$262.95
Seagate ST238 w/Cont.....$279.95
Seagate ST251 40MB.....$369.95
Miniscribe 3650 40MB.....$339.95
PLUS 20MB Hard Card.....$479.95
PLUS 40MB Hard Card.....$679.95
Seagate ST4096 80MB.....$649.89
Seagate ST251-1 40MB.....$449.95
Sysgen PSF-360K Ext. Drive..$202.95
Sysgen 3.5" 1.44MB/AT Kit...$284.95
60MB Internal Drive Kit.....$489.95
120MB Internal 28mls.....$1,709.95
200MB Int. 18mls Kit.....$2,199.95

Input Devices

SummaSketch Plus.....$379.95
Summasketch 12X18.....$624.95
Logitech Publisher Mouse.....$104.95
Logitech Serial or Bus Mouse.$67.95
Logitech Serial or Bus/Paint...$88.95
Logitech Ser/Bus w/CADD...$108.95
Logitech ScanMan.....$194.95
Logitech Hi-Res 320dpi.....$89.95
Logitech EGA Card/Mouse...$189.95
Microsoft Mouse.....$104.95
CH Mach III Joy Stick.....$36.95
CH Game Card Y-Cable.....$44.95
CH Flight Stick.....$49.95
Alturus MAXX.....$74.95
HP ScanJet w/Interface.....$1,499.95
The Complete Hand Scan.....$189.95

Modems

Hayes 1200B.....$259.95
Hayes 1200 Ext.....$289.95
Hayes 2400B.....$384.95
Hayes 2400 Ext.....$419.95
Multitech 224E.....$409.95
Multitech 224 Int.....$324.95
Multitech 686 EH.....$889.95
US Robotics 2400E.....$384.95
Smart One 1200 Int.....$102.95
Smart One 2400 Int.....$189.95

Monitors

AMDEK 410.....$139.95
NEC Multisync II.....$574.95
NEC Multisync Plus.....$949.95
NEC Multisync GS.....$204.95
Mitsubishi Diamond Scan.....$539.95
ZENITH ZCM 1490.....$619.95
IBM 8503 MONO.....$169.95
Sigma Laserview 15" PC.....$1,369.95
Sigma Laserview 19" PC.....$1,724.95
Sigma Laserview 19" PS/2...$1,724.95
Princeton Ultrasync.....$509.95
Princeton HX-12E EGA.....$469.95

Printers

HP Laser II.....$1,709.95
HP DeskJet.....$699.95
HP Plotter 7475A.....$1,449.95
Alps Allegro 24Pin.....$369.95
Alps ALQ324E.....$769.95
Alps P2101 400cps.....$1,189.95
Alps ALQ224E.....$619.95
NEC P2200.....$332.95
NEC LC890 Laser.....CALL
Panasonic KXP1091i M2.....$209.95
Panasonic KXP1524.....$549.95
Panasonic KXP1595.....$497.95

Recreation & Education

Microsoft Flight Sim.....$34.95
Microsoft Learning DOS.....$34.95
Carmen Sandiego Europe.....$31.95
Carmen Sandiego USA.....$31.95
PC GLOBE.....$44.95
Leisure Suit Larry.....$28.95
Mean 18 Golf w/Vol 2.....$28.95
Mean 18 Courses 3&4.....$22.95
Typing Tutor IV.....$34.95
Wizard of Words.....$27.95
Starflight.....$34.95

HOURS: California Time: Monday Through Friday 7AM TO 5PM Saturday 9AM TO 2PM - FAX (805) 584-3442
FOR SALES CALL 1-(800) 537-5355 * * * Inside California CALL 1-(805) 584-0255
For Customer Service, Product Support, Information and Order Status CALL (805) 584-0255

90 West Easy St., Unit #5, Simi Valley,, CA 93065. No charge for Visa & MasterCard. Shipping & Handling: 4%, $6 minimum. Alaska, Puerto Rico and Hawaii extra. All products are shipped fully insured. All prices are subject to change. Unopened returns are subject to a 20% restocking fee plus shipping & handling. Product warranties are solely from the Manufacturer. Kellen Distributing makes no warranties for fitness of purpose or compatability for any product. Cancellations and refusals subject to handling charges. Purchase Orders , C.O.D., APO and FPO orders extra.

XT-8MgHz-20MB-512K-Ser-Par-Clck-Calendar.....$995.00

**AT-12MgHz-640K-EGA 20MB-Ser-Par-Clck-Cal * * *$2,395.00* * *

***** LOGITECH *****
Serial & Bus Mice
ScanMan & Hi-REZ Mice
EGA Card & Mouse
DEALER PRICES CALL !!

Circle 241 on reader service card

HARD DRIVES

Seagate

40Mb ST251

Includes drive, AT mounting hardware & "Disk Manager" partitioning software

Also available for XT. **$319**

40Mb ST251 PC/XT KIT **$369**

Includes drive, controller, cables, How-To manual, mounting hardware & partitioning software.

30 Day "Worry-Free" Guarantee

If for any reason, you are not completely satisfied with any product, simply return it for a prompt and courteous refund!

20Mb ST225 KIT

This complete PC/XT KIT includes the Seagate ST225 drive, controller, cables, How-To manual & mounting hardware. Half height • 65ms.

Also available for AT.

$244

30Mb
Complete PC/XT KIT

Complete PC/XT KIT includes drive, controller, cables, How-To manual & mounting hardware. **$269**

High Speed 40Mb
Seagate ST251-1
Half Height • 28ms access time • Available for XT or AT

$409

Includes drive, AT mounting hardware &"Disk Manager" partitioning software

Drives and Kits are available for PS/2 models **25** & **30**!

We carry the entire **Seagate** product line including 3.5" drives

Card Drive™ Hard Cards

Card Drive 20S	40ms	$319
Card Drive 30S	40ms	$349
Card Drive 50S	40ms	$499

-- Features --

- Available for most Tandy models
- Quality engineered for reliability
- Super easy installation & setup
- ONE YEAR Warranty
- Auto park heads

These Card Drives use quality Seagate Hard Drives

65Mb ST277R
40ms access • Half Height
Autoparking heads
This drive requires an RLL controller
$379

Includes drive, mounting hardware & "Disk Manager" partitioning software

Help is just a phone call away with our Technical Assistance Department!

150Mb Kit

This complete kit includes Seagate drive, cables, Perstor ADRT controller, How-To Manual, mounting hardware and "Disk Manager" partitioning software. Full Height,. 28ms.

$788

No Surcharge for Visa or MasterCard Orders

All products include our ONE YEAR Warranty and our 30Day "Worry-Free" Guarantee!

Hours: 8am to 7pm Monday - Friday, 12pm to 5pm Sat. MST

HARD DRIVES International
An IDN Company

Toll Free Customer Service: (800) 541-8387

(800) 234-DISK

International orders call (602) 784-1038

VISA MasterCard AMERICAN EXPRESS Card

1208 E. Broadway Road #110 • Tempe, AZ 85282

(602) 784-1038 **FAX:** (602) 829-9193

Prices and availability subject to change without notice. All items are NEW. 5% surcharge for American Express and COD orders. P.O.'s accepted NET 10 - subject to 9% surcharge. Add $19 shipping for APO/FPO orders. 30 Day Guarantee conditions: shipping & handling charge is not refundable; product must be undamaged and in original condition. PCW1088

Circle 313 on reader service card

Super Savings! *

SF-286	8MHz	10MHz	10MHz (0 WS)	12MHz (0 WS)	16MHz (386)
Mono System	**$995**	**$1149**	**$1349**	**$1499**	**$2050**
EGA System	**$1369**	**$1569**	**$1720**	**$1870**	**$2349**

Basic System Features:

80286-16 bit CPU, 80287 socket, 512K RAM expandable to 1MB, fully compatible AMI BIOS, 1.2Mb Floppy Disk Drive, combined floppy/hard disk controller, Keytronics 101 enhanced keyboard, clock/calendar with battery backup, 195 watt power supply, 48 hour burn-in testing, operations manual, one year limited warranty and optional on-site maintenance agreement.

SF-286-8MHz

20Mb Mono Special.....$1249

Basic System features plus: Monographics board with printer port, Samsung 12'' amber mono monitor and Seagate 20Mb hard drive.

SF-286-8MHz

20Mb EGA Special.....$1599

Basic System features plus: Everex EGA graphics board, Eversion EGA color monitor and Seagate 20Mb hard drive.

SF-286-8MHz

20Mb VGA Special.....$1899

Basic System features plus: Everex EVGA graphics board (640 x 480, 800 x 600, up to 256 colors), Mitsubishi Diamond Scan multisync monitor and Seagate ST251 40Mb hard drive.

SF-286-12MHz

20Mb Mono Special.....$1749

Basic System features plus: Monographics board with printer port, Eversion 14'' flat screen amber mono monitor and Seagate 20Mb hard drive.

Upgrade to 40Mb Seagate hard drive, Add $160
Upgrade to 80Mb Seagate hard drive, Add $500

EGA Bundle.....$459

Everex EGA autoswitch graphics board and Eversion EGA color monitor.

Super. EGA Bundle.....$629

Everex EGA Deluxe autoswitch graphics board (640x480, 752x410), and Mitsubishi 1371-A Diamond Scan multisync color monitor.

Super VGA Bundle.....$769

Everex EVGA graphics board (640x480, 800x600, up to 256 colors) and Mitsubishi 1371-A Diamond Scan multisync color 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)

Seagate ST125 20Mb (40ms).....$269
Seagate ST138 30Mb (40ms).....$339
Seagate ST251 40Mb (40ms).....$369
Seagate ST251-1 40Mb (28ms).....$429
Seagate 4096 80Mb (28ms).....$649
Micropolis 1335 71Mb (28ms).....$599

Everex Modems

Everex Evercom external and internal half-card modems (fully Hayes compatible) with Bitcom Communications software.

Internal 1200 Baud Modem.....$CALL
External 1200 Baud Pocket Modem.....$139
Internal 2400 Baud Modem.....$149
External 2400 Baud with Mini I/O.....$229

Misc. Specials

Mini I/O (PAR, SER, CLK, CAL).....$49
Mini I/O with Game Port.....$55
Mini I/O + Logitech C7 serial mouse.....$119
Mitsubishi 3.5'' 720K floppy drive.....$99
Mitsubishi 3.5'' 1.4Mb floppy drive.....$129
150 Watt Power Supply.....$49
200 Watt Power Supply.....$79
2Mb EMS memory board with OK.....$80
3Mb EMS memory board with OK.....$99

*Special Prices Subject to Change Without Notice.

Seagate, Samsung, Miniscribe, Everex, Mitsubishi, Hayes, Micropolis, Bitcom, Logitech, are trademarks or registered trademarks of their respective companies.
SFmicro4.3 8/10/88

micro
1825 Lombard Street
San Francisco, CA 94123
California Orders, Information
(415) 929-1505
National Order Desk (800) 237-5631
Technical Support (415) 929-1607

University P.O.'s and Dealers Inquiries are Welcome

TERMS: We accept MasterCard, VISA (no surcharge), American Express, COD's (Certified Funds) and approved company P.O.'s. California residents please add sales tax. 10% fee for unauthorized returns (call for RMA number). Returns must be shipped freight prepaid by customer. Prices are subject to change without notice. We reserve the right to substitute equivalent items.

Circle 223 on reader service card

Designer Carry Case for Laptops: Extra pockets for portable printer, battery pack, pocket modem, manuals & software etc. Comes with handle and shoulder strap. Fits NEC EL & HD and all Toshiba Laptops (except T3200).

Only . . . . 149 With any Laptop 130

TOUCH BASE Systems World Port Pocket Modems: Both 1200 & 2400 use own battery. Operate on Bell and CCITT standards. 2400 includes AC Adapter and Carbon Copy PLUS comm sw. Comes with 25 pin female connector. For Toshiba adapter cable, add 20.

1200/2400 . . . . . 159/259 With any Laptop:1200/2400 . . . . . 150/250

WonUnder: Single Card Expansion slot for Toshiba Laptops. Supports most Toshiba compatible cards of 10" or less such as LAN and EGA cards. If all you need is one expansion slot, this is your low cost alternative to expansion chasis. Specify T1100+, T1200 or T3100/T5100.

Only . . . . . 299 With any Laptop 270

NOVATION Parrot 1200 External modem: World's smallest (size of an audio cassette) external modem. Does not require any batteries, AC or line power. Includes comm. software. Comes with 25 pin female connector. For Toshiba adapter cable, add 20.

Only . . . . . 129 With any Laptop 120

★ DICONIX 150 Parallel w/3' Cable . . . 329 With Purchase of Any Laptop . . . 299 ★ NEC P2200 . . . 329 ★

SYSTEMS

NEC MultiSpeed EL 1199
MultiSpeed EL II 1429
MultiSpeed HD w/20 MB 2239
Battery Pack-Specify EL or HD . . . 99
Carry Case: EL/HD 99
Floppy 5.25" Ext 360K for HD . . 339
NEC Modem 1200/2400 Int 269/339

TOSHIBA LAPTOPS
T1000 w/out Carry Case 759
T1000 w/Carry Case 799
T1000 w/Case & 768K Card . . . 1079
T1200F, 2 floppy w/C Case . . . 1329
T1200FB, Backlit w/C Case . . . 1549
T1200H, 1 floppy+20MB w/CC 2199
T1200HB, Backlit w/C Case . . . 2369
T3120 w/Carry Case 2929
T3200 w/out Carry Case 3639
T3200 w/Carry Case 3699
T5100 w/out Carry Case 4649
T5100 w/Carry Case 4729

ACCESSORIES for Toshiba LapTops
With Laptop . . . . Use Second Price
AC Adapter: T1000/1100+ . . . 75/60
AC Adapter: T1200 . . . . . 99/80
Auto Adapter: T1000/1100+ . . 65/50
Battery Charger: T1200 . . . . 239/210
Battery Pack: T1200 . . . . . 85/70
Carry Case for T1000 69
Carry Case: Specify model 89
Designer Carry Case w/pockets for SW, manuals, portable printer etc. Fits all (except T3200) . . . 149/130
Expansion Chasis w/interface for 1100+/1200 or 3100/5100 869/829
WonUnder: Expansion slot for 1100+, 1200 or 3100/5100 . . . . . 299/270
Floppy 5.25" Ext 360k 339/330
Memory 768k: T1000 . . . . . 299/290
Memory 384k: T1100+ 359/340
Memory 1MB: T1200 . . . . . 599/570
Memory 2MB: T3100 . . . . . 869/840
Memory 3MB: T3200 . . . . 1239/1200
Memory 2MB: T5100 . . . . 1049/1020
Modem 1200 Int: T1000 . . . . 319/300
Modem 1200 No Slot: T1200 299
When installed 350
Modems: T1100+/1200/3120/5100
Toshiba 1200 Int 299/280
MultiTech 1200 Int w/sw 239/220
Prometheus 1200 Int +sw 199/185
Prometheus 2400 Int +sw 329/300
Adaptamodem 2400 Int . . 329/300
Novation Parrot 1200 Ext . 129/120
World Port 1200 Ext 159/150
2400 Ext w/AC Adapter . . 259/250
Toshiba cable for Ext Modems . . . 20
Numeric Keypad: T1000/1200 99/90
Numeric Keypad: T3100/3120 99/90
Brooklyn Bridge 99/90
Laplink Plus 109/100

PRINTERS

ALPS Allegro 24 pin 359
ALQ 200 Color 18/24 pin . . 439/469
ALQ 300 Color 18/24 pin . . 629/669
ALQ 224E Color 599
ALQ 324E Color 749
BiDi Tractor: 200/300 . . . . . 70/90
Ribbon: ALQ Black/Color 15/20
P2000 w/Tractor 679
P2100 w/Tractor 1079
P2400 Color, w/Tractor 24 pin . . 969
★ **DICONIX InkJet 150 parallel** with 3' or 6' cable 329
With any Laptop 299
NEC P2200 329
5200/5300 . . . . . 515/689
Color Kit 5200/5300 109
Cut Sht Fdr 5200/5300 . . . . 169/199
★ **TOSHIBA** 321SL . . . . . 459 ★
★ **TOSHIBA** 341SL . . . . . 599 ★
KENSINGTON Printer Stand 20
★ With Printer . . . . . 10 ★
FREE With Prepaid Printer Order

DRIVES & BACKUP

PLUS HARD CARD: Single Slot 20/40 MB 499/649
FUJITSU 5.25" 360K for PC/XT . 89
FLOPPY 5.25" Ext 360k:Specify PS/2 NEC HD, Toshiba, Zenith 349
TOSHIBA 3.5" Int 1.44MB with Universal mounting kit 115
SEAGATE: For PC/XT HALF HT
PRO PACK 20 MB (ST 225) 279
PRO PACK 30 MB (ST 238) 299
Fully Pretested, PRO PACK includes controller, cables, detailed & illustrated manual. One year warranty.
PC/XT Mtng Kit & Filler Plate 10
FOR AT: 40 MB w/partitioning sw
SEAGATE ST251 - 40ms 399
SEAGATE ST 251-1 28 ms 449
AT Mounting Kit 10
ARCHIVE: Uses Floppy Cont/DC2000 40 MB: External for PC/XT 449
MOUNTAIN: Uses Floppy Cont/DC2000
40 MB: Internal for AT 379
DC 2000 Single/Box of 5 . . . 25/120
DC600 Single/Box of 5 . . . . . 30/140

MONITORS

LOGITECH AutoSync with EGA Card, LogiMouse & Paint Show 649
MITSUBISHI D Scan 1371 499
With Tilt & Swivel 515
Diamond Scan Tilt & Swivel 30
NEC MultiSync II-1402 589
NEC MultiSync PLUS 879
SONY 1311CR-13" Trinitron Color Remote TV & RGB Monitor . . . 449
Sony 1311 to IBM Cable 20
SONY Multiscan 1303 529
SONY Multiscan 1302 649
Sony 1303/2 to IBM Cable 20
Sony 1303/2 to MAC II Cable . . . 30
TAXAN 770 MultiVision plus 519
ZENITH ZCM-1490 Flat Screen . . 599
With Zenith Tilt & Swivel 620
Zenith Tilt & Swivel 30
UNIVERSAL Tilt & Swivel 35

MATH/RAM CHIPS

64K RAM 120ns Set of 9 30
256K RAM 120ns Set of 9 . . . . CALL
8087-3 PC/XT 5 Mhz 115
8087-2 PC/XT 8 Mhz 145
80287-6 AT 6 Mhz 169
80287-8 AT 8 Mhz 239
80287-10 AT 10 Mhz 279
80387-16 for 386 Machines 449
80387-20 for 386 Machines 699

MODEMS

LAP TOP Modems . . See SYSTEMS
EVEREX 1200 Int w/BitCom 89
2400 w BitCom Int/Ext 169/199
HAYES 1200B Internal-No SW . . 219
1200B with SmartCom II 269
NOVATION Parrot 1200 Ext. Size of Cassette. Needs no pwr/battery . 129
PROMETHEUS 2400G Ext 179
TOUCHBASE SYSTEMS
World Port 1200 Ext 159
2400 Ext w/AC Adapter 259
U S ROBOTICS Direct
1200 Int/Ext 79/99
2400 Int/Ext 149/179
ZOOM HC 2400 Int w/ProComm 129

FAX MACHINES/BOARDS

SHARP UX-80 for Books/Mags . . 969
SHARP UX-140/UX-160 . . . . 919/1119
SHARP FO-300 1199
SHARP FO-420/500 . . . . 1349/1499
TOSHIBA 3010O/3700 . . . . 1079/1499
FAX BOARDS
PANASONIC FX-B88/89 Fax Partner769
QUADRAM JT Fax Board 299
JT Fax Portable 369
THE COMPLETE PC Fax Board . . . 349

DISPLAY CARDS

With Monitor . . . . . Use Second Price
ATI VIP 299/270
GENOA SuperEGA HiRes+ 219/190
SuperVGA HiRes 5200-10 399/370
PARADISE AutoSwitch 480 . 199/170
Paradise VGA Plus 289/250
Paradise VGA Professional . 449/400
VIDEO-7 Vega Deluxe 229/200
Vega VGA 299/270
Vega V-RAM VGA (256k) . . . 549/500
ZENITH Z-449 . . . . . 279/250
9 to 15 Pin Connector-Required for some Monitor/Card combinations . 20
Gem Graph 50

KEYBOARD/MOUSE

KEYTRONIC 101 Keys for IBM PC, XT, AT with Function Keys on top row, separate Cursor Control Keypad and Numeric Keypad. With 3 years Keytronics warranty 109
OEM Version: Identical Keyboard w/90 day warranty from us 79
Keyboard Extension cable 10
LOGITECH with Plus software
PS/2 Mouse 79
C-7 Serial or Bus 85
HiRez Bus 89
Logitech Publisher 50
LogiPaint/LogiCadd 25/50
MICROSOFT Mouse: Bus or Ser 119
With Windows: Bus or Serial . . 149
MOUSE SYSTEMS PC Mouse: Bus with PC Paint Plus 119

POWER

REPLACEMENT POWER SUPPLIES
For PC XT 150 Watts 69
For AT 200 Watts 89
DATASHIELD Surge Pro 100 79
300 Watts Turbo Backup 399
450 Watts Turbo Backup 469
625 Watts Turbo Backup 569
SOLID STATE UPS 3" High SS400/SS700 . . . . . 699/829
KENSINGTON Masterpiece 99
Masterpiece Plus 109
Masterpiece Remote 109

★ FREE DELIVERY ★

★ PREPAID ORDERS IN CONTINENTAL USA ONLY ★

Simply mail the check for the exact amount (CA add 6%) as shown here with your order. We will ship your order UPS Ground, FREE of any other charges. It is that simple. For 2 Day AIR shipment, add 2% (Min $10). For Printers & Monitors 5% (Min $30). Money order/Bank check orders shipped immediately. Personal/Co. checks delay shipment 2/3 weeks. (Credit Card orders are not considered prepaid).

NEC MultiSync II-1402 . . . 589 With Any Display Card **. . . 569**

★ TOSHIBA T1000 . . . . .759 ★ TOSHIBA 321SL/341SL . . . . . 459/599 ★

★ PREPAID BY CHECK ONLY ★
★ POSTMARKED BY OCTOBER 20, 1988 ★

★ SUPER SPECIALS ★

★ PREPAID BY CHECK ONLY ★
★ POSTMARKED BY OCTOBER 20, 1988 ★

T1000 w/out Carry Case 735
T1000 w/Carry Case 775
T1000 w/Case & 768K Card 1035
T1200F, 2 floppy w/Carry Case 1299
T1200FB, 2 floppy Backlit w/CC 1499
T1200H, 1 floppy+20MB w/CC 2150
T1200HB, 1 F+20MB Backlit w/CC . . 2329
T3120 w/Carry Case 2890
T3200 w/out Carry Case 3600
T5100 w/out Carry Case 4600

TOSHIBA 321SL w/Par Cable 470
TOSHIBA 341SL w/Par Cable 610
ARCHIVE 40MB External: PC/XT 430
MOUNTAIN 40MB Internal: AT 360
ALPS Allegro 24 pin w/par cable 365
ALPS ALQ 300 24 pin w/par cable . . . 675
SHARP FO-420/500 . . . . . 1300/1450
SHARP UX-140/UX-160 . . . . . 895/1095
Touchbase Systems World Port with Toshiba Cable: 1200/2400 Ext . . . 175/275

PLUS Hard Card 40 MB 640
HAYES 1200B Internal-No SW 199
HAYES 1200B with SmartCom II 249
PROMETHEUS 2400G Ext 160
MOUSE SYSTEMS PC Mouse: Bus 99
LOGITECH HiRez Bus 80
LOTUS symphony 3.5" Ver 1.2 199
LOTUS Metro 3.5" Ver 1.0 29
BORLAND Sidekick: Specify 5.25 or 3.5 29
PC Paint Plus/Gem Graph 25/40

NEC MultiSpeed EL II 1399
NEC MultiSpeed HD 2199
NEC P2200 Par w/Cable 340
MITSUBISHI 1371 w/Tilt & Swivel 490
TAXAN 770 Plus w/Genoa HiRes+ . . . 690
SONY 1311 w/cable for IBM 460
SONY 1303 w/cable: IBM or Apple . . . 545
SONY 1302 w/cable: IBM or Apple . . . 665
ZENITH ZCM 1490 Flat Screen with Zenith Z-449 830

★ FOREIGN ORDERS ★

For foreign orders add special handling charge of $30 per order. Air shipments add 10% (Min. $50). For Printers & Monitors 30% (Min. $150). Some items may be more. Credit card orders, add 5% to amount owed.

FAX: 714-891-2364

★ PLUS HARD CARD 20/40 . . . 499/649 ★

POLICY: Min. order $100 for COD/Credit Cards. Prepaid orders Min. $50. Prices & availability subject to change. Shipping charges vary (Min. $10). Prices reflect discount for advance payment. Personal/Co. checks delay shipment 2/3 weeks. Add 2% (Min. $5) for COD & Discover, 3% for MC/Visa and 5% for Amex & Optima. COD requires cash or cashier check. No showroom or walkin sales. Open acct. PO min. order $1000, call for special prices. All sales final. Refused shipments subject to a 20% charge (Min. $50). Not responsible for compatibility.

★ PICKUP HOURS: Mon-Fri: 3 to 5 pm. PLEASE CALL FIRST FOR WORKORDER #. ★

★ APO ★ FPO ★

For APO/FPO orders, add special handling charge $30 per order. Shipping charges add 5% (Min. $20). For Printers & Monitors 10% (Min. $40). Some items may be more. No COD orders. Credit Card orders, add 5% to amount owed.

MICROBEST 714-897-2100

12605 HOOVER STREET, GARDEN GROVE, CA 92641 **PLEASE REFER TO AD # 8W-45**

Compu$ave

MMC MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.

1-800-877-8855

INTERNATIONAL ORDERS ARE WELCOME

BOARDS

Adv. Dig. Slave	545	Orchid Designer	329
Alloy Slave	599	Panasonic Fax	642
AST 4 Port	299	**Paradise 480 Auto**	169
AST 5251-11E	545	**Paradise VGA+**	249
AST Hot Shot 286	349	**Paradise VGA Pro**	352
ATI VGA Wonder..SAVE		STB VGA EM 512K	299
ATI EGA Wonder	195	**Sigma VGA H**	242
BOCA RAM AT	142	**Video 7 V RAM**	485
Genoa VGA HiRes	392	**Video 7 Vega VGA**	252
Artist/Computone/Intel/Metheus/Number 9			CALL
Quadram/Talltree/West. Digital/Verticom/VMI			CALL

DISK DRIVES

CDC 150 Mb	1,445	**Seagate 20M Kit**	262
Miniscribe 40M	295	**Seagate 30M Kit**	279
Miniscribe 6053	545	**Seagate 251**	359
Miniscribe 6085	649	Seagate ST251-1	429
PlusCard 20M	518	**Seagate 4096**	599
PlusCard 40M	655	Toshiba 3.5" Kit	89
AST/Archive/Alloy/Genoa/Iomega/Micropolis			CALL
Maynard/Maxtor/Tallgrass/Tecmar			CALL

SOFTWARE

Carbon Copy+ 5.0	108	**Microsoft Word 4.0**	209
DBase III Plus	374	**Multimate Advan. II**	249
Fastback Plus	92	**Paradox 2.0**	429
First Publisher 2.0	75	**Quattro**	139
Harvard Graph 2.1	259	**Top for DOS**	105
Microsoft Excel/PC	289	**WordPerfect 5.0**	239
Microsoft Works	109	**Ventura Publisher**	495
Peachtree Complete	155	**R:BASE for DOS**	448

COMPUTERS

Acer 20 Mhz	CALL	**Toshiba 1000**	769
AST Model 80	1599	**Toshiba T1200F**	1495
AST Model 386	CALL	**Toshiba T1200H**	2249
Intel 25 MHz	CALL	**Toshiba 3100/20**	2995
NEC EL II	1465	**Toshiba 3200**	3839
Packard Bell 12 Mhz. 1279		**Toshiba 5100**	4939
Samsung 20 Mhz	2899	Zenith 183 - 20 Mb	1949
Samsung Laptops	SAVE	Zenith Supersport	1625
Sharp	CALL	Zenith Supersport 286	3395
Acer 80386:16 MHz/0 Wait/1 Meg Ram			2745
Mitsubishi 286: 12 MHz / 40 Mb Hard Drive			1925
NEC Powermate Portable 286/640k/20M			2645
NEC Powermate Portable 286/640k/40M			3095
Sperry PC IT 512k/44M HD/Keyboard			2795
Samsung S500 AT: 10MHz/40M Drive			1565
Televideo 386: 16 MHz/2m/1.2M Drive			2595
Wyse 2108: 8 MHz/512k/1.2M Drive			1199
Wyse 2112: 12.5 MHz/1M/1.2M Drive			1699
Wyse 2214: 12.5 MHz/0 Wait/1.2 Drive			1895
Wyse 386: 16 MHz/1M/1.2M Drive/0 Wait			2795
Unisys 386: 16 MHz/1M/1.2M Drive/0 Wait			2599
Altos & Other Models			CALL

TERMINALS

Altos V	485	**Televideo 965**	412
Adds 1010	299	**Wyse 30**	289
IBM 3151	389	**Wyse 50**	355
Kimtron KT-70 PC	359	**Wyse 60**	395
Televideo 905	289	**Wyse 85G**	379
Televideo 955	375	**Wyse 99GT**	469
Visual/CIE/Link/Qume/Falco			CALL

PLOTTERS

Calcomp 1023GT	3785	Houston 62	4495
Calcomp 5902	3395	HP 7475	1395
Calcomp 1044GT	10,245	HP 7550 A	2895
Enter SP 1800	3095	HP 7595	7595
Houston DMP 52	2795	Ioline 3700	3055
Houston 41/42	2095	Ioline 4000	3995
Houston 56A	3795	**Roland 980**	1195
Houston 61	3295	**Roland 880**	929
Numonics/Taxan/Versatec/JDL/Other Models			CALL

DIGITIZERS

Calcomp12 x12	365	Logitech HiRes Mouse	92
Calcomp 44 x 60	3745	**Kurta IS 3**	CALL
Calcomp36 x 48	3195	**Kurta IS 8.5 x 11**	249
GTCO 24 x36	1945	**Kurta IS 12 x 12**	315
GTCO 36 x 48	2395	**Kurta IS 12 x 17**	535
Hitachi 11 x 11	439	Summa 12 x 12 +	355
Logitech C7 Mouse	79	Summa 12 x 18	599

MODEMS

ATI ETC	159	Novation Parrot	85
Anchor 2400E	145	Practical 1200I	65
AST 9600	779	Prometheus 2400B/2	119
Avatex 1200 Ext.	95	Prometheus 2400G	149
Hayes 1200	279	Racal-Vadic 2400VP	399
Hayes 2400	415	USR Courier 2400	299
Incomm T2400	235	USR 2400E	345
Migent Pocket	109	**USR HST 9600**	649
Multitech 224 EH	388	Ven-Tel 18000	939
Multitech 224 EC	305	Zoom 2400 HC	139
Avatex/Case/Everex/UDS/Other Models			CALL

PRINTERS

Alps Allegro 24	362	**NEC 5300**	689
Alps 324 E	745	**NEC P5XL**	835
Canon BJ 130	675	**NEC P9XL**	1038
Citizen120D	142	Panasonic 1080M2	165
Citizen 180D	165	Panasonic 1091M2	198
Citizen MSP40	312	Panasonic 1524	549
Citizen MSP55	489	Panasonic 1595	435
Fujitsu DL3400	512	**Star NX1000**	169
Okidata 390	464	**Toshiba P351SX**	935
Okidata 391	645	**Canon 8II**	1565
NEC P2200	330	**NEC LC 890**	3165
NEC 5200	519	HP Lazer Jet II	SAVE
Brother/C Itoh/Data Products/Data South			CALL
Diconix/Epson/Genicom/QMS/OTC/TI			CALL

MONITORS

Amdek 310A	69	PGS LM 300	539
Amdek 1280	645	Tatung Multiscan	475
Intercolor 19"VGA	1595	Taxan 770+	515
Mitsubishi 1381A	515	Thomson 4160 RGB	209
Mitsubishi 20" Auto	CALL	Thomson EGA	319
NEC Multisync II	575	Sigma Laser 19"	1765
NEC Multisync +	915	Wyse 650 VGA	489
NEC Multisync XL	2095	Wyse 700	678
NEC Multisync GS	179	Verticom 2 Page	1765
PGS Ultra Synch	522	Zenith 1490	598
Seiko 1430: 14", Multiscan, 1024x768, .26mm			649

SCANNERS

Datacopy 730	1095	PGS LS-300 /w OCR	965
AST / HP / Taxan / PC Hand Scanner			CALL

HOURS: MON-FRI 7 AM-6 PM, SAT: 9 AM- 2 PM. Address: 4207 S. 37th St. Phoenix AZ 85040. Prices reflect cash discounts and are subject to change without notice. We do not guarantee compatibility. Major credit cards and selected PO's are accepted. RMA required for all returns.

ARIZONA SALES: (602)437-4855 - CUSTOMER SERVICE (602)437-4856 - FAX (602)437-9685.

Circle 72 on reader service card

THIS ISSUE'S HIGHLIGHTS

MONITORS:

AMDEK

310A	125.00	410A	145.00
600	345.00	722	434.00

NEC

Multisync II	599.00
Multisync GS	195.00
Multisync Plus	929.00
Multisync XL 19"	2189.00

PRINCETON

Max-12	148.00	Hx-12	435.00
Hx-12E	475.00	Ultrasync	539.00

* Other name brands are available, call for pricing.

MODEMS:

HAYES

1200 ext.	288.00
1200B w/software	288.00
1200B w/o software	258.00
2400 ext.	428.00
2400 w/software	428.00

DRIVES

SEAGATE

20MG Kit	274.00	30MB Kit	294.00

PLUS

20MB Hard Card	538.00
40MB Hard Card	698.00
360K Floppy	98.00

PRINTERS:

OKIDATA

192 Plus	345.00		
193 Plus	445.00		
292 w/module	429.00		
293 w/module	589.00		
393	949.00		
Laserline 6	1465.00		

TOSHIBA

321 S/L	489.00	341 S/L	659.00
351 S/X	CALL!		

NEC

P6	450.00	3550	769.00
P5XL	849.00	P7	624.00
P9XL	1049.00	P2200	348.00
8850	1079.00		

* More name brands are available, call and ask.

MULTIFUNCTION BOARDS:

AST 6 pak w/384K	185.00
AST 6 pak Premium w/256k	219.00
AST Advantage	235.00
AST Advantage Premium w/512k	419.00
AST Rampage/2	235.00
AST Rampage 286	334.00
Orchid Tiny Turbo	269.00

Multifunction Boards Cont.

Orchid Twin Turbo	385.00
Orchid Jet 386 w/adapter	969.00
Orchid PC Net Starter Kit	729.00
Orchid Ramquest w/2MB	649.00
Intel Above Board 286	375.00
Intel Above Board PS 286	419.00
Intel Above Board 2	255.00
Intel Above Board 2W/512K	419.00
Intel Inboard 386 w/adapter	999.00
AST 6 Pak Plus w/384K	239.00
AST 5251-11 Plus Enhanced	599.00

* Additional name brands are available, Call for special pricing.

GRAPHIC ADAPTERS:

ATI EGA Wonder	185.00
ATI VGA	279.00
Hercules Graphics Plus	CALL!
Hercules In-Color	259.00
Hercules Color	154.00
NEC GB-1	198.00
NEC MVA	795.00
Genoa Super Hi-Res	199.00

Graphic Adapters Cont.

Quadram Prosync	219.00
Quadram EGA plus	179.00
Orchid Designer VGA	355.00
Orchid Designer VGA II	448.00

* Additional name brands are available, just call.

SOFTWARE:

Crosstalk	108.00
D-Base III plus	378.00
Framework	388.00
Lotus 1-2-3	298.00
Managing Your Money	124.00
Microsoft Word	208.00
Microsoft Excel	328.00
Multimate Adv. II	258.00
R-Base System V	408.00
Smartcom II	79.00
Symphony	428.00
Ventura Desktop Publishing	498.00
Volkswriter III	144.00
Wordperfect 5.0	228.00
Wordstar 2000	238.00

* If you don't see it, call and ask for it.

VISA MC

* All sales final except defective products. Will repair or replace at our option within 15 days.

* Prices reflect cash discount of up to 5%. Allow up to 10 days for delivery.

MICROWARE TECHNOLOGY

1-800-633-2029

Customer Service (704) 867-3360

2448E Chantres Drive, Gastonia, North Carolina 28054

Full Manufacturers Service Warranty Included. Prices and Availability Are Subject To Change

Circle 8 on reader service card

Leprecard

Leprecards feature components utilizing the latest technology from Seagate & Western Digital. You get a 1 year warranty, & illustrated user's guide. Low power drives mean less strain on the power supply, lower operating temperatures, and longer component life. **FREE SOFTWARE** including **TakeTwo,** the backup utility. PC MAGAZINE Editor's Choice in 1986 & 1987, & **PC-KWIK** disk cache software from Multisoft.

21MB	30MB	30MB	40MB	49MB	65MB
85ms	85ms	40ms	70ms*	28ms*	16ms*
$299	**$339**	**$389**	**$449**	**$549**	**$649**

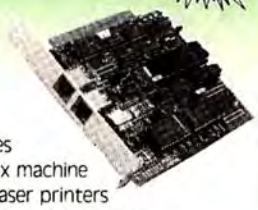
*Average access speed per partition

TANDY 1000/A/SX/TX Leprecards add $20

LepreFAX Modems

New!

Internal **$299** External **$359**



- Easy to use Pop-up Menus
- Sends ASCII or word processing files
- Send/Receive from any Group 3 fax machine
- Prints on standard dot-matrix or laser printers
- Automated sending during low phone rate periods
- Internal 4800bps, $289 9600bps $559
- Portable external plugs into PC serial port, $359

PC/XT Disk Kits

- Pretested & formatted
- Western Digital short controller
- 30 page installation guide & reference manual
- Cables, mounting screws, full & half-height face plates
- **TakeTwo** backup software, PC MAGAGINE "Editor's Choice"
- **PC-KWIK** disk cache software by **Multisoft**
- 1 year Warranty, 30 day Money Back Guarantee
- Optional: 150 watt, UL/FCC approved power supply for IBM PC's **$69**

TANDY 1000 kits add $20

20MB kit **$289**
Seagate ST225 21.4MB/65ms/Half-Height/14.8 watts

30MB kit **$309**
Seagate ST238 32.7MB/65ms/Half-Height/14.8 watts

40MB kit **$459**
Seagate ST251 42.8MB/Half-Height/11 watts pre-formatted into a pair of 21MB/28ms partitions

65MB kit **$549**
Seagate ST277R 65.5MB/Half-Height/11 watts pre-formatted into a pair of 32MB/28ms partitions

286[10] Computer

80286 processor at running at 6/10 Mhz with 0 wait states provides a Norton SI rating of 11.5. 8 slots - Room for 1 full height and 3 half - height drives - 200 watt power supply - Clock calendar - Choice of 1.2 or 1.44MB floppy drive - Combination Hard Disk/Floppy drive controller - Maxiswitch 84 or 101 key Keyboard - 512K RAM standard expandable to 1 MB - Award BIOS - 1 year warranty - 30 day money back guarantee. **$895**

Complete Systems with Serial/Parallel/Game Ports:

Monographics Card & Monitor	**$1095**	Orchid 512K VGA & Multisync II	**$1995**
with 20MB/65ms Seagate	**$1289**	with 20MB/65ms Seagate	**$2189**
with 40MB/40ms Seagate	**$1429**	with 40MB/40ms Seagate	**$2329**
with 65MB/40ms Seagate	**$1549**	with 65MB/40ms Seagate	**$2449**

1.5 MB Laser Printer

"One of the Laserjet's strongest competitors."
INFOWORLD October 5, 1987

512K RAM **$1495** 1.5MB RAM **$1595**

- 100% HP Laserjet, & Laserjet + compatible
- 1.5MB RAM Gives Full Page 300dpi graphics
- Vector graphics capability improves speed on programs like Autocad up to 93%
- 9 resident & 5 downloadable soft fonts standard
- Printer utility software
- Serial & Parallel Interfaces
- 120 day TRW on site maintenance
- 1 year Warranty
- Options: All HP style font cartridges Toner Cartridge **$29**

AT Hard Disk Kits

- Includes IBM AT rails & cables
- **SpeedStor** or **OnTrack** large drive software
- Formatted, Partitioned & Tested

Size	Model	Speed	Capacity	Price
HH	Seagate ST251	40ms	42.8MB	**$359**
HH	Seagate ST251-1	30ms	42.8MB	**$449**
FH	Seagate ST4096	28ms	80.2MB	**$599**
FH	Maxtor 1140	27ms	117MB	**$1669**
FH	Maxtor 2190	30ms	150MB	**$1999**

Orchid

Designer VGA
512K **$299** 256K **$269**
Tiny Turbo 286 **$289**
Ramquest II 1MB **$799**

Shamrock

2524B Townsgate Road, Dept. W / Westlake Village, CA 91361

To order, or get our free catalog, call:

Toll Free
800-722-AT-XT

California
805-373-7847

MMC

- ★ No extra for Visa/Mastercard (AMEX add 3%).
- ★ Prices include UPS surface shipping.
- ★ Federal Express shipping just $1.50 per pound.
- ★ 30 Day Money Back Guarantee.
- ★ Corporate & Institutional PO's accepted.

3.5" Floppy Kits

Internal kits for PC/XT/AT computers include 5¼" mounting bracket, black & gray face plates, and AT rails. 1.44 MB for PC/XT includes high speed Western Digital controller. FREE TAKE TWO floppy backup software.

720 Kit **$109** 1.44MB for AT **$139** 1.44MB for PC/XT **$199**

2400 MNP Modems

$239/$229

- Hayes Compatible, 300/1200/2400
- MNP level 4 error correction
- **FREE** MIRROR II Software, a $69 value
- Internal model $229, fits in short slot

Internal with MIRROR II (non MNP) $109

Circle 283 on reader service card

SAVE ON TANDY COMPUTERS CALL 1-800-248-3823

TANDY COMPUTERS

Tandy 1000 SL 384K (8086) 5 1/4" Drive	675.00
Tandy 1000 TL 640K (80286) 3 1/2" Drive	955.00
Tandy 3000 NL 512K (80286) 3 1/2" Drive	1275.00
Tandy 4000 LX 2Meg (80386) 3 1/2" Drive	2999.00
Tandy 4000 1 Meg (80386) 3 1/2" Drive	1890.00
Tandy 5000 2 Meg (80386) 1 Drive	3825.00
Tandy 5000 2 Meg (80386) 40 Meg HD	4955.00
Tandy 5000 2 Meg (80386) 84 Meg HD	5395.00
Tandy 1400LT (Nec V-20) 768K 2 Drives	1285.00
102 Portable Computer 32K	430.00

TANDY PRINTERS

DMP-132 Dot-Matrix 80 Column 120CPS	285.00
DMP-440 Dot-Matrix 132 Column 300CPS	595.00
DMP-2120 Dot-Matrix 132 Column 240CPS	1325.00
DWP-230 Daisy Wheel 132 Column 20CPS	335.00
LP-1000 Laser Printer 6 Pages Per Minute	1815.00

HARD DRIVES

20 Meg Internal for Tandy 1400LT	775.00
Tandy 20 Meg Hardcard for 1000/3000	450.00
5 1/4" External Drive for Tandy 1400LT	215.00
Seagate ST-225 20 Meg Drive (no controller)	265.00
Tandy 1000SX/TX Hard Drive Controller	80.00

ZUCKERBOARD PRODUCTS

512K Board For 1000 & 1000A	CALL
512K MFB For 1000 & 1000A	CALL
30 Meg Hardcard for Tandy 1000/SX/TX	435.00
300/1200 Baud Modem Card 1000/3000/4000	75.00
Mono Graphics Adapter Card	75.00
Clock Board for 1000/1000A/SX/SL/TX	35.00

EPSON PRINTERS

LX-800 Dot-Matrix 80 Column 180CPS	205.00
FX-850 Dot-Matrix 80 Column 220CPS	375.00
FX-1050 Dot-Matrix 132 Column 220CPS	540.00
EX-800 Dot-Matrix 80 Column 250CPS	425.00
LQ-850 24Pin Matrix 80 Column 220CPS	579.00
LQ-1050 24Pin Matrix 132 Column 220CPS	820.00
LQ-2550 24Pin Matrix 132 Column 333CPS	1120.00
LQ-500 24Pin Matrix 80 Column 150CPS	375.00

MONITORS

VM-4 Monochrome Composite Green	95.00
CM-5 Color RGB 320 X 200 Resolution	220.00
CM-11 Color RGB 640 X 200 Resolution	335.00
EGM-1 Color EGA 640 X 350 Resolution	510.00
Nec Multisync II Color RGB Monitor	625.00
Amdek 410 Monochrome TTL Monitor	160.00
Amdek 722 EGA Color Monitor	485.00

VIDEO ADAPTER CARDS

Tandy EGA Adapter Card (CGA,EGA,Herc.)	185.00
Zucker Monochrome Graphics Card	75.00
Video 7 Vega/Deluxe (CGA,EGA,Herc.)	215.00
Video 7 Vega VGA (CGA,EGA,VGA,Herc.)	295.00
Hercules Graphics Card Plus Adapter	195.00
Hercules In Color Card Adapter	225.00
Paradise VGA Plus Adapter Card	305.00
Paradise EGA 480 Adapter Card	205.00

MICE

Microsoft Serial W/Paintbrush/Menus	120.00
Mouse Systems Serial W/Pop-Up Menus	99.00
Logitech C7 Serial Mouse	90.00

MODEMS

Tandy 1200 Baud Modem Board (Short Card)	85.00
Zuckerboard 300/1200 BPS Modem Board	75.00
Practical Peripherals 1200 BPS Modem Board	75.00
Practical Peripherals 2400 BPS Modem Board	175.00
Hayes 1200 Baud Internal Modem Board	295.00
Hayes 2400 Baud Internal Modem Board	445.00

TANDY FAX MACHINES

Tandy Fax 1000 Fax Machine	1100.00

CELLULAR TELEPHONES

CT-101 Mobile Telephone	620.00
CT-201 Transportable Telephone	799.00
CT-301 Portable Telephone	1115.00

SOFTWARE

Borland Reflex V 1.14	99.00
Borland Quattro	165.00
Borland Sidekick Plus	135.00
Fifth Generation Fastback Plus	106.00
Funk Software Sideways V 3.2	45.00
Wordstar Professional 4.0	265.00
Microsoft Windows V 2.0	69.00
Microsoft Word V 4.0	230.00
Norton Utilities	55.00
PFS: First Publisher	76.00
PFS: First Choice V 2.0	95.00
Wordperfect V 5.0	245.00
Xerox Ventura Publisher V 1.1	529.00
Traveling Software Laplink Plus	95.00

Prices subject to change, call for current prices.

Perry Computers 124 S. Main St. Perry, Mi. 48872 Monday thru Friday 9 am - 5 pm

Technical Questions and Information Call 1-517-625-4161. FOR ORDERS ONLY CALL 1-800-248-3823

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. MC/VISA/DISCOVER add 2%.
Delivery subject to availibilty. Shipping charges add 1.5%(minimum charge $5.00). C.O.D. accepted add 2 %(minimum charge $10.00)

Circle 264 on reader service card

SOFTWARE ADD-ONS

"Where America's Professionals Shop for IBM Compatible Software."

1810 Byberry Rd
Bensalem, PA 19020

To Order — Call our National HOTLINE:
1.- 800 - 822 - 8088
Customer Service Inquiries call:
1-215-639-7110

ACCOUNTING	
Accpac + 5 GL,AR,AP	$ 429
Accpac + 5 ICDE RI	389
Accpac BPI GA/AR/AP	249
Accpac Easy	59
Bedford Accounting	169
Dac Easy 3.0	57
Dac Easy Lite	47
Managing Yr/Money 4	117
Peachtree Comp II	149
Quicken	29

C.A.D.	
AutoCad w/ADE3.9.0	2199
DesignCad 3D	148
Drafix 1 Plus	159
Generic CADD 3.0	49
Generic Dot Plot	29
MathCad 2.0	209

COMMUNICATIONS	
Carbon Copy + 5.0	105
Crosstalk Mark IV	119
Crosstalk XVI 3.61	95
Deskink 2.0	95
Lap Link Plus	79
Mirror II	33
PC Anywhere III	75
Relay Gold	138

DATABASE	
AskSam 4.0(text db)	252
Clipper Summer '87	395
Dataperfect	269
dBase III + 1.1	365
dBase Prog. Util	69
dBXL Diamond	105
Foxbase + 2.05/U	189
Foxbase + 2.0M/U	295
Paradox 2.0	419
PC File Plus 2.0	45
Q & A 3.0	195
Quickcode/Q Report	135
R & R 3.0	129
RBase for DOS	439
Reflex	79
VP Info	59

DESKTOP PUBLISHING	
First Publisher 2.0	79
ByLine	179
First Publisher Graph	35
Fontasy	$ 35
Gem Desktop Pub	169
Newsmaster II	42
Newsroom Pro	59
Publisher's Ptbrush	159
Ventura Pub. 1.1	479
Pagemaker 3.0	489

GRAPHICS	
Boeing Graph	195
Chartmaster	219
Gem 3/Graph	175
Graphin'theBox	55
Harvard Graph 2.1	295
Lotus Graphwrx II	369
MS Chart 3.0	229
VP Graphics	59

PAINTING	
Dr Halo III	35
Easyflow	139
Flowcharting II +	149
Formtools	59
Formworx	85
Formworx Film file	135
Gem 3/Draw Plus	159
Lotus Freelance +	299
MS Windows Draw	189
Org Plus	85
PC Paint Plus	53
PC Paintbrush Plus	85
Printmaster Plus	29
Print Shop	35

INTEGRATED	
Ability Plus	149
First Choice	call
Framework II	379
Lotus Symphony 2.0	432
MS Works	109

MICE	
Logimouse C7 Plus	85
Logimouse Hres	85
Logimouse w/CADD	109
Logimouse w/Paint	84
Logimouse w/Publish	99
MS Mouse w/ECAD	109
MS Mouse w/Paint	92
PC Mouse w/Paint(s)	85
Logimouse PS/2	79
MS Mouse w/Windows	129

PROGRAMMING	
Brief Editor 2.0	$195
IBM Personal Ed.II	129
Kedit	109
MS C Compiler 5.1	269
MS Fortran 4.1	269
MS Macro Assemb 5.1	89
MS Quick C	56
MS Quickbasic 4.0	56
MS Windows Dev Kit	349
Norton Editor	39
SPF/PC 2.0	219
Turbo C/Bas/Pas/Pro	58
Turbo Toolboxes(ea)	58
VP Expert	85

PROJECT--MANAGEMENT	
Harvard Total Proj	369
MS Project 4.0	287
Project Mgr/Workad	799
Project Mgr/Workst	599
SuperProject Plus	269
Timeline 3.0	329
Timeline Graphics	119

SPREADSHEETS	
4Word	55
Analyst	59
Boeing Calc	199
Lotus 123 2.01	294
Lotus HAL	89
Lotus Reporwriter	65
LUCID 3D	99
MS Excel	285
MS Multiplan 3.0	119
Quattro	145
SuperCalc IV	249
VP Planner Plus	95
VP Planner	47

UTILITIES	
Copy II PC	18
Copywrite	39
Deskview 2	73
Direct Access 4.1	55
Disk Optimizer 4.0	44
Disk Technician +	69
Double DOS	44
Deskview EMM	35
Fastback 5.14	85
Cruise Control	45
Noteworthy	59
Fastback Plus	$ 87
Fastracks	49
Fixed Disk Organ	49
Hitest H/format	49
Le Menu	49
Lotus Metro	59
Mace Utility	47
MS DOS 3.3	89
MS Learning DOS	35
MS Pageview	55
MS Windows 2.03	57
Norton Advanced	74
Norton Util 4.0	49
Norton Commander	45
Nosell Plus	49
One Dr Plus	55
Pathminder 4.0	45
PC DOS 3.3	99
PC Tools DeLuxe	36
Print Q	59
QDOS II	39
Sidekick	49
Sidekick Plus	119
Sideways 3.2	37
Software Carousel	49
Sqz Plus	53
Superkey	58
Tornado Notes	59
Tornado w/Library	79
Typing Tutor IV	29
Xtree	35
Xtree Pro	61

WORDPROCESSING	
Displaywrite IV	299
Easy Extra	49
Grammatik III	49
Lotus Manuscript	319
MS Word 4.0	209
Multimate Advant.II	247
PFS Pro Write 2.0	115
Rightwriter 2.2	49
Sprint	129
Webster's Writer	53
Wordperfect 5.0	227
Wordperfect Library	69
Wordperfect LAN	369
Wordperfect Exec	189
Wordperfect 5.0 (3.5")	249
Wordperfect LAN Sln	99
Volkswriter III	169
PC Write 2.71	89

- Corporate and Goverment Orders Welcome
- Lowest Shipping Charges
- Volume Discounts Available
- Prompt Nationwide Shipping
- DEALER ENQUIRIES WELCOME

Policies:
1 - no surcharge on credit cards
2 - shipping any 1 item $ 6.00
any 2 items $ 7.00
any 3 or more add 2 (no min. charge)
3 - COD charge $5.00
4 - prices, terms and availability subject to change without notice
5 - all returns subject to RA approval and 20 restocking fee

Circle 22 on reader service card

SAVE 20-40%
ON TANDY COMPUTERS!
America's #1 Compatibles

New! 80286 Based Tandy 1000 TL

SAVE $370 or more!

CALL For Info & Pricing On Tandy's New Releases!

1 MB Tandy* 4000

SAVE $1000 OR MORE

- Powerful 8 MHz 80286 Microprocessor
- 640K RAM • Enhanced Keyboard
- Automatically Loads MS-DOS and DeskMate® Without Diskettes

OS/2* ready! Features 3½" disk drive, 80386 microprocessor and a fast 16 MHz clock speed. #25-5000

- ✓ Complete Line of Tandy Equipment in Stock.
- ✓ Courteous, Efficient Service & Customer Support.
- ✓ Tandy Laptops...SAVE $500 or more!
- ✓ We are Experts with NON-Tandy Peripherals...SAVE!!
- ✓ TANDY 1000 SL....$659!
- ✓ This is our Sixth Year of Discount Operation.
- ✓ SALE! 30 Meg. ATD Hardcard, list $649, our price $479.

CALL OR WRITE TODAY... SEE HOW MUCH YOU CAN SAVE!

1-800-447-4225

Colo. residents, shipping and customer service, call: (303)249-9125

GREAT WESTERN ELECTRONICS
232 MAIN ST. • MONTROSE, CO 81401
• HOURS: 9-5 MST, M-F

Circle 122 on reader service card

HOURS:
7 AM to 7 PM Monday–Friday
8 AM to 2 PM Saturday
Call on Sunday

RP Systems

2625 BUTTERFIELD ROAD • SUITE 103N • OAK BROOK, ILLINOIS 60521

Visa, MasterCard, Discover and American Express Accepted.

1% Consultant and Reseller Accrual Program

Toshiba Laptop 386/16 T5100 $4590

Packard-Bell 386 System $2600 286 System $1200 8088 System $640

Everex 1200 B Internal $75

IBM-NOVELL Network Support System 36 & 38 Support

IBM PS/2

Model 30–2 Floppies	$1175
Model 30–20 Mb Disk	$1595
Model 50–20 Mb Disk	$2450
Model 50–30 Mb Disk	$2775
Model 50–60 Mb Disk	$3150
Model 60–44 Mb Disk	$3200
Model 70–60 Mb Disk	$4175
Model 70–120 Mb Disk	$5375
Model 80–44 Mb Disk	$4250
Model 80–70 Mb Disk	$4900
Model 80–115 Mb Disk	$6000

COMPAQ

286 Mod 1/640 K	$1620
286 Mod 1/40 Mb-640 K-Monitor	$2300
386 Deskpro/20 60 Mb	$5200
386 Deskpro/20 130 Mb	$6400
386 Deskpro/20 300 Mb	$8900
386S Deskpro	$2660
386S Deskpro 20Mb/40Mb	$3150/3640
386/25 110Mb/300Mb	$7210/9000
Portable II Model 4	$2700
Portable III Model 20	$3400
Portable III Model 40	$4150
Portable 386 Model 40	$5400
Portable 386 Model 100	$6800

TOSHIBA LAPTOPS

T1000	$775
T1200F	$1585
T1200	$2250
T3100/20	$2950
T3200	$3575
T5100	$4590
Battery Backup	$325
Modem	$275

PACKARD-BELL

386 System	$2600
286 System	$1200
8088 System	$640

DRIVES

Seagate

20 Mb Kit (ST225)	$259
30 Mb Kit (ST238)	$295
40 Mb (ST251)	$366
40 Mb Kit (ST251-1)	$449
80 Mb (ST4096)	$699
360 Floppy	$99
3½" 720K/1.44 Mb	$98/111

Miniscribe

20 Mb Hard Card	$379
70 Mb (6085)	$835

Plus

Hard Card 20/40 Mb	$535/647

MONITORS

IBM

8503 12" Monochrome	$185
8512 14" Color	$425
8513 12" Color	$495
8514 16" Color	$1075

Compaq

Mono	$189
VGA Mono	$189
VGA Color	$499

Amdek

310A	$79
410A	$145
C600 (CGA)	$344
C722 (EGA)	$435

Princeton

UltraSync	$560

NEC

MultiSync GS	$180
MultiSync Plus	$910
MultiSync 2	$575
MultiSync XL	$Call

SOFTWARE

COMPAQ DOS 3.31	$89
dBase III Plus 5¼/3½"	$361/395
IBM DOS 3.3/4.0	$90/110
Lotus 1-2-3 V 2.01 5¼/3½"	$292/310
Microsoft Excel	$290
Multimate Advantage 2	$259
Norton Advanced Utilities	$75
Paradox 2.0	$418
R:Base 5000	$309
Q&A	$230
Sidekick	$50
Smartcom II/III	$90/150
Symphony	$430
Word Perfect 5.0	$225
DisplayWrite IV	$285
Aldus Pagemaker	$459

PRINTERS

Epson

FX 286e 200/40 cps	$439
FX 850 260/84 cps	$365
FX 1050 260/84 cps	$530
EX 800 300/60 cps	$459
LQ 850 264/88 cps	$522
LQ 1050 264/88 cps	$745
LQ 2500	$910
LQ 950	$Call
LQ 2550	$Call
DFX 5000	$Call

Okidata

320/21	$365/477
390/91	$464/635
393	$945

Panasonic

KX 1080 I 144/28 cps	$155
KX 1091 I 192/38 cps	$193
KX 1092 I 240/48 cps	$320
KX 1592 180/38 cps	$405
KX 1595 240/51 cps	$445
KX 1524 240/80 cps	$540
KX 3131 17 cps LQ	$290
KX 3151 22 cps LQ	$461
KX 4450 11 PPM Laser Printer	$1600

Hewlett-Packard

LaserJet II	$1695
DeskJet	$675

NEC

P2200 170/55 24 Wire	$339
8850 55 cps	$1050
P5200	$507
P5300	$705
P5XL 290/100 cps	$829
P9XL 400/140 cps	$1025

IBM

Quietwriter III	$1125
Proprinter II	$389
Proprinter X24	$545
Proprinter XL	$545
Proprinter XL 24	$709

Toshiba

321 S/L 216/72 cps	$499
341 S/L 216/72 cps	$855
351 SX 350/100 cps	$1000

MODEMS

US Robotics 1200	$100
US Robotics 2400	$159
Hayes 1200B Int	$243
Hayes 1200B/SCII	$282
Hayes 1200 Ext	$277
Hayes 2400 Ext	$419
Hayes 2400B w/SCII	$418
Everex 1200 w/S/W	$75
Everex 2400 Int	$137
Everex 2400 Ext	$195

MULTIFUNCTION CARDS

Everex MagicCard OK	$100
AST 6 Pack w/384K	$Call
AST 6 Pack Prem.512K	$Call
AST Advantage w/128K	$Call
AST Rampage w/256K	$Call
AST AT Rampage	$Call
AST Advantage/2 for PS/2	$Call
IRMA Board	$680
AST 5251/11 Enhanced	$575
Logitech Series/2 /C7 Serial	$69/72
IBM 5250 Emulation for PS/2 thru 80 is Available	$631
COMPAQ 1Mb Memory 386/20	$Call
COMPAQ 4Mb Memory 386/20	$Call

VIDEO BOARDS

Paradise VGA	$275
Vega VGA	$275
COMPAQ VGA	$Call
Vega Deluxe	$249
Paradise Auto Switch-480	$169
COMPAQ VDU	$Call
Hercules Color w/Par. Port	$135
COMPAQ MonoGraphics	$Call
RP MonoGraphics	$69
Genoa Super Hi Res 800X600	$175
Genoa Super VGA	$333

CHIPS

Intel

8087-1/2/3	$220/149/109
80287-6/8/10	$167/240/289
80387-16/20	$469/702

Call Toll Free . . .

1-800-634-8215

In Illinois Call . . .

1-312-654-4100

SALES AND QUOTES (Outside Illinois) 1-800-634-8215.

SHIPPING AND TECHNICAL SERVICE 1-312-654-4170.

- **Corporate and volume purchases invited. Call Dick.**
- **Lease available.**
- **Stock orders placed by 3:00 CDT shipped same day.**
- **24 hour burn in on all CPUs.**
- Prices subject to availability and change without notice.
- Prices reflect 3% cash discount.
- Allow 10 days for personal checks to clear.
- Wire transfer payments accepted.
- Orders over $250 add 2–3% shipping/handling.
- Minimum $5.00 shipping/handling charge.
- Returns subject to restocking charge.

Circle 125 on reader service card

ACP's Break thru Prices!!

Since 1976...The Nation's TOP Computer Supplier

MEMBER MMC MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.

NEC Silentwriter® LC890 Postscript® Laser Printer *Sale!*

Includes the same resident fonts as the Laserwriter. **3395.**

SPECIAL!! AST® Internal 1200 Baud Modem software included... **79.**

Quantum Theory!

We made a truckload purchase from the factory and while the supply lasts we are offering them at this unbelievable price...

sale

295.

Quantum Q540 42.6Mb

Unformatted, 40ms, perfect for 286 & 386 AT's

ACP...famous since 1976 for delivering the Best Deals!!

Special Purchase AMDEK EPSON COPA QUADRAM

CLOSEOUTS!

While Stock Lasts! **32¢**

- **Bulk DS/DD 5-1/4" Diskettes** box of 100 ..... each
- **Quadram Quadsprint Card** upgrade PC/XT to 10 MHz ..... sale **79.**
- **Sixpack Compatible** Quadram Silver Board, 0K ..... sale **98.**
- **Liberty Card,** EMS, 0K ..... sale **98.**
- **1200 Baud Internal Modem** with software ..... sale **69.**
- **Sharp PC5000 Portable** ..... sale **149.**
- **OmniPak! 1200 Baud Modem** serial/parallel/clock/game/RAM ..... sale **99.**
- **Diablo 620 Printer** ..... sale **199.**
- **Mindset Personal Computer** 360K/floppy/mouse/joy/MS-DOS 2.0 **219.**

MEMORY LOSS?

Don't feel like the Lone Ranger... we are also suffering from loss of memory. ACP sells more Memory Upgrade IC's than other other mail order supplier...But!...the present shortage is driving us up a wall!. We can't get them at the right price, but we are getting them. PLEASE BEAR WITH US...as the market price comes down, so will our price!

Selling Chips? ***Call us, we're buying.***

***New!* RAY-O-VAC® 9.95**

Introductory Price.....

AT Replacement Battery

Direct replacement for real-time clocks, AT/286/386

PC COMPATIBLE DRIVES

ACP Advanced Cards/IBM

Monographics/HGA w/print port ... 55.
Colorgraphics w/printer port ... 55.
SuperEGA,Genoa compatible ... 169.
SuperVGA,1024x768 ... 339.
Diamond Multi I/O,2s,p,g,c/XT ... 139.
XT Six-Pak compatible/0K ... 89.
XT 286 Accelerator card ... 269.
XT Multi I/O w/floppy contr ... 69.
XT dual Floppy controller ... 29.
XT Serial I/O card ... 29.
XT/AT Parallel I/O card ... 29.
AT Serial I/O card ... 39.
XT/AT Game adapter port ... 29.
XT/AT EPROM programmer ... 149.
AT 3.5Mb w/Multi I/O, 0K ... 199.
AT SuperMULTI I/Ow/floppy ... 119.
PS/2 Multi I/O ... 99.
PS/2 Floppy controller 1.4Mb ... 89.
HP Laserjet 1Mb Ram card ... 349.

MOTHERBOARDS

XT Turbo w/BIOS, 8MHz ... 89.
XT Turbo w/BIOS, 10MHz ... 99.
AT 286 w/BIOS, 10 MHz ... 289.
AT Baby w/BIOS, 12MHz ... 299.
AT 386 w/BIOS, 16MHz ... 1499.

HARDWARE

AST Research

Xformer/286, 512K, 10MHz ... 699.
Advantage 2/386,mod.80,1Mb ... 725.
Advantage 2/286,PS/2,0K ... 349.
Advantage Premium 286,512K ... 389.
Rampage 2/286,PS/2,512K ... 499.
Rampage 286, 512K ... 489.
AST Sixpakplus, 0K ... 119.

ATI Technologies

EGA Wonder 800 ... 199.
VGA/VIP ... 319.
2400etc int. Modem w/MNP-5 ... 188.

GENOA

Super EGA ... 199.
Super VGA ... 299.

GULFSTREAM

EZ-FAX Board w/software ... 1188.

HERCULES

Color Card/ CGA ... 149.
Graphics Card Plus ... 174.

INTEL

Inboard 386/PC to 386 ... 975.
Inboard 386/AT to 386 ... 1059.
Above Board 2,PS/2 mod50/60 ... 299.
Above Board 286,AT,512K ... 329.
Above Board PS/286,model 30 ... 349.
8087 (5MHz) ... 102.
8087-1 (10MHz) PS/2 ... 205.
8087-2 (8MHz) ... 158.
80287-6 (6MHz) ... 185.
80287-8 (8MHz) ... 255.
80287-10 (10MHz) ... 309.
80387-16 (16MHz) ... 549.
80387-20 (20MHz) ... 799.

ORCHID Technology

Tiny Turbo 286 -*REDUCED!* ... 289.
Designer VGA Board ... 299.
RAMQUEST 50/PS/2, 2Mb ... 699.

PARADISE

Autoswitch 480 ... 199.
VGA Plus ... 299.

QUADRAM

Quad386XT ... 747.
Prosync(640x480,752x410) ... 269.
Microfazer/I buffer w/64K ... 239.
Quadsprint XT accelerator ... 98.
Liberty EMS XT card, 0K ... 98.
Silver Quadboard, Sixpak comp ... 98.

VIDEO 7

VEGA Deluxe ... 199.
Vega VGA ... 299.

INPUT DEVICES

Advanced PC Keyboards

5160 84key XT/ATswitchable ... 59
5161 101key XT/ATswitchable ... 79.

CH Products

Mach II Joystick-IBM ... 39.
Mach II Joystick-Apple ... 39.
Mach III Joystick-IBM ... 49.
Mach III Joystick-Apple ... 49.
Gamecard III ... 39.

KEYTRONICS

KB101 101key/AT ... 89.
KB5151 84key deluxe ... 119.

KRAFT

IBM PC/XT/AT Joystick ... 33.
Mouse PC/XT/AT serial ... 89.

LIGHTGATE

Felix for PC/XT/AT ... 159.

LOGITECH

Bus Mouse PC/XT/AT ... 99.
Serial Mouse PC/XT/AT ... 99.
Serial Mouse PS/2 ... 99.

MICROSOFT

Bus Mouse w/PC Paintbrush ... 105.
Serial Mouse w/PC Paintbrush ... 105.
Serial PS/2 w/PC Paintbrush ... 118.

MSC Technologies

PC Mouse serial PC/XT/AT ... 98.
PS/2 Mouse serial ... 98.
PC Mouse bus PC/XT/AT ... 98.

SUMMAGRAPHICS

SummaSketch ... 449.

FLOPPY DISK DRIVES

SONY

31/2"Micro Floppy 1.44Mb ... 149.

TEAC

55BV 360K Floppy/PC/XT/AT ... 89.

TOSHIBA AMERICA

FDD4403 31/2" Micro 760K ... 129.
31/2" Micro 1.44Mb w/kit ... 139.
ND04D 360K FloppyPC/XT ... 84.
ND04E-G 360K Floppy AT gray ... 84.
ND08DE-G 1.2Mb AT gray ... 110.

HARD DISK DRIVES

MICROPOLIS

1333A 53Mb Full ht.,30ms. ... 649.
1335 85Mb Full ht.,65ms. ... 849.

MINISCRIBE

3650 43Mb Half ht.,61ms. ... 389.
6053 53Mb Full ht.,28ms. ... 649.
6085 85Mb Full ht.,28ms. ... 849.
8438 38Mb Half ht.,65ms.RLL ... 299.

PLUS Development

Plus20 Hardcard, 20Mb,49ms. ... 549.
Plus40 Hardcard, 40Mb,39ms. ... 719.

SEAGATE

ST225 25Mb,65ms. w/WD cont ... 299.
ST138 38Mb New! 31/2" ... call.
ST238 38Mb,65ms.w/WD RLL ... 398.
ST251 51Mb,40ms. ... 449.
ST251-1 51Mb,28ms. ... 499.
ST4038 38Mb,40ms.-*REDUCED!* ... 469.
ST4096 96Mb,28ms.-*REDUCED!* ... 799.

WESTERN DIGITAL

FilecardPS30 PS/2mod.25/30 ... 389.
Filecard30 ... 449.
1006RAH Contr. 1:1interleave ... 199.
1003RAH Controller RLL/AT ... 187.
1003WA2 Floppy/Hard/AT ... 149.
1002-27X Controller RLL/XT ... 98.
1002-WX1 Controller /XT ... 89.

BACKUP DEVICES

ALPHAMICRO

VCR Video tape backup card ... 349.

IOMEGA

Bernoulli 20Mb 51/4" internal ... 945.
Bernoulli dual20Mb 51/4"ext ... 1699.
Bernoulli dual20Mb 8"ext. ... 1895.
Tri-pak 20Mb cartridge,51/4" ... 189.
Tri-pak 20Mb cartridge, 8" ... 255.
PC3B Adapter card PC/XT/AT ... 189.
PS4 AdapterPS/2mod.50,60,80 ... 299.

IRWIN

110D XT/AT 10Mb backup(int) ... 199.
120D XT 20Mb backup(int) ... 369.
145C AT 40Mb backup(int) ... 499.
245P PS/2 40Mb backup ... 479.

TALLGRASS Technologies

1020i AT 20Mb backup(int) ... 338.
1020i XT 20Mb backup(int) ... 338.
1040i AT 40Mb backup(int) ... 599.
1040i XT 40Mb backup(int) ... 599.
Call for External Pricing!

COMPUTERS

Advanced 386 Clones w/0K

Advanced386/16base system ... 1795.
Advanced386/16 w/40Mb ... 2195.
Advanced386/16w/80Mb ... 2495.

Advanced 286 Clones w/0K

Advanced286/10base system ... 849.
Advanced286/10 w/20Mb ... 1099.
Advanced286/10 w/40Mb ... 1299.

Advanced XT Clones w/0K

AdvancedXT base system ... 489.
AdvancedM/XTw/mono/20Mb ... 999.
call for options & details.....

AST Research

Premium286Model140,40Mb ... 2995.
Premium Workstation ... 2195.
Premium386Model340,40Mb ... 4699.
call for all AST models.....

COMPAQ

Portable III Model 20 ... call.
Deskpro286 Model 20 ... call.
Deskpro386 Model 40 ... call.
Portable386 Model 40 ... call.

EPSON

Equity I+ ... call.
Equity II+ ... call.
Equity III+ ... call.

HYUNDAI

Hyundai286 ... call.
HyundaiXT ... call.
Hyundai PC LAN Terminal ... call.

NEC

Multispeed EL backlit LCD ... call.
Multispeed HD, 20Mb ... call.

SHARP

4501 Laptop single floppy ... 699.
4502 dual floppy, 640K ... 1295.
4520 Laptop, 20Mb ... 2195.
PC7100 Portable, 20Mb ... 2195.
PC7221 Portable286, 20Mb ... 2895.

TOSHIBA

T1000 Laptop, single floppy ... 779.
T1200F Laptop, dual floppy ... 1395.
T3100 Laptop 286, 20Mb ... 2995.
T3200 286 full keybd,40Mb ... 3995.
T5100 386, EGA, 40Mb ... 4995.

NETWORKS

3COM

Ethernet card ... 399.
Ethernet II card ... 399.

WESTERN DIGITAL

StarLan/Novell starter kit ... 1077.
(network for less than $400/node)
Ethernet Plus adapter board ... 239.
ViaNet LAN software ... 120.
Starhub ... 329.

MODEMS

Advanced MODEMS

1200baud w/software(int) ... 79.
1200baud External ... 89.
1200baud Pocket MODEM ... 99.
2400baud w/software(int) ... 149.
2400baud External ... 159.

HAYES

Smartmodem 1200B w/sw(int) ... 299.
Smartmodem 1200 External ... 299.
Smartmodem 2400B w/sw(nt) ... 447.
Smartmodem 2400 External ... 447.

MIGENT

Pocket MODEM 1200 ... 129.

PROMETHEUS

2400G External ... 199.
2400B/2 w/software (int) ... 149.
2400PS PS/2 w/software(int) ... 299.
1200B/2 w/software(int) sale! ... 79.

MONITORS

AMDEK

VIDEO 310A 12" amber TTL ... 99.
410A 12" amber grn or white ... 153.
1280 13" graphics(1280x800) ... 799.
LaserDrive CD ROMw/Mic`soft ... 899.

IBM MONITORS

8503 12" Mono(640X480) ... 228.
8512 14" Color analog ... 527.
8513 12" EGA(640x480) ... 595.
8514 16" Hi-res(1024x768) ... 1395.

MAGNAVOX

Multiscan 14" multimode ... 399.
CGA 13" color ... 288.
TTL Mono 12" grn or amber ... 89.

NEC

Multisync II 13" TTL/analog ... 595.
Multisync Plus 15" VGA/EGA ... 945.
Multisync XL 20"(1024x768) ... 2275.
Monograph sys (1024x1024) ... 1555.

SAMSUNG/LTI

Flatscreen 12" amber TTL ... 99.
Mono 12" amber TTL ... 88.
CGA 14" RGB Color ... 288.
EGA 14" EGA/CGA Color ... 395.

SONY

CPD1302 13" Multiscan color ... 699.
CPD1303 13" EGA ... 569.

WYSE

WY30 14" terminal ... 349.
WY50 14" terminal ... 419.
WY60 14" terminal ASCII ... 519.

PRINTERS

DICONICS/KODAK

150P Portable printer(par) ... 339.
300P w/wide carriage(par) ... 539.

EPSON

LX800 80column, 180cps ... 209.
EX800,FX286e,FX86e,LQ850, LQ1050,LQ1000 ... call.
ACP is your full line Epson dealer

HEWLETT PACKARD

Laserjet Series II ... 1799.
Deskjet w/laser quality ... 895.
Scanjet flatbed scanner ... 1549.

IBM PRINTERS

Proprinter II, 240cps ... 435.
Proprinter X24, 240cps 24pin ... 635.
Proprinter XL24, 240cps 24pin ... 835.

NEC

P2200, 24pin(360x360dpi) ... 399.
P565XL Color,100cpsNLQ ... 1095.
P660 Pinwriter, 65cpsNLQ ... 599.
LC890 Silentwriter Laser ... 3395.

OKIDATA

ML393,180cpsNLQ ... 995.
ML182+, parallel ... 245.
ML192+, parallel ... 319.
ML193+, parallel ... 469.
Laserline 6 (req.IBM int.) ... 1399.

PANASONIC

KX-P1080i, 160cps draft,par ... 185.
KX-P1091i, 192cps draft,par ... 198.
KX-P1092i, 240cps draft,132 ... 339.
KX-P1524, 24pin, 80cpsNLQ ... 595.

SEIKOSHA

SL80A1, 24pin ... 366.
SL130A1, 24pin ... 749.
SBP10A1, 18pin, 800cps ... 3299.
SK3000A1, 9pin, 300cps,s/p ... 399.
SK3005A1, 9pin, 300cps,132 ... 499.

TOSHIBA

P321SL, 24pin, 216cps ... 499.
P341SL, 24pin, 216cps ... 699.
P351SX,(color add $179) ... 1099.
Pagelaser 12, High volume ... call.

PLOTTERS

HOUSTON INSTRUMENTS

DMP41 or 42 ... 2399.
DMP51 or 52 ... 3099.
SCANCAD ... 2499.
DMP56A ... 4399.

ROLAND

DXY880, 8 pen AB size ... 1088.
DXY980 ... 1488.

ACCESSORIES

COMPUTER ACCESSORIES

P15 Power Director ... 89.
P25 4 outlet stand alone ... 62.
F20 Print Saver ... 289.
A200 PC Data Display Module ... 888.

KENSINGTON

Masterpiece Power Center ... 98.
Masterpiece Plus ... 108.
System Saver IIe ... 69.
System Saver IIgs ... 119.
Printer Muffler, 80column ... 39.

MICROCOMP. ACCESSORIES

51/4" Rolltop Diskette File ... 29.
31/2" Rolltop Diskette File ... 22.
PC Vacuum Cleaner ... 39.
CRT Valet (12"x12") ... 119.
Underdesk Keyboard Drawer ... 49.

FLIP n' FILE

FNF MiniXT,100 51/4",smoke ... 10.
FNF MicroXT,100 31/2",smoke ... 11.
FNF Maxi,50 8", smoke ... 15.
FNF Micro,25 31/2", smoke ... 8.
Universal Printer Stand ... 9.

DISKETTES-lifetime warranty

5 1/4" DS/DD Diskettes PC/XT360K
Maxell MD2-D ... 11.
Verbatim Datalife DS/DD ... 12.
Fuji MD2D ... 11.
Advanced Color w/plastic box ... 8.
5 1/4" DS/HD High Density AT1.2Mb
Maxell MD2-DD ... 23.
Verbatim DatalifeHD ... 23.
Fuji MD2HD ... 22.
3 1/2" High Density Disks(1.44Mb)
Maxell ... 49.
Verbatim Datalife ... 49.
Fuji ... 49.
Sony ... 49.

PRINTER BUFFERS

Advanced 64K parallel buffer ... 129.
Advanced 64K AB buffer ... 169.

SWITCH BOXES

Advanced 2-position AB 3636 ... 29.
Advanced 2-position AB 2525 ... 29.
Advanced par/ser converter ... 69.
Advanced ser/par converter ... 69.
BuffaloSX PC share (up to 7) ... 499.
Logical Connection 256K ... 499.

INTELLICOM

Longlink-Parallel ... 199.
Longlink-Serial ... 199.
Quicklink-Par to Ser-64K ... 149.
Quicklink-Par to Par-64K ... 149.
Megalink-4prt Buff-Par & Ser ... 299.

TRIPPLITE

Isobar4 surge supp w/4 outlets ... 59.
Isobar8 surge supp w/8 outlets ... 69.
Line Conditioner w/4 outlets ... 149.
Backup Power Supply, 450w ... 399.
Backup Power supply, 675w ... 575.
Backup Power Supply, 1000w ... 999.
Backup Power Supply, 2000w ... 1299.

GOLDSTAR DVM/SCOPES

DM 6135-3.5 DVM ... 49.95
DM 6235-3.5 DVM ... 52.95
DM 6335-3.5 DVM ... 59.95
DM 6133-3.5 DVM ... 59.95
OS-7020-20MHz Scope ... 419.
OS-7040-40MHz Scope ... 699.

MEMORY UPGRADES

64K or 256K Upgrades(set of 9) ... call.
1Mb SIMM's or Ram's ... call.

SOFTWARE

ncp=not copy protected cp=copy protected

ALDUS-ncp

Pagemaker/IBM ... 499.
Pagemaker/MAC ... 379.
Freehand/MAC ... call.

ALPHA SOFTWARE-ncp

Advanced Keyworks1.0 ... 175.
Alpha/three1.0 ... 232.

AMER. SMALL BUSINESS-ncp

Design CAD 3D 3.0 ... 168.

ANSA

Paradox v1.1 ... 329.
Paradox v2.0 w/EMS&EEMS ... 424.

ASHTON TATE-ncp

dBaseIII plus 1.1 ... 422.
Rapidfile 1.2 ... 219.
Multimate AdvantageII 1.0 ... 275.
Applause Presentation pkg ... call.

BORLAND-ncp

Sidekick plus ... 139.
Sidekick 1.0 sale! old vers. ... 19.
Turbo BASIC 1.0 ... 69.
Turbo PASCAL 4.0 ... 69.
Turbo C 1.5 ... 69.
Reflex 1.14 ... 99.
Quattro ... 149.
Eureka ... 99.

BRODERBUND-cp

Print Shop ... 40.
Graphics Library 1 or 2 ... 23.
Toy Shop ... 37.
Memory Mate 2.0-ncp ... 45.

COMPUSERVE

Subscription kit ... 29.
Groilers Online Encyclopedia ... 34.

COMPUTER ASSOCIATES-ncp

Supercalc 4 v1.1 ... 339.
Superproject plus v3.0 ... 339.

CROSSTALK COMM-ncp

Crosstalk XVI v3.61 ... 99.
Crosstalk MK4 v1.01 ... 139.

DAC SOFTWARE-ncp

DAC Easy Light v1.0 ... 49.
DAC Easy Accounting v2.0 ... 69.

DIGITAL RESEARCH-ncp

GEM Draw plus v2.01 ... 185.
GEM Desktop Publisher ... 270.

EXECUTIVE SYSTEMS-ncp

XTREE v2.0 ... 45.
XTREE Professional v1.0 ... 89.

FUNK SOFTWARE-ncp

Sideways v3.2 ... 42.
InWord v1.0 ... 59.

5th GENERATION-ncp

Fastback Plus ... 99.

FOX SOFTWARE

Foxbase+ single user ... 220.

GENERIC-ncp

Generic CADD 3.0 ... 65.

LIFETREE-ncp

Volkswriter 3 Plus ... 160.
Total Word v1.0 ... 259.

LOTUS

Hal ... 99.
Lotus 123/Hal Bundle ... call.
Manuscript ... 349.

MECA-cp

Managing your Money,Tobias ... 129.

MICROLYTICS

Gofer ... 45.
Wordfinder ... 65.

MICROPRO-ncp

Wordstar Professional Rel 4 ... 269.
Wordstar 2000 Rel 3 ... 199.

MICRORIM-ncp

R:BASE 5000 ... 369.
R Base SystemV ... 469.

MICROSOFT-ncp

Windows 386 ... 139.
Windows 2.03 ... 66.
Quick C v1.0 ... 69.
Quick BASIC ... 69.
Word v4.0 ... 219.
Excel v2.0/AT ... 319.

NORTON-ncp

Utilities 4.0 ... 69.
Commander ... 49.
Guides(assem,C,bas, or pascal) ... 59.

PAPERBACK SOFTWARE

VP Planner sale! ... 49.
VP Expert ... 69.

SURPASS SOFTWARE-ncp

Surpass v1.0 ... 299.

SYMANTEC-ncp

Q & A v2.0 ... 219.
Q & A Write ... 139.
Grand View ... 175.

TRAVELING SOFTWARE

Laplink Plus ... 86.

TURNER HALL-ncp

SQZ! Plus ... 65.
Note-It Plus(Lotus123 notes) ... 55.
Cambridge Spreadsheet Anlst ... 75.
4Word (123 Wordprocessing) ... 65.

XEROX

Ventura ... 499.

WORDPERFECT-ncp

WordPerfect v5.0 ... 240.
WordPerfect Library v1.1 ... 65.
WordPerfect Executive ... 125.
DataPerfect v2.0 ... 299.

Advanced Computer Products, Inc.

Mail Order: P.O. Box 17329 Irvine, CA 92713
Retail: 1310-B E. Edinger, Santa Ana, CA 92705

for Fast Service Order by Phone!

NEW PHONE FOR ALL USA

800-FONE ACP

800-366-3227 • 714-558-8813

MasterCard VISA AMERICAN EXPRESS

- $25.00 Minimum MAIL ORDER
- No Surcharge for VISA or Mastercard
- Volume purchasing agreements available • Orders subject to availability
- Pricing subject to change without notice • Supply limited on certain items
- ACP Retail store pricing may vary. Not responsible for typos.
- Limited warranties and other conditions may apply

Call for our NEW 1988 Catalog...

Compuclassics

1 800 328-4473 US 1 818 705-1895
1 800 231-6603 CA
1 818 705-4885 FAX

SOFTWARE

ALDUS
Pagemaker 3.0 — 539.00

AMERICAN SMALL BUSINESS
Design Cad — 159.00
Design Cad 3D — 159.00

ASHTON TATE
Multimate II — 279.00
Dbase III Plus — 395.00
Rapidfile — 195.00
Framework II — 429.00
Chartmaster — 229.00
Master Graphics — 299.00

ASK SAM SYSTEM
Ask Sam — 235.00

AUTODESK
Autosketch Enhanced — 65.00

BLOC DEVELOPMENT
Formtool W/Greatest Hits — 59.00

BOEING COMPUTER SERVICES
Boeing Graphics (3D Color) — 209.00

BORLAND
Sprint — 125.00
Sidekick — 55.00
Sidekick Plus — 125.00
Eureka — 99.00
Quattro — 149.00
Turbo Database Toolbox — 62.00
Turbo Graphix — 62.00
The Developer's Library — 235.00
Turbo Lightning — 62.00
Reflex — 90.00
Superkey — 62.00
Turbo Prolog — 62.00
Turbo Basic — 62.00
Turbo C — 62.00
Paradox V 2.0 — 429.00
Turbo Pascal 4.0 — 62.00
Turbo Tutor 4.0 — 45.00

BREAKTHROUGH
Timeline V 3 — 339.00

BRODERBUND
Print Shop — 35.00
Memory Mate — 45.00

BUTTONWARE
PC File + — 45.00

CENTRAL POINT
Copy II PC — 25.00
Copy II PC Option Brd Dlx — 109.00
PC Tools Deluxe — 39.00

COMPUTER ASSOCIATES
Supercalc IV — 299.00
Superproject Expert — 445.00
ACCPAC BPI — 275.00
Silverado — 99.00

CONCENTRIC DATA SYSTEMS
R & R Relational Report — 109.00

CORE INTERNATIONAL
Corefast — 89.00

DAC
Easy Accounting 3.0 — 59.00
Easy Payroll 3.0 — 59.00
Bonus Pack 3.0 — 115.00

UTILITIES
Org Plus — 59.00
1 Dir PLUS — 55.00
Duet — 49.00
Direct Access — 55.00
Grammatik III — 55.00
X Tree — 37.00
X Tree Pro — 69.00
Sideways — 40.00
Max Think — 45.00
Tornado — 59.00
Graph-In-The-Box — 55.00
Mace Utilities — 55.00
Norton Utilities — 50.00
Norton Utilities Advanced — 79.00
Norton Commander — 49.00
Disk Technician — 59.00
Disk Technician Plus — 79.00
Copywrite/Zerodisk — CALL
Desqview 2.01 — 75.00
Rightwriter — 59.00
Mirror II — 35.00
Flash 5.6 — 49.00
Q & A 3.0 — 199.00
Laplink Plus — 85.00
Note-It-Plus — 49.00
SQZ Plus — 59.00
Cambridge Spreadsheet Analyst — 89.00
The Documentor — 179.00
dFlow — 89.00

DATASTORM
Procomm Plus — 52.00

DBFAST
Dbfast — 62.00

DIGITAL RESEARCH
Gem Desktop — 32.00
Gem Draw Plus — 179.00
Gem 1st Word Plus — 115.00
Gem Word Chart — 115.00
Presentation Team — 285.00
Desktop Publisher — 179.00

DIGITALK
Smalltalk V — 75.00
Smalltalk V 286 — 145.00

FIFTH GENERATION
Fastback — 79.00
Fastback Plus — 99.00

FOX SOFTWARE
Foxbase Plus — 199.00
Foxbase Multi-user — 299.00
Foxbase Runtime Unlimited — 265.00

GENERIC SOFTWARE
Generic Cad 3.0 — 55.00
Dot Plot — 27.00
Auto Convert — 27.00
Auto Dimension — 27.00
3D Solid Modeling/Rendering — 179.00

GIBSON TECHNOLOGY
Spinwrite — 55.00

GOLDEN BOW
V Feature Deluxe — 125.00
V Cache — 45.00

HAVENTREE
Interactive Easyflow — 129.00

HAYES
Smartcom III — 149.00

HILGRAEVE
Hyper Access — 89.00

IBM
Displaywrite IV — 299.00
DOS 3.3 — 95.00

LATTICE
Lattice C Compiler — 229.00

LEADING EDGE
Word Processor W/Spell/Merge — 59.00
Word Processor V1.5 — 89.00

LIVING VIDEOTEXT
Grandview — 159.00

LOTUS DEVELOPMENT
ALL PRODUCTS — CALL

MATHSOFT
Mathcad 2.0 — 225.00

MECA
Managing Your Money 4.0 — 125.00

MERIDIAN TECHNOLOGY
Carbon Copy Plus — 115.00

MICROGRAFX
Designer — 465.00

MICROLYTICS
Gofer — 42.00

MICROPRO
Wordstar Professional — 249.00
Wordstar 2000 Plus — 239.00

MICRORIM
Rbase for Dos — 475.00

MICROSOFT
Pageview — 35.00
Quick C — 67.00
Word — 225.00
Quickbasic — 67.00
C Compiler — 299.00
Fortran Compiler — 299.00
Cobol Compiler — 599.00
Macro Assembler — 99.00
Learning DOS — 35.00
Flight Simulator — 35.00
Excel — 309.00
Windows 386 — 129.00
PC Works — 129.00

MICROSTUF
Crosstalk XVI — 99.00
Crosstalk Mark 4 — 125.00

MIGENT
Ability Plus — 145.00

NANTUCKET
Clipper — 439.00

NASHOBA
Nutshell Plus — 159.00

NORTH EDGE SOFTWARE
Timeslips III — 115.00

PAPERBACK SOFTWARE
VP Info — 65.00
VP Planner — 55.00
VP Planner Plus — 95.00

PATTON & PATTON
Flowcharting II Plus — 145.00

PC SUPPORT GROUP
Lightning — 55.00
Lucid 3D V 2.0 — 89.00

PEACHTREE
Complete Accounting II — 159.00

PERSOFT
Smarterm 240 — 209.00
Referee — 45.00

SANTA CRUZ OPERATION
Xenix 286 Operating Sys — 439.00
Xenix 286 Developement Sys — 439.00
Xenix 386 Operating Sys — 509.00
Xenix 386 Developement Sys — 509.00

SCITOR
Project Scheduler Network — 365.00

SIMON & SCHUSTER
New World Writer II — 99.00
Typing Tutor IV — 32.00

SOFTLOGIC SOLUTIONS
Disk Optimizer — 42.00
Cubit — 42.00
Double DOS — 42.00
@ Liberty — 115.00
Magic Mirror — 59.00

SOFTWARE PUBLISHING
PFS First Publisher — 79.00
Professional Write — 119.00
Professional File — 179.00
PFS Professional Plan — 59.00
PFS First Choice — 89.00
Harvard Total Project II — 379.00
Harvard Graphics — 299.00

STORAGE DIMENSIONS
Speedstor — 49.00

TRANSEC SYSTEMS
Masterkey Unlock — 109.00
dAnalyst — 135.00

TURBO POWER
TDebug — 35.00
Turbo Professional — 65.00

UNISON WORLD
Printmaster Plus — 32.00
Art Gallery I & II & III (Each) — 19.00
Newsmaster II — 49.00

WISEWARE
Prime Time — 65.00

WORD PERFECT CORPORATION
Word Perfect 5.0 — 239.00
Word Perfect Network Server — 349.00
Word Perfect Network Add-On — 75.00
Plan Perfect — 195.00
Data Perfect — 299.00
Word Perfect Executive — 125.00
Word Perfect Library — 65.00

WORD TECH
DBXL Diamond — 115.00
Quicksilver Diamond — 345.00

XEROX
Ventura Publisher 1.1 — 519.00

HARDWARE

ARRAY TECHNOLOGIES (ATI)
VIP VGA — 279.00
EGAWonder — 189.00

AST RESEARCH
Advantage Premium 512K — 379.00
Six Pack Plus 384K — 269.00
Six Pack Premium 256K — 269.00
Rampage AT 512K — 439.00
AST 5251/11 Enhanced — 579.00
Hot Shot 286 — 395.00

ATD ZUCKER
Monographics Short Card — 79.00
Memory Expansion 384K — 219.00
Modular I/O Bare P/S/Clock — 75.00
Clock Board Standalone — 35.00
1200 Baud Internal Modem — 85.00

CITIZEN
120D — 159.00
MSP 40 — 349.00
MSP 15E — 359.00
MSP 50 — 445.00

COMPUTER ACCESSORIES
P15 Power Director — 99.00

EVEREX
EV 1800 8MHZ AT System — 985.00
EV 1800 10MHZ AT 0 Wait — 1249.00
Evercom II 1200 Modem — 75.00
Evercom III 2400 Int Modem — 155.00
Magic I/O For AT — 59.00
RAM 3000 EMS Expansion — 99.00

FIFTH GENERATION
Logical Connection 256K — 379.00

HAYES
Smartmodem 1200 — 299.00
Smartmodem 1200B W/Software — 299.00
Smartmodem 2400 — 465.00
Smartmodem 2400B W/Software — 465.00

HERCULES
Hercules Monochrome Plus — 189.00

HEWLETT PACKARD
Laserjet II — 1849.00
Fonts/Cartridges for Laserjet II — CALL

INTEL
Above Board PC 64K — 269.00
Above Board 286 W/512K — 369.00
8087-3 (5MHZ) — 109.00
8087-2 (8 MHZ) — 159.00
80287 (6 MHZ) — 175.00
80827 (8 MHZ) — 250.00
80287 (10 MHZ) — 319.00
Inboard 386 PC or 386 AT — 1099.00
1 MB Exp for 386 Inboard — 675.00

INTERNATIONAL BATTERY
AT Replacement Battery — 19.50
AST Six Pack Battery — 3.50

IRWIN MAGNETICS
120 XT 20MB Internal — 339.00
125 AT 20 MB Internal — 339.00

KENSINGTON
Masterpiece — 89.00
Masterpiece Plus — 105.00
Masterpiece Remote — 115.00

LOGITECH
Logimouse C7 — 75.00
Logimouse Hi Rez — 99.00
Logimouse C7 + Paintbrush — 95.00
Logimouse W/Cad/Paint — 125.00
Publisher Mouse — 125.00

MICROSOFT
BUS Mouse W/Paintbrush — 109.00
BUS Mouse W/Windows — 145.00
Serial Mouse W/Paintbrush — 109.00
Serial Mouse W/Windows — 145.00

MICROSPEED
Fast Trap — 95.00

MIGENT
Pocket Modem — 115.00

MOUSE SYSTEMS
PC Mouse BUS Plus — 95.00
PC Mouse Serial Plus — 95.00

NEC HOME ELECTRONICS
Multisync II — 629.00

NEC INFORMATION SYSTEMS
P 2200 80 COL — 379.00
P5200 — 589.00
P5300 — 769.00

PANASONIC
KX-P1091I — 209.00
KX-P1595 — 479.00
KX-P1524 — 649.00
KX-1092I — 365.00

PARADISE
Autoswitch 480 — 169.00
VGA Plus — 279.00

PLUS DEVELOPMENT
Hardcard 20 MB — 569.00
Hardcard 40 MB — 709.00

POLAROID
Polaroid Palette — 1499.00
Polaroid Palette Plus — 2399.00

PRACTICAL PERIPHERALS
Practical Modem 1200 Internal — 69.00
Practical Modem 1200 SA — 109.00
Practical Modem 2400 INT — 155.00
Practical Modem 2400 SA — 185.00

SAMSUNG
Amber Monitor — 85.00

SEAGATE TECHNOLOGY
ST 251 40MB No Controller — 389.00
ST 225 20MB W/Controller — 295.00
ST 238 30MB W/Controller — 319.00
ST 251-1 No Controller — 445.00

SUMMAGRAPHICS
Summasketch 1201 Plus — 389.00

SYSGEN
Ext 5¼" Drive — 289.00

TOUCHBASE
Worldport 2400 Modem — 269.00
Worldport 1200 Modem — 159.00

TOSHIBA
T 1000 Laptop — 875.00
T 3100-20 Laptop — 3415.00
P321 SL Printer — 549.00
P341 SL — 759.00
P351 SX — 1175.00

ADVANTAGES

- Orders placed before 3 p.m. (PST) shipped same day
- We welcome corporate accounts
- Free technical support
- Immediate replacement of defective goods
- Bulk discounts
- One million dollar inventory
- Immediate shipment on purchase orders from qualified institutions (schools and universities included)
- No hidden charges.

TERMS:

All prices are subject to change without notice. We do not guarantee compatibility. No surcharge for VISA or MasterCard. 2% surcharge American Express. No returns without RA#. Short shipments must be notified within 48 hours. 15% restocking fee on non-defective goods: $3.50 C.O.D. charge. Shipping $4.50 per item, less on bulk orders. ($8.50 Blue Label.) (Higher for some hardware items.)

Call for prices for any item not included in this price list.

Order desk & technical support open
8 a.m. to 6 p.m. Monday-Friday
10 a.m. to 2 p.m. Saturday (PST)

P.O. BOX 1588
6934 Canby St., Suite #109-110
Reseda, CA 91335

We welcome International Orders and Corporate Accounts

Telex 292415COMPU UR/Fax 818-705-4885

1 818 705-1895 US 1 800 231-6603 CA 1 800 328-4473 US

Circle 4 on reader service card

Arlington Computer Products gives you the best prices on IBM PCs...

IBM AT

1.2 Floppy, 512K,
40 MB Hard Disk
w/Monochrome Monitor ... ***$3195***
w/Color Monitor ***$3395***

IBM XT

CALL FOR CUSTOM CONFIGURATIONS

IBM PERSONAL SYSTEM II

Model 30, 2 floppies w/Monitor ***$1475***
Model 30, w/20 MB & Monitor . ***$1899***
Model 50, w/20 MB & Monitor . ***$2875***
Model 50, w/30 MB & Monitor . ***$3095***
Model 50, w/60 MB & Monitor . ***$3699***
Model 60, w/44 MB & Monitor . ***$3495***
Model 60, w/70 MB & Monitor . ***$3995***
Model 80, w/44 MB & Monitor . ***$4595***
Model 80, w/70 MB & Monitor . ***$5249***
Model 80, w/115 MB & Monitor ***$6895***
w/Color Monitor add $250

...and COMPAQ too!

COMPAQ 286

DESKTOP — 1 Drive
640K, 40 MB, Monitor ***$2395***
PORTABLE II MODEL IV —
1 Drive 640K, 20 MB ***$2799***
PORTABLE III —
1 Drive 640K, 20 MB ***$3599***
w/40 MB ***$4175***

COMPAQ DESK PRO

1 Drive, 640K, 20 MB
Green or Amber Monitor ***$1695***

COMPAQ 386

Model 386S (16 MHZ)..... ***$2995***
Model 386S w/40 MB (16 MHZ) ***$3895***
Model w/60 MB-20 MHZ ***$5399***
Model w/130 MB-20 MHZ ***$6695***
Model w/300 MB-20 MHZ ***$9195***
Model w/110 MB-25 MHZ ***$7699***

COMPAQ PORT. 386

Model 40 ..... ***$5649***
Model 100..... ***$7195***

AST PREMIUM 286

10 MHZ, 512K, 1 floppy, 40 MB, monitor.

$2199

PACKARD BELL or SAMSUNG

XT Turbo, 512K, 1 drive, DOS, S/P/C, 20 MB, monitor.

$1049

DRIVES & TAPES

Ext. 5¼" for PSII $239
Toshiba 3½" 720K ... $109
Toshiba 3½" 1.44 .... $125
20 MB Tape $339
40 MB Tape for AT
or Compaq 386 ..... $459

EVEREX
60 MB Internal $679
60 MB External $679

SEAGATE HARD DISKS
20 MB for XT (ST225). $269
30 MB for XT (ST238). $289
40 MB for AT (ST251) . $369
40 MB for AT (ST251-1)$479
80 MB for AT $749

PRIAM HARD DISKS
40 MB $679
60 MB $819
130 MB $1999

IOMEGA
10 + 10 Bernoulli w/Controller..... $1489
20 + 20 Bernoulli w/Controller..... $1829
Bernoulli Box II 5¼" 20 MB Int. w/card $969
Dual 20 Ext. w/card $1785
Bernoulli Plus $3450

PLUS
Hard Card 20 MB $529
Hard Card 40 MB $689

VIDEO BOARDS

ATI EGA Wonder $189
ATI VIP VGA $269
Compaq VGA $449
Everex EGA Autoswitch .. $139
Hercules Graphics Plus .. $179
NEC MVA 1024 ..... $799
Orchid VGA $289
Paradise Autoswitch 480 . $169
Paradise VGA $259
Paradise Professional $399
Vega VRAM VGA $499
Vega VGA $289

MICE & PLOTTERS

Mouse Systems..... $99
Microsoft..... $109
Logitech $74
Summasketch 12x12 ..... $389
Summasketch 12x18 ..... $689
HP7440 ..... $989
HP7445 ..... $1449

MONITORS

AMDEK
310A ... $129 600..... $349
410A ... $149 722..... $439

PRINCETON
HX12E $449
Ultrasync $529

IBM
8502.... $199 8513.... $519
8512.... $449 8514... $1150

NEC
Multisync II $579
Multisync Plus..... $879
19" XL 1999
GS..... $189

COMPAQ VGA $539
SAMSUNG Color $249
SAMSUNG EGA $349
SONY Multiscan $599
ZENITH 1490..... $699

Arlington Computer Products, inc.
3025-E S. MALMO
ARLINGTON HEIGHTS, IL 60005

VISA MasterCard AMERICAN EXPRESS

FOR ORDERS & SYSTEMS QUOTES:

800-548-5105

CUSTOMER SERVICE AND IN ILLINOIS 312-228-6333
SHIPPING 312-228-6333
TECHNICAL ASSISTANCE 312-228-1470
FAX 312-228-0516

Prices and Availability Subject To Change Without Notice

Bringing you the best in IBM compatible peripherals since 1984.

OUR EPSON PRINTER PRODUCTS ARE SO GOOD WE NEED TO SHOW THEM OFF!

LX 800	*FX 850*	*FX286E*	*LQ 850*	*LQ 950*
$189	*$339*	*$419*	*$519*	*$599*
DFX 5000	*FX1050*	*LQ 500*	*LQ 1050*	*LQ 2550*
$1399	*$489*	*$329*	*$719*	*$969*

PRINTERS

EPSON

LX 800	$189	LQ 500	$329
DFX 5000	$1399	LQ 850	$519
FX 850	$339	LQ 1050	$719
FX 1050	$489	LQ 950	$599
FX 286E	$419	LQ 2550	$969

OKIDATA

292	$449	ML 320	$339
293	$589	ML 321	$469
393	$929	ML 390	$469
		ML 391	$639
Laser Line 6 w/Module			$1499

HEWLETT-PACKARD

Laserjet II	$1699
1 MG Upgrade	$339
2 MG Upgrade	$629
4 MG Upgrade	$1199

NEC

P5200	$539	P5300	$699
3550	$749	P9XL	$1049
P5XL	$859	P2200	$349

TOSHIBA

321 S/L	$489	341 S/L	$659
351 SX	$989	Laser	$2649

PANASONIC

1080 I	$189	1091 I	$209
1092	$319	1592	$409

IBM

Quietwriter III	$1199
Proprinter II	$389
Proprinter X24	$539
Proprinter XL	$539
Proprinter XL24	$699

SOFTWARE

D Base III Plus	$379
Framework	$339
IBM Displaywrite IV	$299
Lotus 123	$299
Managing Your Money	$125
Microsoft Word	$219
Microsoft Excel	$299
Multimate Adv. II	$259
R Base for DOS	$439
Smartcom	$59
Symphony	$429
Ventura Desktop Publ.	$499
Word Perfect 5.0	$219
Wordstar 2000+	$239

MULTIFUNCTION BOARDS

Everex Magicard 384K	$169
AST 6 Pack w/384K	$239
AST 6 Pack Premium w/256K	$219
AST Advantage	$259
AST Rampage PC w/64K	$239
AST Rampage AT w/512K	$399
Orchid Tiny Turbo	$279
Intel Above Board PC	$239
Intel Above Board 286	$319
Intel Above Board PSII	$269
Intel PC 386	$999
Irma Board	$695
AST 5251-11	$529
AST 5251-11 Plus Enhanced	$599

MODEMS & FACSIMILES

Hayes 1200/1200B	$289
Hayes 2400/2400B	$429
Everex 300/1200 w/Software	$79
Everex 2400 Internal	$169
Everex 2400 External	$239
Prometheus 2400 Internal	$159
Prometheus 2400 External	$199
Sharp FO-300 Fax	$1219
Sharp FO-420 Fax	$1339

CHIPS

64K Ram Chips	9 for $25
256K Chips	each $11
8087-3	$109
8087-2	$149
80287	$159
80287-8MHZ	$249
80287-10MHZ	$289
80387-16	$449
80387-20	$689

★ ISSUE HIGHLIGHTS ★

AST RAMPAGE AT W/2 MEGABYTES	*NEC MULTISYNC MONITOR*	*SHARP FO-300 FAX*	*NEC MULTISPEED HD*	*WORDPERFECT 5.0*
$999	*$579*	*$1219*	*$2299*	*$219*
EXTERNAL 5¼" FOR PSII	*SEAGATE 30MB HARD DISK KIT*	*HP LASERJET II*	*NEC MULTISPEED EL*	*D BASE III+*
$239	*$289*	*$1699*	*$1549*	*$379*

Arlington Computer Products, inc.
3025-E S. MALMO
ARLINGTON HEIGHTS, IL 60005

FOR ORDERS & SYSTEMS QUOTES:
800-548-5105
CUSTOMER SERVICE AND IN ILLINOIS 312-228-6333
SHIPPING 312-228-6333
TECHNICAL ASSISTANCE 312-228-1470
FAX 312-228-0516

Prices and Availability Subject To Change Without Notice

Scottsdale Systems

Scottsdale Systems 386

- 80386 32-Bit 16/20 MHz Microprocessor with Dual Master Capability
- 12 I/O Expansion Slots: Three 32-Bit/16-Bit, Five 16-Bit, Four 8-Bit
- 238 Watt, 110/220 VAC Switch-Selectable Power Supply
- 16 MHz, 0 Wait State / 20 MHz, 0 Wait State
- Optional: 80287 Math Coprocessor or 80387 Math Coprocessor (Sockets on CPU Board)
- Storage Devices: Capacity for 5 Half-Height Drives
- 2 MB RAM • Serial & Parallel
- Battery Back-Up for Real-Time Clock
- User's Manual and "Setup" Utilities Disk
- Hardware Reset Button • Keyboard
- 1 Year End-User Warranty
- 16 MHz $3156
- 20 MHz 3821

Scottsdale Systems 286

- 12 I/O Expansion Slots: Six 16 Bit, Six 8-Bit
- 238 Watt, 110/220 VAC, Switch-Selectable Power Supply
- 80286 16-Bit Microprocessor
- 8/10 MHz, 0 Wait State or 8/12 MHz, 0 Wait State
- Software or Hardware Selectable
- Keyboard
- 1 MB RAM • Serial & Parallel
- Storage Devices: Capacity for 5 Half-Height Drives
- Optional: 80287 Math Coprocessor (Socket on Baseboard)
- FCC Class A and B Certification
- User's Manual and "Setup" Utilities Disk
- Hardware and Software Reset Button
- Battery Back-Up for Real-Time Clock and CMOS RAM
- 1 Year End-User Warranty
- 10 MHz $1421
- 12 MHz 1645

LASER PRINTERS

CITIZEN OVERTURE 110	$1499
PANASONIC 4450	CALL
NEC - LC 860	2295
NEC - LC 890	3699
TOSHIBA PAGE LASER 12	CALL
AST TURBO LASER P/S	2792
HEWLETT PACKARD	
Laser Jet 2	1734
CANON	
LPB-8 II	1695
PCPI Laser Image 2000	2649
Genicom 5010	CALL

PRINTERS

OTC-700W	700 CPS	$1587
OTC-850XL	850 CPS	1719
OTC-2114	400 LPM	3892
OTC-2161	600 LPM	4995
star micronics		CALL
CITIZEN		
16 Month Warranty		CALL
PANASONIC		
2 Year Warranty		CALL
All NEC Printer		CALL
All Okidata		CALL
Fujitsu		CALL
Canon		CALL
Alps		CALL
Seikosha		CALL
C. Itoh		CALL
Toshiba		CALL

ALPS AMERICA

Allegro	180 CPS	$359
324 E	240 CPS	735
224 E	240 CPS	589

ALTOS MULTI USER SYSTEMS WITH XENIX

Altos 386 Series 1000/2000	CALL
Altos 386	CALL
Altos 686	CALL
686	CALL
886	CALL
1086	CALL
2086	CALL
3086	CALL
Altos Software	CALL

UNISYS Series-5000 Series-7000

Roland DIGITAL GROUP — PLOTTERS

ROLAND DESKTOP PLOTTERS
1 Year Warranty

DXY-880 8 Pen	$1065
DXY-885 8 Pen	1295
DXY-980 8 Pen	1369
DXY-990 8 Pen with Electrostatic Paper Hold	1755

ROLAND DRAFTING PLOTTERS
1 Year Warranty

GRX-300 A-D Size	3999
GRX-400 A-E Size	5725

HOUSTON INSTRUMENTS

DMP-29/40/695	CALL
DMP-41/42	2219
DMP-51/52	3480/2959
DMP-51/52 MP	3919/3479
DMP-56A	4069
DMP-56C	4220
DMP-61-A-D	3479
DMP-62-A-E	4812
Ioline	CALL
Encad	CALL

CAD SOFTWARE

VERSA CAD	CALL
AUTO CAD 2.9	CALL
EZ CAD	299
FAST CAD	1549

AST RESEARCH

TurboScan w/Software	1816

ROLAND FLATBED PLOTTERS
1 Year Warranty

DPX-2000 8 Pen w/Stand	$4499
DPX-2200 8 Pen w/Stand	4810
DPX-3300 8 Pen w/Stand	5999

ROLAND CAMM MACHINES

Software & Accessories	CALL

CALCOMP

1023 Artisan Pen Plotter	$4023
1042 GT W/Plot Mgr	8499
1043 GT W/Plot Mgr	7648
1044 GT W/Plot Mgr	CALL

CalComp Electrostatic Plotter

Series - 5700	CALL
Series - 5800	CALL

HEWLETT PACKARD

H.P.-7440 A	999
H.P.-7475 A	1449
H.P.-7550 A	3149
H.P.-7570 A	3969
H.P.-7595 A Draftmaster I	8389
H.P.-7596 A Draftmaster II	CALL

BRUNING

ZETADRAF 900	7052
512K Buffer	588

PLOTTER PENS ..... CALL

OPTICAL SCANNER & SOFTWARE

Princeton Graphics LS-300 Scanner	755

DIGITIZERS

Hitachi	CALL
Houston Instruments	CALL
Cal Comp	CALL
Hewlett Packard	CALL

KURTA

IS-1 12x12	$ 450
IS-1 12x17	684
IS-3 24x24	2540
IS-3 30x36	3338
IS-3 36x48	3895
IS-3 42x60	4511

SUMMAGRAPHICS

12x12	$ 395
12x18	699
17x24	2395
24x36	CALL
36x48	CALL
42x60	CALL

TERMINALS/MONITORS

Wyse Terminals

Wyse WY-30 Green	$ 290
Wyse WY-50 Green	360
Wyse WY-60 Green/White/Amber	395
Wyse WY-85 Green	360
Wyse 99GT	458

IBM Terminals ..... CALL

Altos IV	379
Altos V	513

Wyse Monitors

Wyse 450	277
Wyse 530	189
Wyse 550	180
Wyse 650	445
Wyse 700	680

Televideo

T.V. 905	309
T.V. 955	385

Amdek 310A	$ 79
Amdek All Models	CALL
Packard Bell	79
Taxan All Models	CALL
Sigma Laser View Plus	CALL
Princeton Graphics LM300	
Portrait Monitor	CALL
Princeton Ultrasync	525
NEC II/Plus/XL	CALL
NEC Monograph	1529
19" CAD Monitors & Boards	CALL
Genius 420 w/Card	1175
Genius 2 19" w/Card	2140
Monograph 16" Full Page White	
1 Year Warranty	1499
Mitsubishi Diamond Scan	528
Mitsubishi 37"	CALL

T.V. 9220	399
T.V. 965	417

LEASING AVAILABLE

Scottsdale Systems

—Since 1980—

617 N. Scottsdale Rd., Scottsdale, AZ 85257

602-941-5856 For Inquiries — **1-800-777-2369** Toll Free — For Orders — **602-941-5897** Fax

Prices listed are for cash/MasterCard and Visa add 1 ½% surcharge on AM/EX/AZ residents add 6 ½% tax/add $3.00 for C.O.D./all items are new with manufacturer's warranty/Returned products subject to 20% restocking fee and in new condition in original packaging, with all warranty cards and manuals, cables/No credit issued after 30 days from date of shipment/We do not guarantee compatibility/Personal and company checks take up to 5 days to clear/No APO's/Prices and specifications subject to change/Product subject to availability/all applicable trademarks recognized and on file

WYSEpc 386

- 1 MB Exp to 24 MB
- Zero Wait State
- Front Panel Displays Date, Time, Speed, Disk Access, Systems Performance
- Switch & Software Selectable
- 8/16 MHz
- Socket for 80387 or 80287
- 1.2 Disk Drive
- Serial & Parallel
- 8 Slots
- Enhanced Keyboard
- 220 W Power Supply
- Security Keylock
- MS-DOS 3.2 GW-BASIC 3.2
- 1 Year Warranty $2725
- 40 MB Hard Drive 3416
- 80 MB Hard Drive 3611

WYSE 286

- 5 & 10 MHz
- Socket for 80287
- 640 K RAM Exp to 15 MB
- 1.2 Disk Drive
- Choice of IBM PC AT or IBM Enhanced PC keyboard
- 8 Slots • S/P
- MS-DOS 3.1 and GW-BASIC
- 1 Year Warranty $1599
- Model 2108 1299
- Model 2112 1845
- Model 2214 1999

TeleVideo

Tele/386

- Zero Wait State
- 16 MHz 32 Bit
- 80386 OPT 80387
- 8 Slots
- 2 MB Exp to 16 MB
- 220W Power Supply
- Clock/Calendar/Alarm/Battery
- Serial & Parallel
- 1.2 MB Drive
- Enhanced at Keyboard
- 90 Day Warranty $2758

SAMSUNG

LAPTOP S5000	$2341
TOSHIBA / 1 Year Warranty	
T-5100	4799
T-1000	852

STANDBY POWER SYSTEMS

ALLOY

P.C. Slave/16N	$ 746
NTNX	379
Retriever 40	455

ARCNET

Cards, Cables & Hubs	CALL
Modems	CALL

TAPE BACKUPS

Emerald Systems	CALL
Genoa	CALL
Priam	CALL
Irwin	CALL

BOARDS

Genoa	CALL
Intel	CALL
Video 7	CALL

Circle 27 on reader service card

CHEAP!

ZENITH

SUPERSPORT 2 Drive	$ 1498
SUPERSPORT 20MB HD	$ 2197
SUPERSPORT 286 20M	$ 3034
SUPERSPORT 286 40M	$ 3376

HEWLETT-PACKARD
LASERJET Series II $1649

HEWLETT-PACKARD
DESKJET
$699

AT&T

6300 WGS 1 Drive	$ 989
6300 WGS 30M	$ 1268
6386 WGS	$ 3326

EPSON

Equity I+	$ 688
Equity II+	$1039
Equity III+	$1344
LT Laptop Dual Drive	$1189
LT Laptop 20M Harddisk	$1792

NEC
Powermate

1	$ 1198
1 20M	$ 1527
1 40M	$ 1818
2	$ 1527
2 20M	$ 1818
2 40M	$ 2097
2 66M	$ 2692
386	$ 2585
386 40M	$ 3098
386 66M	$ 3755
386 130M	$ 4596

All Original NEC Components
All Models Include Keyboard

NEC

Powermate Portable 20M	$ 2358
Powermate Portable 40M	$ 2744
Multispeed EL II	$ 1419
Multispeed HD	$ 2248

TOSHIBA

T1000	$ 777
T1100 PLUS	$ 1388
T1200	$ 2284
T3100/20	$ 2987
T3200	$ 3744
T5100	$ 4784

HARD DISK DRIVES

SEAGATE	
20M w/Cont	$ 267
30M w/Cont	$ 276
40M w/Cont	$ 444
40M	$ 448
80M	$ 659
MINISCRIBE	
40M w/Cont	$ 334
40M #3650	$ 298
40M 28ms	$ 659
71M 28ms	$ 659
MICROPOLIS	
153M 23ms w/Cont	$ 1594
332M 18ms w/Cont	$ 2389

DISK DRIVES

PLUS	
20M Hardcard	$ 498
40M Hardcard	$ 629
TOSHIBA	
3.5" 720K	$ 88
3.5" 1.44M	$ 126
5.25" 360K	$ 89
5.25" 1.2M	$ 89
AMR 5.25' for PS/2	$ 239
AMDEK Laserdrive with MS Bookshelf	$ 799

MODEMS

HAYES	
1200B Internal	$ 229
2400B Internal	$ 368
1200 External	$ 268
2400 External	$ 397
2400P PS/2	$ 359
US ROBOTICS	
1200 Internal	$ 88
2400 Internal	$ 164
1200 External	$ 99
2400 External	$ 166
Courier 2400 PS/2	$ 277
VENTEL	
2400B for PS/2	$ 348

VIDEO CARDS

Boca EGA	$ 144
Hercules Mono +	$ 169
Hercules Color	$ 139
Hercules INColor	$ 266
NEC GB-1	$ 268
Nitro Monographic	$ 49
Nitro Color Card	$ 49
Paradise Auto 480	$ 148
Paradise VGA Plus	$ 228
PGS Laserpage	$ 532
PGS PG-1600	$ 532
Video-7 Vega VGA	$ 248

MOUSE DEVICES

MICROSOFT	
Mouse	$ 97
With Windows 2.0	$ 138
LOGITECH	
Mouse	$ 74
With LogiCADD	$ 118
Publisher Mouse	$ 113
HiRes Mouse	$ 86

Note: Specify either Serial or Bus Version

CALL FOR BEST PRICES ON

AST®

PREMIUM PRODUCTS

PRINTERS

NEC PRINTERS

P6 10" wide	$ 463
CP6 10" Color	$ 549
P7 16" wide	$ 644
CP7 16' Color	$ 733
P2200 10" wide	$ 359
P5XL 16" Color	$ 877
P9XL 16" Color	$ 1079
LC890 Silentwriter	$ 3433
ELF-350 19 cps	$ 417
3500 35 cps	$ 896
8800 55 cps	$ 1166

CITIZEN PRINTERS

120D	$ 184
180D	$ 199
MSP-10	$ 268
MSP-15E	$ 369
MSP-40	$ 337
MSP-45	$ 488
MSP-50	$ 422
MSP-55	$ 551
Premiere 35	$ 533
Tribute 124	$ 498
Tribute 224	$ 664

EPSON PRINTERS

LX-800	$ 189
FX-850	$ 339
FX-1050	$ 488
FX-86E	$ 329
FX-286E	$ 469
LQ-500	$ 328
LQ-850	$ 519
LQ-1050	$ 737
LQ-2500	$ 788

OKIDATA PRINTERS

182 PLUS	$ 224
192 PLUS	$ 318
193 PLUS	$ 412
292 IBM Parallel	$ 416
293 IBM Parallel	$ 533
294 Color Parallel	$ 754
393	$ 877
393 Color	$ 939
LASERLINE 6 Par	$ 1348

PANASONIC PRINTERS

KX-P1080i	$ 198
KX-P1091i	$ 218
KX-P1092i	$ 344
KX-P1592	$ 436
KX-P1595	$ 492
KX-P1524	$ 555
KX-P3131 17 cps	$ 327
KX-P3151 22 cps	$ 519
Laser Partner	$ 1738

PRINTERS

AST Turbolaser/PS	$ 3383
DICONIX 150	$ 332
DICONIX 300W	$ 515
GENICOM	
4410 400 lpm	$ 4689
4440 800 lpm	$ 5979
HP Paintjet	$ 949
OTC 850XL	$ 1644
XEROX 4020 Color	$ 1088

SOFTWARE

Aldus Pagemaker 3.0	$ 488
Carbon Copy	$ 109
Clipper	$ 399
Crosstalk 16	$ 98
DBXL Diamond Rel	$ 118
Deskview 2.0	$ 77
Disk Optimizer	$ 44
Eureka	$ 98
Fastback Plus	$ 94
Foxbase Plus	$ 196
Foxbase Plus 386	$ 288
Generic CADD	$ 78
Kings Quest	$ 34
Managing Money	$ 119
Microsoft C	$ 266
MS QuickBasic	$ 64

SCANNERS

HP ScanJet w/Int	$ 1178
AST Turboscan	$ 1233
DEST Scan Plus	$ 1798
Panasonic OCR	$ 1798
PGS LS300 w/Int	$ 698
PGS LS300 OCR	$ 939

SOFTWARE

Microsoft EXCEL	$ 296
Microsoft Word 4	$ 209
Microsoft Works	$ 114
Microsoft Write	$ 119
MS Windows 2.03	$ 68
MS Windows 386	$ 123
MS Flight Simulator	$ 34
Windows Toolkit 2	$ 329
MS Macro Asm 5.1	$ 98
Newsroom	$ 36
Paradox 1.1	$ 282
Paradox 2.0	$ 387
PFS: Pro Write	$ 139
PFS: First Choice	$ 88
Q & A	$ 189
Quattro	$ 144

INTEL

8087 4.77MHz	$ 99
8087 8 MHz	$ 142
80287 6/8 MHz	$ 179
80287 8 MHz	$ 243
80287 10 MHz	$ 289
80387 16 MHz	$ 448
80387 20 MHz	$ 689
Above Bd 286 512K	$ 314
Above Bd PS/2 OK	$ 249
Inboard 386/PC Kit	$ 726
Inboard 386/AT Kit	$ 988

SOFTWARE

Xerox Ventura Publ	$ 474
Quickativer Diam Rel.	$ 337
Reflex	$ 87
Sideways	$ 43
Smart Notes	$ 52
SQZ Plus	$ 62
Supercalc 4	$ 259
Turbo Basic	$ 59
Turbo C	$ 59
Turbo Lightning	$ 59
Turbo Pascal 4.0	$ 59
Turbo Prolog	$ 59
VP Planner	$ 58
Word Perfect 5.0	$ 219
Wordstar Profes	$ 218
Yeager Adv Flight	$ 29

PLOTTERS

HEWLETT-PACKARD	
7440 COLORPRO	$ 877
7475A 6 Pen	$ 1259
7550A 8 Pen	$ 2489
7570A Draftpro	$ 2598

MONITORS

Amdek 410	$ 138
432 VGA Mono	$ 156
732 VGA Color	$ 414
1280 & video card	$ 638
AST Monochrome	$ 129
AST EGA Color	$ 477
Epson Mono	$ 114
Epson Color	$ 288
Epson EGA Color	$ 368
Genius Disp Sys	$ 1288
NEC Monograph	$ 1244
NEC Multisync XL	$ 1892

MONITORS

NEC Multisync II	$ 549
NEC Multisync GS	$ 179
NEC Multisync Plus	$ 858
PGS HX-12	$ 436
PGS Max-15	$ 264
PGS LM-300	$ 538
PGS Ultrasync	$ 539
Taxan Crystal View	$ 1434
WYSE WY-700	$ 717
Zenith 149	$ 109
Zenith 1390	$ 419
Zenith 1490	$ 584

ACCESSORIES

Printer Cable 6'	$ 9
Printer Cable 10'	$ 14
Parallel Adapter	$ 29
Serial Adapter	$ 29
Game Adapter	$ 19
101 Keyboard	$ 68
PS/2 Keybd Exten	$ 16
PS/2 Monitor Exten	$ 21
Xidex DS/DD Disks	$ 7
Xidex 1.2M Disks	$ 13
IBM 3.5" 1M Disks	$ 29
IBM 3.5" 2M Disks	$ 58

HOURS (E.S.T.)
9-9 Monday-Friday
1-6 Saturday

NITRO MICRO

120 West Main Street • CARMEL, IN 46032

800-382-3888

MasterCard VISA

Please add 3% for shipping & handling. NO SURCHARGE FOR CREDIT CARDS and we do not charge until we ship. All items subject to availability and price change. All standard orders are sent UPS.

Circle 132 on reader service card

COMPUTER DISCOUNT WAREHOUSE™

OVER $4,000,000.00 INVENTORY IN STOCK

ALL EPSON® Printers in Stock for Immediate Shipment

WHY PAY RETAIL?

Nobody Sells EPSON® For Less

LX-800

from $199.00

ALL EPSON® MODELS READY TO SELL AT LOWEST EVER *DISCOUNT* PRICES

EPSON®

Quality computer products that deliver outstanding performance and value at prices only COMPUTER DISCOUNT WAREHOUSE™ can offer!

EPSON®

LQ-500

- 180 cps in draft mode
- 60 cps (12 CPI) in Near Letter Quality mode
- Friction and Tractor feed
- Automatic single-sheet loading
- Two resident Letter-quality fonts
- "Shadow" and "Outline" print
- Front panel controls

Options
- Cut-sheet feeder
- LQ software for Microsoft Windows

LQ-1050

LQ-850

- 264 cps in draft mode
- 88 cps in Near Letter Quality mode
- 6K buffer
- SmartPark paper handling
- Front panel controls

Options
- Tractor Feed
- Cut-sheet feeder
- 32K buffer

LQ-950

- **Horizontally prints graphics on 11" wide paper**
- 264 cps in draft mode
- 88 cps in Near Letter Quality
- 6K buffer
- SmartPark paper handling

Options
- Tractor Feed
- Cut-sheet feeder
- 32K buffer

LQ-2550

- 324 cps (Elite 12 CPI) in draft mode
- 405 cps (Elite 15 CPI) in ultra high-speed mode
- 106 cps (Elite 12 CPI) in Near Letter Quality mode
- 8K buffer
- 5 Letter quality fonts
- Front panel controls with LCD display

Options
- Single and dual-bin cut-sheet feeders
- Color enhancement
- 32K buffer

DFX-5000

9-PIN DOT MATRIX PRINTER

- 533 cps in SuperDraft mode; 480 cps in draft mode; 80 cps in Near Letter Quality
- Dual push tractor system with two separate paper paths.
- SmartPark paper handling
- Software compatible with industry standard Epson FX control codes.
- Optional I-O 8300™ TWINAX and Avatar® EP-connect COAX interface boards provide direct connectivity to the IBM® Systems/3X and AS/400 or 3270 environments.

EPSON®

EX-800

- 300 cps (12 CPI) in draft mode
- 54 cps in Near Letter Quality
- 8K buffer
- 8 typestyles
- Front panel controls
- Push tractor feed
- Single sheet loading

Options
- Color enhancement
- 32K buffer

FX-286e

- 240 cps in draft Elite mode
- 48 cps in Near Letter Quality
- 8K buffer
- 136 column
- Friction and tractor feed
- Automatic single-sheet loading
- Front panel controls
- IBM ProPrinter character set

Options
- 32K buffer
- Cut sheet feeder

FX-850 FX-1050

- 264 cps in draft Elite mode
- 54 cps in Near Letter Quality
- 8K buffer
- 136 column (FX-1050)
- Friction and tractor feed
- Automatic single-sheet loading
- Front panel controls

Options
- Cut sheet feeder w/envelope feed capability
- Serial interface

AUTHORIZED EPSON® DEALER

MOST ORDERS SHIPPED WITHIN 48 HOURS.

Call CDW for custom quotes on our entire line of products.

If you find a better price call us before you buy.

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

CDW™ stocks a full line of products to support every computer need.

Nationwide Toll Free

(800) 233-4426

In Illinois (312) 498-1426

FAX (312) 291-1737

Credit card charges are not submitted until time of shipment

MasterCard VISA American Express Card

CHARTER MEMBER MMC MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.

MEMBER

COMPUTER DISCOUNT WAREHOUSE™

NEC

NEC Multispeed	$1348.64
NEC Multispeed EL	1499.76
NEC Multispeed HD w/20 Meg	2365.77
NEC Powermate 2, 40 Meg	NEW
NEC Powermate 2, 66 Meg	LOWER
NEC Powermate 386, 66 Meg	NEC
NEC Powermate 386, 130 Meg	PRICES

AT&T *The right choice*

6300 WGS	$1099.42
6312 WGS	1692.12
6386 WGS	3187.78
Model 63	4995.85
Model 64	5880.70
Model 75	6920.35

All WGS Models Come with Keyboard

WHY PAY RETAIL?

Nobody Sells For Less

CALL FOR LOWEST CUSTOM QUOTES

TOSHIBA

3100 w/20 Meg	$2998.50
1000	779.41
1200	2237.55
1200, 2 Floppy	1612.35
3200	SPECIAL BUY
5100	NEW MODEL

PC Magazine Award of Excellence

SAMSUNG

S-300 4/8 MHz, 512K, 6 Slots S/P/C, Monographics board, DOS, Keyboard

S-300, 1 Floppy	$749.50
S-300, 20 Meg	989.95
S-300, 40 Meg	1117.82

S-500 AT Compatible 8/10 MHz, 8 Slots, S/P/C, Monographics Board, DOS, Keyboard

S-500, 1.2M Floppy	$1095.45
S-500, 20 Meg	1469.80
S-500, 40 Meg	1624.45

HARDWARE, SOFTWARE & PERIPHERALS AT *DISCOUNT* PRICES

COMPUTERS

AST

MDL 70	$1335.20	MDL 170	$2998.36
MDL 80	1639.70	MDL 300	3490.40
MDL 90	1936.15	MDL 340	3945.65
MDL 120	2280.05	MDL 390	5589.40
MDL 140	2649.55		

IBM PS2

MDL 30, 2 dr	$1272.20	MDL 50Z, 30 Meg	$2943.60
MDL 30, 20 Meg	1725.17	MDL 50Z, 60 Meg	NEW
MDL 60, 40 Meg	3340.15	MDL 70, All Mdls.	PS2s
MDL 60, 70 Meg	3567.50	MDL 80, 40 Meg	4497.67
MDL 80, 111 Meg	5995.80	MDL 80, 70 Meg	5330.30

COMPAQ™

286, Model 1	$1868.55	386, Model 300	$8995.20
286, 40 Meg	2495.20	Port. II, Mdl 2	1896.10
286, 70 Meg	2798.20	Port. II, Mdl 4	2797.00
386, Model 60	5485.30	Port. III, Mdl 20	3495.85
386, Model 130	6945.92	Port. III, Mdl 40	4095.35
386S, Model 20	SAVE	Port. 386 Mdl 40	5426.24
386S, Model 40	3762.20	Port. 386 Mdl 100	6689.74

TOSHIBA

T3100, 20 Meg	$2998.50	T1200	$2237.55
T3200	3689.65	T1200, 2 Floppy	1612.35
T1000	779.41	T5100	4767.62

PACKARD BELL

PB88 (XT Turbo)	$645.64
PB88 w/1 floppy, 20 Meg	956.80
VT286, 10 MHz	1249.36
VT286, 12 MHz	1349.36
VT286 w/20 Meg	1573.50
VT286 w/40 Meg	1724.10
VT386	NEW MODEL

WYSE

MDL 2108	$1170.50	MDL 2214	$1978.30
MDL 2112	1739.20	MDL 3216	2749.05

ZENITH data systems

Supersport Model 2	ALL ZENITH
Supersport Model 20	MODELS
Supersport 286 Model 20	IN STOCK

Other Computers Available Upon Request

DRIVES, TAPES & HARDCARDS

FLOPPIES, DRIVES & TAPES

1/2 height floppy drive	$99.00
MINISCRIBE 20 Meg 1/2 height w/cont.	329.14
MINISCRIBE 30 Meg 1/2 height w/RLL	345.95
SEAGATE 20 Meg 1/2 height hard drive	289.69
SEAGATE 30 Meg 1/2 height w/RLL	309.72
SEAGATE 40 Meg 1/2 height	399.50
GENOA 60 Meg int. tape/ext. tape	734.60/895.10
GENOA 150 Meg int. tape	1078.85
IOMEGA 20+20 External 5¼	1795.73
IRWIN 20 M/40 M Internal Tape	399.10/539.20
MINISCRIBE 40 Meg 28ms	619.40
MINISCRIBE 80 Meg 28ms	795.45
MOUNTAIN 4440 int./ext.	385.80/557.75
PLUS Passport 20	479.10
PLUS Passport 40	599.88
PLUS 20 & 40 System Kit	489.75
PLUS PS2 MC System Kit	585.58
PRIAM 40 Meg/60 Meg	669.55/749.95
PRIAM 130 Meg hard disk	1510.40
SEAGATE 30 Meg/40 Meg	479.80/558.98
SEAGATE 4096 80 Meg hard disk	645.10

HARDCARDS

PLUS DEVELOPMENT 20 Meg	$569.55
PLUS DEVELOPMENT 40 Meg	749.80
WESTERN DIGITAL 30 Meg	416.30

PRINTERS

EPSON

DFX5000	CALL	LX800	ALL
EX800	CDW™	LQ500	EPSON
FX86e	FOR	LQ850	MODELS
FX286e	BEST	LQ950	READY
FX850	PRICE	LQ1050	TO
FX1050	EVER	LQ2550	SHIP

DICONIX by Kodak

150P/300 $319.17/479.17

IBM

Pro Printer II $429.95 Quietwriter III $1295.62

NEC

P560XL	$914.75	5200	$532.25
P2200	369.65	5300	696.47
3550	744.12	8850	1080.75
P960XL	1067.70	CALL FOR ACCESSORIES	

OKIDATA

ML 182S	$279.76	ML 320	$346.63
ML 182P	232.50	ML 321	479.28
LASERLINE 6	1286.69	ML 390	475.96
ML 292 Plus	377.44	ML 391	648.48
ML 293 Plus	516.55	ML 393	949.55
ML 294	737.10	ML 393 Color	1057.60

PANASONIC

1080i	$179.60	1091i	$219.85
1092i	334.28	1592	433.44
1595	459.45	3131	299.32
3151	446.52	1524	579.10

CITIZEN

120D	$199.55	MSP55	$579.66
MSP50	423.64	Premiere 35	577.17

TOSHIBA

P321SL	$494.85	P351-2 Color	$1199.95
P341SL	634.17	P351SX	1019.45

LASER PRINTERS

H-P Laser Jet Model 2	$1699.40
AST Turbolaser P/S	IN STOCK
H-P Deskjet	689.00
NEC LC860/LC890	1982.44/3295.60
PANASONIC Laser	1599.35
TOSHIBA PageLaser	2530.20

CHIPS

8087-2/8087-3	$159.33/122.50
80287-6/-8/-10	174.30/289.55/329.25
80387-16/80387-20	445.68/728.44

PLOTTERS, DIGITIZERS & SCANNERS

CALCOMP

1023	$3838.38	1043	$6477.15
1042	7539.95	1044	10,305.06

ROLAND

DXY-885	$1149.79	DPX-2000	$3464.12
DXY-990	1457.82	DPX-3300	4689.52

SUMMASKETCH

12x12	$376.30	12x18	$632.50

HEWLETT PACKARD	HOUSTON INSTRUMENTS
HP7440A $968.30	HI DMP-42
HP7475A 1417.44	HI DMP-52/52MP
HP7550 2926.56	HI DMP-56A
HP7570 LOWEST PRICE	HI DMP-61/62
HP SCANJET SAVE	

FAX MACHINES & PAPER SHREDDERS

SHARP FO-300	$1199.10	TOSHIBA 3010	$1314.44
SHARP FO-420	1399.95	GBC-1656	1459.80
SHARP FO-500	1599.95	GBC-1236S	915.44

NOVELL NETWORKING

SANTA CLARA Diskless Workstation $640.40

SOFTWARE & STARTER KITS

WESTERN DIGITAL 3 Node LAN kit w/Western Digital software	$720.34
Entry-level 286 Starter Kit, 4 Users	489.90
Entry-level 286 Starter Kit, 8 Users	SAVE
NOVELL 286 Software V. 2.11	1676.34
NOVELL SFT Netware Level I	2148.66
NOVELL SFT Netware Level II V2.1	2757.60

INTERFACE CARDS

ARCNET PC110 LANboard PS2	$539.40
ARCNET PC110 LANBoard	188.27
ARCNET PC210 LANBoard	235.50
ETHERNET Interface Connector	329.80
ETHERNET Plus Board (for 286)	698.74
G-NET Interface Card w/cable	296.52
WESTERN DIGITAL Ethernet Cards	269.10

ACCESSORIES

ARCNET Passive Hub	$79.00
ARCNET Active Hub	427.98
Ethernet Terminators	39.50
Novell Keycard 2.11	78.40

Novell trained and authorized sales and support. Call CDW for all new Software versions.

MODEMS & COMMUNICATIONS

AST 5251-11 Plus	$619.04
EVEREX 1200B/2400B	109.90/199.50
IRMA 3278/79	695.17
PACKARD BELL 2400 Int/2400 Ext	169.95/199.22

Hayes

HAYES 1200	$289.60	2400B	$379.65
1200B	269.20	2400PS2	399.15
2400	424.68		

U.S. Robotics

1200B	$108.45	2400B	$199.70
1200 External	129.10	9600 HST	665.20

Ven-Tel

1200 Int.	$194.50	2400 Int.	$299.10
1200 Plus	228.88	2400 Ext.	389.44

BATTERY BACKUP & SURGE

PERMA POWER 6 Outlet Surge Supp. $29.40

TRIPPLITE

BC-450	$419.78	4 outlet	$44.25
BC-1200	765.55	LC-1200	159.85
BC-2000	1179.80	LC-1800	189.85

DATASHIELD

500 Watt	$560.05	1200 Watt	$994.75
600 Watt	638.50	6 Outlet Surge	27.85

MISC. & ACCESSORIES

A-B Switching Box (par. or serial)	$44.95
BASF 5 Pack of 10 DS/DD w/case	49.00
KENSINGTON Masterpiece	99.99
KENSINGTON Masterpiece Plus	123.40
KEYTRONICS 5151 IBM or AT&T	154.95
KEYTRONICS 101	107.65
Printer Cable (IBM to Centronics) 6 ft.	19.99
XT Power Supply 150 Watt	69.95

MONITOR INTERFACE CARDS

CDW™ color card	$ 99.00
CDW™ monographics card w/p	99.00
GENOA Spectrum (color monographic w/p)	168.75
HERCULES color card w/p	146.16
HERCULES monographics plus w/p	179.84
TAXAN MONOGRAPHIC w/p	99.00

MONOCHROME MONITORS

AT&T Monochrome Monitor	$189.40
AMDEK 310A/410A	119.99/149.99
AMDEK 1280	679.78
COMPAQ monochrome monitor	194.46
COMPAQ VGA Mono	193.10
IBM PS2 8503	209.95
NEC Multisync GS	194.52
NEC Monograph	1297.25
PGS MAX 12E	139.40
PACKARD BELL Green or Amber	89.95
TAXAN 123 Green/124 Amber	119.50/124.05

COLOR GRAPHIC MONITORS

AMDEK color 600T/722	$349.24/444.49
IBM PS2 8512 Color	438.40
IBM PS2 8513 Enhanced Color	519.20
SAMSUNG RGB Comp	248.60
PGS HX-12 Plus	417.15
TAXAN 650/720	469.90/299.80
MAGNAVOX 8762	259.05

VGA & EGA PRODUCTS

VGA & EGA MONITORS

COMPAQ VGA monitor	$548.68
MAGNAVOX 943EGA	387.40
MITSUBISHI Diamond Scan	522.20
NEC Multisync II/PLUS	609.76/888.10
NEC Multisync XL 19 Inch	1974.46
PACKARD BELL VGA Monitor	389.95
PGS Ultrasync	515.33
SONY Multiscan 1303/1302	599.45/649.25
TAXAN 770 PLUS	499.40
ZENITH Z-1490	699.31

VGA DISPLAY CARDS

ATI VGA VIP	$289.24
GENOA 5100/5200	234.34/330.55
PARADISE VGA	297.68
ORCHID VGA	278.14
VIDEO-7 VGA	299.15

EGA DISPLAY CARDS

ATI Wonder Card	$199.95
GENOA Super EGA Hi-Res 800 x 600	234.40
NEC MVA 1024	960.50
NEC GB-1 640x480	229.43
PARADISE Auto Switch EGA 480	179.65
VIDEO 7 Vega Deluxe	249.74

CAD MONITORS & CARDS

MITSUBISHI 6905, 19 inch	$2375.96
MITSUBISHI 6922, 19 inch	1974.60
HITACHI 4119, 19 inch	2310.65
CONTROL SYSTEMS ARTIST 1016	1779.20
VERMONT Cobra	1977.75
METHEUS 1104	948.65

MICE

LOGITECH HiRez	$99.95
LOGITECH C7/Bus	89.95/109.06
LOGITECH Logimouse C7 w/publisher	124.85
MICROSOFT Mouse (Bus Version)	109.34
MICROSOFT Mouse (Serial Version)	117.25
MOUSE SYSTEMS (Serial Version)	99.55
MOUSE SYSTEMS (Bus Version)	108.77
MOUSE SYSTEMS Omnimouse	59.70

MOST ORDERS SHIPPED WITHIN 48 HOURS.

HIGH VOLUME BIDS INVITED
730 Anthony Trail, Northbrook, IL 60062 FAX-A-BID (312) 291-1737

If you find a better price call us before you buy.

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

Open terms available to approved credit

WORDPERFECT 5.0 5¼/3½	$219.90/228.90
dBase III + 5¼/3½	399.00/424.00
LOTUS 1-2-3 5¼/3½	305.00/327.00
Paradox Version 2.0	424.00
Ventura Software Version 1.1	499.00
MICROSOFT Word V 4/Excel	243.50/319.30

Credit Card charges are not submitted until time of shipment. Shipping and handling additional. On all hard drive orders and orders under $200.00 please add $5.00 handling fee. Non-defective returns subject to restocking fee. All prices reflect 3% discount for cash. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. TM - Registered trademarks of IBM and COMPAQ

(800) 233-4426

In Illinois (312) 498-1426

FAX (312) 291-1737

Credit card charges are not submitted until time of shipment.

MasterCard VISA American Express Card

CHARTER MEMBER MMC MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.

MEMBER A928

Circle 200 on reader service card

• Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FR

The New PC NETWORK

625 ACADEMY DRIVE NORTHBROOK, IL 60062

PRINTERS

NEC LC 890 ..... **$2,950.00***

- 35 Resident type fonts
- 4 standard interfaces
- 3MB of internal memory

LC 890 Toner Cartridge (6Pk.) 62.10*

MODEMS

THE 2400 BAUD MODEM

100% Hayes compatible half height internal card modem w/ Bitcom Communications software. **$99.99***

THE® 1200 BAUD External 85.85*
THE® 2400 BAUD External 139.00*

SYSTEMS

THE 286/12 **$915.00***

•512K of 1MB on the Motherboard • 6-12Mhz • Keyboard/Toggle Switch Selectable • 1.2MB Mitsubishi HDC/FDC • Phoenix Bios • 101 Key Keyboard • Monitor & Video Board Optional

BUY NOW AT ~~DISCOUNT~~ WHOLESALE + 8% PRICES ! *

BUSINESS SOFTWARE

ALDUS PageMaker 3.0	479.75*
ASHTON-TATE Dbase III+	345.32*
ASHTON-TATE Multimate Advan II	235.35*
BORLAND INT Paradox 2.0	392.89*
BORLAND INT Quattro	129.00*
BORLAND INT Sidekick Plus	112.11*
BORLAND INT Sprint	108.50*
BORLAND INT Turbo C or Basic	56.05*
CENTRAL POINT PC Tools Deluxe	37.50*
DAC SFT DAC Easy Accounting 3.0	53.00*
LOTUS DEVELOPMENT Lotus 1-2-3	279.00*
MERIDIAN TECH Carbon Copy Plus	100.49*
MICROSOFT "C" Compiler	271.69*
MICROSOFT Excel	285.32*
MICROSOFT Basic 4.0 or Windows	60.55*
MICROSOFT Word 4.0	199.00*
PEACHTREE SFT Accting Sys II	146.45*
PETER NORTON Utilities-Advanced	68.25*
QUARTERDECK OFFICE Desqview	69.69*
SYMANTEC Q&A 3.0	186.85*
WORDPERFECT Wordperfect 5.0	205.00*
XEROX CORP Ventura Publisher	445.00*

PLOTTERS/SCANNERS

HOUSTON INSTRUMENTS All Models	CALL
HEWLETT PACKARD Scanjet	984.75*
PRINCETON GRAPHICS LS-300	701.95*
IOLINE PLOTTERS	CALL
SUMMAGRAPHICS(12 x 12)	342.39*
SUMMAGRAPHICS(12 x 18)	564.59*

PRINTERS

PANASONIC

1080i	170.69*
1592	389.00*
KX-P4450 LASER	1,469.00*

CITIZEN

180D	166.65*
MSP-50	388.85*
MSP-45	437.00*
Tribute 224	578.90*
Premier 35	489.00*

EPSON

LX800	176.00*
LQ500	CALL
LQ1050	CALL
FX1050	CALL
FX850	CALL

NEC

LC860 +	1,839.00*
5200	503.49*
P9XL	958.49*
P5300	639.00*
P2200 Dot Matrix	317.14*

OKIDATA

390	439.00*
ML 393	879.00*
ML 321	443.12*
ML 320	319.23*

PANASONIC 1091I MDL.2

192/32 CPS, 10" Par w/ tractor

$175.00*

MONO & COLOR CARDS

HERCULES Graphics Card Plus	170.69*
THE® Color Card or Mono	55.00*
A.T.I. EGA Wonder 800 x 560	162.00*
ORCHID Designer VGA (IBM PC/XT)	287.31*
PARADISE Auto Switch 480	162.00*
PARADISE VGA Plus Card	253.00*
VIDEO 7 Vega Deluxe 640 x 480	185.14*
VIDEO 7 VGA	249.96*

COMPUTER SYSTEMS

AST Premium 286 Model 80	1,542.77*
AST Premium 286 Model 140	2,513.91*
COMPAQ Deskpro 286/40MB	2,295.25*
COMPAQ Deskpro 386/60MB	5,089.00*
COMPAQ Portable III MDL 40	3,850.00*
IBM PS/2 Model 30 CMS 20MB	1,473.59*
IBM PS/2 Model 50	2,499.75*
TOSHIBA T-1000 Laptop w/512K	719.00*
TOSHIBA T-3100/20 Laptop w/640K	2,838.00*
TOSHIBA T-5100 w/2MB RAM, 40MB	4,450.00*
TOSHIBA T-3200 Laptop	3,395.00*
TOSHIBA T-1200 Laptop	2,125.00*

Call For Best Pricing On Other Models

WordPerfect
Word Processing Software

$205.00*

- Advanced word processing functions
- 100,000 word phonetic dictionary
- Split screen editing
- Use up to 5 different fields at once

FLOPPIES, DRIVES, TAPES

CMS 360K Ext. PS/2 Floppy	231.29*
10MEGA Bernoulli II 20MB Int	738.00*
IRWIN 64MB Int Tape for IBM PS/2	499.00*
IRWIN 145 40MB Internal Tape	419.65*
MINISCRIBE 3650 40MB Kit	360.57*
MITSUBISHI 360K 1/2 Ht Dr	79.79*
MITSUBISHI 1MB 3.5"FD	79.79*
MITSUBISHI 1.2MB Floppy 1/2 Ht	85.62*
PLUS DEVEL Hardcard 20	489.87*
PLUS DEVELHardcard 40	601.82*
SEAGATE ST-225 20MB Kit	249.00*
MINISCRIBE 3675 60MB HD Kit	389.00*
MINISCRIBE 6128 110MB RLL Full Ht	659.00*
SEAGATE ST-251 42MB/40MS HD	349.00*
SEAGATE ST-4096 80MB Full Ht	529.00*
SYSGEN Bridge File 3.5" Ext. Drive	205.00*

MITSUBISHI DIAMOND SCAN
13" Color Monitor
$455.00*

NEC Multisync II Hi-Res 13" Monitor $544.99*

Call For Best Prices on Magnavox, Amdek, IBM, Princeton, and NEC

MODEMS

HAYES Smartmodem 2400	392.89*
HAYES Smartmodem 1200	261.59*
U.S. ROBOTICS HST 9600	604.99*

MULTIFUNCTION CARDS

AST Advantage Premium	295.00*
INTEL Above Board 286	385.00*
ORCHID Tiny Turbo 286	241.39*
ORCHID Twinturbo 12	342.39*
THE®Multi I/O w/P/S/G/CLK/CAL	50.40*

MATH CO-PROCESSOR

INTEL 80287 10MHZ Co-Processor	284.50*
INTEL 8087-2 Math Co-Processor	147.00*
INTEL 80387-16 Co-Processor	445.00*

MICE & ACCESSORIES

LOGITECH Logimouse +	69.69*
LOGITECH Hi-Res Mouse	85.85*
MICROSOFT Mouse w Paintbrush	93.50*
MICROSOFT Mouse w Windows	125.00*
CENTRAL PT Deluxe Option Brd	106.05*
CURTIS Ruby + w/Fax Protector	63.63*
KENSINGTON Masterpiece+	99.99*
THE COMPLETE PC Complete Fax	297.95*
FUJI 3 1/2" DS/HD Box of 10	45.45*
UNISON Unipower 400 UPS	329.00*
640K & 256K CHIPS	CALL
DISKETTES (25) Hi Dens IBM AT	32.82*
DISKETTES (50) 5 1/4" DS/DD	17.50*

FAX MACHINES/COPIERS

SHARP FAX FO-300

Sharp's deluxe, full-featured compact fax with auto dialing and document feeder, 18 second transmission and programming polling/turn-around polling/timer polling.

SHARP FO20 Fax Paper (6 Rolls) 23.23*

$1,131.20* **SHARP**

SHARP Z-50 Copier	487.83*
SHARP Toner Cartridge	60.60*

Call For Pricing On Other Models

1-800-621-SAVE

Corporate & Export Hotline **1-312-205-1300**

MONDAY-FRIDAY 8:30AM-6:00PM
SATURDAY 10:00AM-4:00PM

TECH SUPPORT 1-312-205-1410
CUSTOMER SERVICE 1-312-205-1510
FAX 1-312-205-1525
MONDAY-FRIDAY 9:00AM-4:30PM

MMC

PW1088

REAL BUYING CLOUT- Call now and join over 200,000 members who are too smart to pay more! **MEMBERSHIP BENEFITS:** * Pay just 8% above advertised wholesale price • 3%cash discount (included in wholesale price) • Price Protection • Optional software rental library • FREE Wholesale Buyers Guide • FREE UPDATES • Fully Insured 48 Hour Delivery • 10 day Return Policy • FREE Technical Support • FREE Bulletin Board • Quantity Discounts • All Prices Subject To Change. All Products Subject To Availability. **JOIN TODAY FOR AS LITTLE AS $10.**

*All Prices Shown are Wholesale Prices

• Come Visit Our Computer Warehouse Club Outlet Store • Come Visit Our Computer Warehouse Club Outlet Store • Come Visit Our Computer Warehouse Club Outlet Store • Cor

Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FR

Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for

JOIN THE #1 "COMPUTER WAREHOUSE CLUB" FOR BUSINESS

The New PC NETWORK

PRICE BREAKTHROUGH

T.H.E. Complete Computer Systems

Complete Monochrome System $554.00*

- 512K Expandable to 640K RAM
- 360K Disk Drive
- 10Mhz Speed
- 101 Key Keyboard
- LED w/Keylock
- Serial/Parallel/Game/Clock
- Hercules Monochrome Video Card
- HI-RES 12" Monochrome Monitor
- FREE 1-Year Warranty
- Pheonix Bios & More!

Monitor Included

(MS DOS & GW Basic $59.59 w/ System Purchase)

PC MAGAZINE *"THE PC is well built and has enough company support behind it to make it a very attractive alternative to higher pricedcompetition.*

Complete Color System $798.00*

- 512K Expandable to 640K RAM
- 360K Disk Drive
- 10Mhz Speed
- 101 Key Keyboard
- LED w/Keylock
- Serial/Parallel/Game/Clock
- CGA Color Video Card
- HI-RES 14" RGB Color Monitor
- FREE 1-Year Warranty
- Pheonix Bios & More!

9600 Baud Modem, Hayes Compatible

The Last Modem You'll Ever Buy

$399*

- 1200, 2400, & 9600 Baud
- Software Included
- Internal Card
- Hayes Compatible
- Built-in Speaker
- Auto Answer, dial, redial

386/16

• 1MB RAM • 32Bit 16 Mhz Operational • 200 Watt Power Supply • 101 Key "AT Style" Keyboard • 1.2 MB Floppy Driver • Western Digital Hard/Floppy Controller • Pheonix Bios Monitor Optional

$1,790*

Hard Drive Super Sale

Seagate ST-251

- 42MB Half Height Hard Drive
- 40MS Access Time

$349.00*

MiniScribe $360.57*

- 42MB half Height Hard Drive
- 40MS Access Time

Seagate ST-225 20MB Half Height Hard Drive Kit $249.00*

EPSON PRINTERS

LX800	80 Col., 180cps	176.00*
LQ500	80 Col., 180cps	CALL
LQ1050	132 Col., 246cps	CALL
FX1050	132 Col., 264cps	CALL
FX850	80 Col., 264cps	CALL

Call For Your FREE Wholesale Buying Guide

1000's of Products at Wholesale Prices

1-800-621-SAVE

* All Prices Shown are Wholesale Prices

MasterCard · American Express · VISA

Corporate & Export Order Hotline 1-312-205-1300

* Pay just 8% above the advertised wholesale price. Optional software rental library. Fully insured 48 hour delivery. 10 Day return policy. FREE Technical support. Quantity discounts. All Prices are subject to change. All products are subject to availability.

Come Visit Our Computer Warehouse Club Outlet Store • Come Visit Our Computer Warehouse Club Outlet Store • Come Visit Our Computer Warehouse Club Outlet Store • Co

• Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for FREE Catalog • Call for

Circle 135 on reader service card

KENOSHA COMPUTER CENTER

PACKARD BELL TURBO XT
only $1029

4.77 and 8 MHZ • Switchable • 512K Ram • 1 Floppy Drive • 20 MB Seagate Hard Disk • Parallel and Serial Ports • Clock • Mono/Color Graphics Card • Monochrome Amber Monitor • AT Style Keyboard • 135 W power supply • DOS & Basic • 1 year warranty

TRW Warranty Service

SALES LINE OUTSIDE WISCONSIN
1-800-255-2989

(in Wisconsin Call 414-697-9595)

Shipping & technical assistance 414-697-9595

ZENITH data systems

SUPERSPORT 286 w/20 MB Hard Disk

only $3025

Supersport 286 w/40MB Hard Disk $3369

IBM

Model 30 w/20 MB	$1725
Model 50Z w/30 MB	$2999
Model 50	$2699
Model 60 w/44 MB	$3395
Model 60 w/70 MB	$3795
Model 70 w/60 MB	$4499
Model 70 w/121 MB	$5599
Model 80 w/44 MB	$4449
Model 80 w/70 MB	$4995

COMPAQ

286 Deskpro 640K 40MB	$2199
386 Model 40	CALL
386 Deskpro Model 60	$5375
386 Deskpro Model 130	CALL
386S	CALL
386 25MHz	CALL
Portable II	CALL
Portable III	CALL

LEADING EDGE MODEL D

1 floppy, 20MB hard disk, mono graphics card & monitor, DOS & Basic $1099

AST

All Models ..... CALL

LAP TOPS

Zenith Supersport	CALL
NEC Multispeed EL	$1495
NEC Multispeed HD	$2259
Toshiba T1000	$809
Toshiba 1100 Plus	$1519
Toshiba 1200	$2235
Toshiba 3100	$3029
Toshiba 3200	$3599
Toshiba 5100	$4895

CHIPS

64K Ram Chips	CALL
256K Chips	CALL
8087-3/8087-2	$105/$145
80287-6MHZ	$155
80287-8MHZ	$229
80287-10MHZ	$269
80387-16MHZ	$419
80387-20MHZ	$639

HARD DISKS

SEAGATE

20MB w/contr ST225	$265
30MB w/contr ST238	$279
30MB for AT ST4038	$465
40MB for AT ST251	$359
40MB for AT ST251-1	$459
80MB for AT ST4096	$699

PLUS

Hard Card 20MB	$525
Hard Card 40MB	$649

SOFTWARE

D Base III Plus	$389
Framework	$389
IBM Displaywrite IV	$299
Lotus 123	$299
Managing Your Money 4.0	$119
Microsoft Word	$215
Multimate Adv. II	$259
Quattro	$149
R Base for DOS	$409
Symphony	$429
Ventura Desktop Publ.	$489
Word Perfect 5.0	$229
Wordstar 2000 Plus	$229
Wordstar Pro 4.0	$229

MONITORS

Compaq VGA	$539
Mitsubishi Diamondscan	$519
NEC Multisync II	$579
NEC Multisync Plus	$879
NEC Multisync GS	$199
NEC Multisync XL	$2049
Thomson Ultrascan	$449
Packard Bell Color	$239
Packard Bell EGA	$369
Packard Bell VGA	$379
Princeton Ultrasync	$509
Sony Multiscan	$559

GRAPHICS CARDS

ATI EGA Wonder 800	$225
ATI VIP VGA	$269
Compaq VGA	$409
Everex Enhancer	$135
Everex Edge	$179
Everex VGA	$249
Hercules Graphics Plus	$179
NEC GB-1	$209
NEC MVA 1024	$829
Paradise Autoswitch 480	$175
Paradise Professional	$379
Paradise VGA Plus	$259
Quadram VGA	$259
Quadram Ultra VGA	$299
Sigma VGA	$249
STB EGA Plus	$159
Vega Deluxe	$199
Vega VGA	$265

MULTIFUNCTION CARDS

AST 6 Pack Plus w/384K	$229
AST 6 Pack Prem. 256K	$195
AST Advantage 128K	$299
AST Advantage Prem. 512K	$339
AST Rampage PC w/256K	$249
AST Rampage AT w/512K	$379
AST 5251-11 Plus Enhanced	$579
Intel Above Board PC	$229
Intel Above Board PC P/S	$259
Intel Above Board 286	$369
Intel Above Board 286 P/S	$389
Irma Board	$695
Orchid Tiny Turbo 286	$269
2MB & 4MB Upgrades for PSII	CALL

MICE

Logitech Serial or Bus	$74
w/Paint	$99
w/Cadd	$117
w/Publisher	$109
Logitech Hirez	$95
Logitech PSII	$75
Microsoft Serial w/Paint	$105
Microsoft Bus w/Paint	$105
Mouse Systems Serial	$106
Mouse Systems Bus	$115

PRINTERS

EPSON

LX 800	$189	LQ 1050	$719
FX 286E	$419	LQ 500	$329
FX 850	$339	LQ 2550	$969
FX 1050	$489	EX 800	$399
LQ 850	$519	DFX5000	
LQ 950	$599		$1399

OKIDATA

ML320	$339	ML391	$639
ML321	$465	ML393	$925
ML390	$465		

NEC

P2200	$339	P5XL	$849
P5200	$539	P9XL	$1049
P5300	$719		

HEWLETT-PACKARD

Laserjet II	$1699
Memory Upgrade	CALL
Deskjet	$759

IBM

Proprinter	$389
Proprinter XL	$549
Proprinter X24	$549
Proprinter XL24	$759

MODEMS

Everex 1200/2400 Int.	$79/$147
Everex 2400 External	$279
Hayes 1200	$279
Hayes 1200B Alone	$244
Hayes 1200B w/Software	$279
Hayes 2400 ext	$409
Hayes 2400B int	$377
Hayes 2400B w/software	$419
US Robotics 2400 int	$149
US Robotics 2400 ext	$162
US Robotics 1200 int	$84
US Robotics 1200 ext	$98
US Robotics Cour. 2400	$279
US Robotics HST 9600	$625
2400 Internal IBM PSII	$199

FAX MACHINES

Sharp FO-300	$1219
Sharp FO-420	$1339

No charge for MasterCard or Visa. We will ship COD on a cash or cashier's check basis only. Shipping & handling 3% — $6 minimum; AK and HI slightly higher. 15% restocking charge on returned items. Purchase orders accepted from Fortune 1000, Government institutions, schools and universities. 2% shipping discount available on orders over $2000 if prepaid by check.

KENOSHA
COMPUTER CENTER
2133 91st St
Kenosha, WI 53140

KENOSHA COMPUTER CENTER

Circle 41 on reader service card

Prices and availability subject to change

SAVE MONEY ON COMPUTERS

COMPUTER PRODUCTS AT THE LOWEST PRICES

CALL 707 COMPUTER SALES BEFORE YOU BUY

1-800-426-2489

LASER TURBO XT $499.00
LASER TURBO XT ENHANCED $799.00

COMPUTER SPECIALS
PACKARD BELL VT286 $1,125.00

COMPUTERS

THE ALL NEW IBM PERSONAL SYSTEM 2

MODEL 25 MONOCHROME 1 FLOPPY	$1,045.00
MODEL 25 MONOCHROME 2 FLOPPIES	$1,222.00
MODEL 25 COLOR 1 FLOPPY	$1,339.00
MODEL 25 COLOR 2 FLOPPIES	$1,499.00
MODEL 30-002 (2 720K FLOPPIES)	$1,259.00
MODEL 30-021 (20MB HARD DRIVE)	$1,699.00

80286 SYSTEMS

MODEL 50-021 (20MB HARD DRIVE)	$2,609.00
MODEL 50Z-031 (30MB HARD DRIVE)	$2,996.00
MODEL 50Z-061 (60MB HARD DRIVE)	$3,499.00
MODEL 60-041	$3,339.00
NEW! MODEL 70'S	IN STOCK
MODEL 70-E61	$4,400.00
MODEL 70-121	$5,799.00
MODEL 70-A21	CALL
MODEL 80-041	$4,399.00
MODEL 80-071	$5,330.00

IBM PERSONAL SYSTEM/2 DISPLAYS

MONOCHROME 8503	$189.00
COLOR-8512 (14")	$432.00
COLOR 8513 (12")	$498.00
COLOR 8514 (16")	$1,150.00

NEW PERSONAL SYSTEM 2 SOFTWARE

IBM DOS 3.3	$90.00

COMPAQ™

DESKPRO 286 MODEL I	$1,750.00
DESKPRO 286 W/40MB HARD DRIVE	$2,499.00
DESKPRO 286 W/80MB HARD DRIVE	$2,889.00
DESKPRO 386 MODEL 60, 20MHz	$5,499.00
DESKPRO 386 MODEL 130, 20MHz	$6,799.00
DESKPRO 386 MODEL 300, 20MHz	$8,899.00
COMPAQ PORTABLE III	IN STOCK
NEW! COMPAQ 386S/16 MODEL 1 1MB RAM, 1.2MB FDD, HD/FD CONTROLLER	$2,900.00
COMPAQ 386S/16 MODEL 20 SAME AS ABOVE W/ 20MB HARD DRIVE	$3,424.75
COMPAQ 386S/16 MODEL 40 SAME AS ABOVE W/ 40MB HARD DRIVE	$3,900.00
COMPAQ DESKPRO 386/25 MODEL 110	$7,699.00
COMPAQ DESKPRO 386/25 MODEL 300	$9,899.00

EVEREX

EVEREX 286/10 512K, 1.2M FLOPPY 512K, ENHANCED KEYBOARD	$1,119.00
EVEREX 386/16 1MB, 1.2M FLOPPY ENHANCED KEYBOARD	$1,999.00

WYSE COMPUTERS AND TERMINALS

MODEL 2108	CALL
MODEL 2108-20	FOR
MODEL 2112	NEW
MODEL 2112-40	PRICING
MODEL 2200-01	IN
MODEL 2200-20	STOCK
MODEL 2214	YOUR
MODEL 2114-40	WYSE
MODEL 3216-01	DEALER
MODEL 3216-40	CALL
AT STYLE ENHANCED KEYBOARD	$109.00

TERMINALS

MODEL 30 GREEN OR AMBER	$299.00
MODEL 50 GREEN OR AMBER	$369.00
MODEL 60 GREEN, AMBER OR WHITE	$309.00
MODEL 85 GREEN OR AMBER	$375.00
MODEL 60 KEYBOARD	$100.00

LASER XT AND SSI 286 SPECIALS

LASER XT TURBO - 10 MHz, W/640K, 2 FLOPPIES, MULTI I/O CARD, TTL MONOCHROME MONITOR MONOGRAPHICS	$799.00
SPECIAL! SSI AT 286-10, 512K, 1.2MB FLOPPY, HD/FD CONTROLLER, AT STYLE KEYBOARD, 8 EXPANSION SLOTS, 195 WATT POWER SUPPLY, FULL 1 YEAR WARRANTY	$1,119.00

NEW PACKARD BELL W/NATIONWIDE 1 YEAR SERVICE

PB88 XT TURBO, 512K 1 360K FLOPPY, DOS, GW-BASIC, SER/PAR, COLOR/MONO ADAPTER, CLK/CAL, AT STYLE KEYBOARD	$639.00
VT286 (AT COMPATIBLE) 10 MHz 0 WAIT STATE, 640K, 1.2MB FLOPPY, SER/PAR, FD/HD CONTROLLER, ENH. KEYBOARD	$1,125.00

AST SPECIALS

AST MODEL 80/90/120/140/170	CALL
AST MODEL 300, 340 & 390	CALL

NOVELL NETWORKING

TURNKEY NETWORK SYSTEM

10MHz 286 FILE SERVER, ARCNET PC TERMINALS, LOADED NETWARE, CABLES, TERMINATORS AND TEES. EVERYTHING. PLUG IN & TURN ON	
4-USER (40MB)	$7,099.00
6-USER (80MB)	$9,099.00
8-USER (80MB)	$11,599.00

OPERATING SYSTEMS

ADV. NETWARE 286 V2.11	$1,749.00
ADV. NETWARE 286 V 2.1 SFT	$2,499.00
ELS 4-USER SOFTWARE	$429.00
DISK CO-PROCESSOR BOARD	$349.00
KEYCARD (STANDARD BUS)	$70.00
KEYCARD (MICROCHANNEL BUS)	$70.00
NOVELL UPS MONITOR BOARD	$69.00

CARDS

ARCNET (8 BIT) PC/XT	$169.00
ARCNET (16 BIT) 286/386	359.00
ETHERNET	$259.00
ETHERLINK PLUS AT	$699.00
MICROCHANNEL CARDS PS/2	$399.00

WORK STATIONS

ARCNET PC TERMINAL	$799.00
ETHERNET PC TERMINAL	$799.00

MISC. NETWORKING ITEMS

ARCHIVE FT60 EXT TAPE BACKUP	$699.00
ADDTL. CONT. CARDS FOR ARCHIVE	199.00
MOUNTAIN 40MB TAPE BACKUP	$469.00
WANGTEK 60MB TAPE BACKUP (INT)	$699.00
ARCNET ACTIVE HUB	$499.00
ARCNET PASSIVE HUB	$85.00
ELGAR MONITOR 1000 WATT UPS	$899.00
APC MONITOR 1000 WATT UPS	$1,199.00

LAPTOP COMPUTERS

NEC MULTISPEED EL2, BACKLIT	$1,449.00
NEC MULTISPEED HD	$2,279.00
TOSHIBA 1000 IN STOCK	$789.00
TOSHIBA 1200	$2,237.00
NEW! TOSHIBA 1200 F 1MB RAM, 2FDD, SUPERTWIST	$1,625.00
TOSHIBA 3100-20	$2,979.00
NEW! TOSHIBA 3200	$3,699.00
NEW! TOSHIBA 5100	$4,800.00

ZENITH LAPTOP COMPUTERS

ZENITH SUPERSPORT MODEL 2 8088, 640K, 2 3.5" FDD	$1,589.00
ZENITH SUPERSPORT MODEL 20 8088, 640K, 1 3.5" FDD & 20MB	$2,439.00
ZENITH SUPERSPORT 286 MODEL 20 80286, 1MB RAM 20 MB 1 3.5"	$3,499.30

DISK DRIVES

SEAGATE ST225 20MB W/CONT.	$289.00
SEAGATE ST238 30MB W/RLL CONT.	$309.00
SEAGATE ST251 40MB 1/2 HEIGHT - AT	$399.00
SEAGATE ST251-1 40MB 1/2 HT 28 MLS	$499.00
SEAGATE ST125I-PS/2 20MB 1/2 HT.	$359.00
SPECIAL! SEAGATE ST4096 80MB W/ON-TRAC	$699.00
MINISCRIBE 20MB 3.5" W/WD #8425	$299.00
MINISCRIBE 3675F-2072 60MB, 1/2 HT. FOR XT W/CONT	$450.00
20MB MINISCRIBE HARD DISK CARD	$399.00
30MB MINISCRIBE HARD DISK CARD	$419.00
SPECIAL! 40MB 1/2 HGT. MINISCRIBE	$350.00
PLUS HARDCARD 20 / 40	$550.00 / $670.00
SPECIAL! FUJITSU 360K 1/2 HGT. FLOPPY	$69.00
COMPAQ 360K FULL HGT. FLOPPY	$47.00
TAXAN TDM-5 5.25" EXTERNAL FDD FOR IBM PS/2	$239.00
BERNOULLI BOX 10 + 10	$1,395.00
SPECIAL! BERNOULLI BOX 20 + 20	$1,599.00
NON BOOTABLE CONTROLLER	$159.00
BOOTABLE CONTROLLER	209.00
SPECIAL! IRWIN 10MB INTNL TAPE BACK-UP	$259.00
IRWIN 20MB AND 40MB INTERNAL TAPE BACK-UPS	IN STOCK
ARCHIVE 40MB TAPE BACK-UP UNIT FOR XT/AT	$339.00

FAX MACHINES

SHARP FO-300	$1,220.00
SHARP FO-420	$1,379.00
SHARP FO-500	$1,649.00
CANON FAXPHONE 8	$999.00

PLOTTERS

CALCOMP 1023 8 PEN A-D SIZE	$3,829.00
CALCOMP 1042 8 PEN A-D ROLL FEED	$7,500.00
CALCOMP 1043 8 PEN A-E SIZE	$6,499.00
CALCOMP 1044 8 PEN A-E ROLL FEED	$19,299.00

EGA/VGA BOARDS

EPIC 480, EGA, CGA, MDA, HERC, 640 X 480 VIDEO 7 COMPATIBLE	$149.00
BOCA EGA 640 X 350	$159.00
PARADISE AUTOSWITCH EGA 640 X 480	$199.00
VIDEO 7 VEGA DELUXE	$239.00
SPECIAL! **NEW** GENOA SUPER EGA HI-RES. 800 x 600 RESOLUTION	$215.00
ATI WONDERBOARD, EGA, VGA, CGA	$249.00
GENOA VGA 5100 800 X 600	SAVE
GENOA SUPER VGA 1024 X 768	SAVE
NEC MVA 1024	$799.00
NEC MVA 1024 ENHANCED	$999.00
VIDEO 7 VGA	$299.00
ORCHID DESIGNER VGA	$289.00
PARADISE VGA CARD 640 X 480	$296.00
PARADISE VGA PROFESSIONAL	CALL
AST VGA CARD	$314.50
ATI VGA VIP CARD	$307.00
COMPAQ VGA BOARD	$439.00
STB VGA XTRA 640 X 480, 64 COLORS	$259.00

MODEMS

PACKARD BELL 2400 BAUD INTERNAL MODEM W/ (PRO COM) SOFTWARE	$169.00
PACKARD BELL 2400 BAUD EXTERNAL	$199.00
USR SPORTSTER 1200 EXTERNAL	$128.00
USR SPORTSTER 1200 HALF INTERNAL	$108.00
USR SPORTSTER 2400 INT W/SW	$199.00
USR COURIER HST9600 EXT. W/O SFTWRE	$659.00
EVEREX 1200BAUD INTERNAL	$109.00
EVEREX 2400BAUD INTERNAL	$199.00
EVEREX 2400BAUD EXTERNAL	$289.00
HAYES SMARTMODEM 1200 EXTERNAL	$289.00
HAYES SM1200B W/SMARTCOM II	$289.00
HAYES SMARTMODEM 1200B INT. NO SW	$250.00
HAYES SMARTMODEM 2400 EXT NO SW	$424.00
HAYES SMARTMODEM 2400B W/SFTWR	$424.00
HAYES SMARTMODEM 2400B INTERNAL HARDWARE ONLY	$379.00
EXTERNAL MODEM CABLES	$15.00
IBM 5250 EMUL 2.12 CONV KIT	$633.75

PRINTERS W/ FREE CABLE

IBM PROPRINTER II	$439.25
IBM PROPRINTER XL24	$799.00
IBM QUIETWRITER III PRINTER	$1,249.00
EPSON LX-800 W/TRACTOR FEED	$219.00
EPSON FX-286E	$439.00
EPSON EX 800	$459.00
EPSON LQ 500	$369.00
EPSON LQ 850	$549.00
EPSON LQ 1050	$765.00
EPSON LQ 2500	$859.00
SPECIAL! NEC P2200	$339.00
NEW! MODEL NEC P5200	CALL
NEW! MODEL NEC P5300	CALL
NEC P560 XL	$839.00
NEC P960 XL	$1,025.00
NEC 3550 SPINWRITER	CALL
NEC 8850 SPINWRITER	CALL
PANASONIC 1080i	$159.00
PANASONIC 1091i	$199.00
PANASONIC KX-P1524	$579.00
PANASONIC KX-P1595	CALL
OKIDATA ML182 PLUS FOR IBM	$243.49
OKIDATA ML292E	$377.44
OKIDATA ML293E	$515.50
INTERFACE MODULE FOR 292/293	$94.99
SPECIAL! OKIDATA ML393 P/SERIAL	$949.00
OKIDATA ML320 IBM	$369.00
OKIDATA ML321 IBM	$470.00
OKIDATA ML390 IBM	$469.00
OKIDATA ML391	$638.00
NEW! TOSHIBA P321 SL W/TRACTOR	$490.00
TOSHIBA P341 S/L	$699.00
TOSHIBA P351 SX W/TRACTOR	$1,019.00
HP LASERJET SERIES II	$1,699.00
HP DESKJET INKJET PRINTER	$695.00
HP 7475A PLOTTER	IN STOCK
DICONIX 150P BY KODAK – BATTERY POWERED PORTABLE PRINTER	$319.00
DICONIX 300 WIDE CARRIAGE BATTERY PWRD. PORT. PRINTER	$529.00

MONOCHROME MONITORS

LTI TTL MONITOR, TILT SWIVEL, GREEN OR AMBER	$85.00
PACKARD BELL AMBER OR GREEN	$79.99
AMDEK 310A AMBER MONOCHROME	$119.00
AMDEK 410A AMBER MONOCHROME	$149.00
WYSE 530 GREEN OR AMBER	$175.36
COMPAQ MONOCHROME MONITOR	$191.00
NEC MONOGRAPH	$1,279.00
WYSE 700 1280 X 800 RES. W/GRAPHICS CARD	$699.00
AST DISPLAY MONOCHROME MONITOR, 14" BLACK & WHITE	$179.50

COLOR MONITORS

SAMSUNG COLOR 640 X 200	$259.00
SPECIAL! MAGNAVOX COLOR MONITOR	$259.00
TAXAN 720 COLOR MONITOR	$299.50
RAGE COLOR MONITOR	$289.00
GOLDSTAR COLOR MONITOR	$239.00
SPECIAL! AMDEK COLOR 600T	$339.00
AMDEK COLOR 722	$444.00
LTI COLOR MONITOR	$269.00

EGA/VGA MONITORS

AST EGA DISPLAY	$489.00
MAGNAVOX EGA CM9043	$385.00
SAMSUNG EGA MONITOR	$389.00
SPECIAL! GOLDSTAR EGA MONITOR	$369.00
NEW! TAXAN 770 MULTISYNC	$539.00
COMPAQ VGA MONITOR	$524.25
NEW! IMTEC MULTI-MODE/VGA DISPLAY 800 X 560 14" T/S	$469.00
NEW! NEC MULTISYNC II	$579.00
NEC MULTISYNC PLUS 14" 960 x 720	$879.00
NEC MULTISYNC XL 19" 1024 x 768	$1,939.00
ZENITH **FTM** ZCM-1490	$669.00
SONY MULTISCAN MODEL 1303, 800 X 600	$649.00
MAGNAVOX MULTISCAN 8CM873	$519.00

CARDS

SPECIAL! MULTI I/O	$50.00
MONOCHROME GRAPHICS W/PP	$69.85
HERCULES GRAPHICS CARD PLUS	$179.00
COLOR GRAPHICS CARD	$69.00
COLOR GRAPHICS CARD W/PP	$89.00
HERCULES COLOR CARD W/PP	$146.00
NEW HERCULES INCOLOR CARD	$249.00

QUANTITY DISCOUNTS AVAILABLE

MOST ORDERS SHIPPED WITHIN 48 HOURS. Prices reflect 3% cash discount. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. Returns are subject to a restocking charge. Prices are subject to change without notice.

VISA MasterCard AMERICAN EXPRESS

Credit card charges are submitted at time of shipment

CALL 707 COMPUTER SALES TODAY!

1-800-426-2489

or in Illinois 312-537-3600 **TECH HOT LINE (312) 537-3970** **FAX: (312) 537-2850**

MEMBER MMC MICROCOMPUTER MARKETING COUNCIL of the Direct Marketing Association, Inc.

PCW1088

707 COMPUTER SALES

707 Dartmouth Drive
Buffalo Grove, IL 60089

Circle 81 on reader service card

COMPUTERS FROM IOWA?

Gateway 2000 is centrally located in order to efficiently serve the entire country. We are honest, hard working, well educated people, committed to succeeding and growing in the highly competitive micro-computer market.

Gateway 2000 is a full-service and support organization that realizes the key to our success lies in a satisfied customer base.

One look at the configurations we have listed below and you will see that we have high quality equipment at incredible prices. We have many different configurations available as well as a complete line of software and peripherals. So call one of our knowledgeable salespeople for more information.

We look forward to doing business with you, and establishing a long term business relationship.

16 Mhz 286 EGA SYSTEM

80286-16 Processor
1 Meg 0 Wait State RAM
1.2 Meg Floppy Drive
1.44 Meg Diskette Drive
40 Meg Seagate ST251
Samsung EGA Monitor w/Card
2-Parallel/2-Serial Ports
101 Key Enhanced Keyboard
DOS 3.3 w/GWBasic
1 Year Warranty
30 Day Money Back Guarantee

$2295.00

20 Mhz 386 VGA SYSTEM

80386 Processor Running at 20Mhz
1 Meg 60 NS Ram (Expandable to 8 Megs)
1.2 Meg Floppy Drive
1.44 Meg Diskette Drive
80 Meg Seagate ST4096 (28MS)
1 to 1 Interleave Controller
Samsung Multisynch Monitor
EVEREX EVGA Board
2-Parallel/2-Serial Ports
101 Key Enhanced Keyboard
Tower Case w/275 Watt Power Supply
80287 and 80387 Sockets
DOS 3.3 w/GWBasic
1 Year Warranty
30 Day Money Back Guarantee

$3795.00
Call For 25 Mhz Option

Circle 227 on reader service card

GATEWAY 2000

Gateway 2000 • P.O. Box 2414 • Sioux City, IA 51107

800-233-8472/712-255-7899

Due to the volatility in the DRAM market, all prices are subject to change.

COMPUTER BROKERS

GET THE BEST FOR LESS!!!

1-404-455-6394

COMPUTERS

ALR

Tower 386\25mhz 150mg HD	$ 9490
Tower 386\25mhz 300mg HD	$ 12499
Desktop 386\25mhz 66mg HD	$ 6490
Desktop 386\25mhz 100mg HD	$ 6990
Flexcache 386\20mhz 40mg HD	$ 4490
Flexcache 386\20mhz 60mg HD	$ 4590
Flexcache 386\20mhz 100mg HD	$ 6490

ZENITH

Supersport Portable, Dual 3.5 (720K)	$ 1645
Supersport Portable, 20MB, 3.5	$ 2485
Supersport 286 Portable, 20MB, 3.5	$ 3479
Z-248/12, 0 Wait, 1.2 Drive	$ 1795
Z-386/25, 1 Wait, 20MB Drive	$ 4490

DTK

DTK DATA 1000, 8088, AT Jr Case 4.77-10mhz, 150 Watt Power, TESTED	$ 179
DTK PTM-1200 AT, 80286, AT Case 12mhz, 200 Watt Power, TESTED	$ 469
IBM ..... COMPAQ	30% OFF
ALSO .... AST, SAMSUNG, WYSE	CALL

WE BUY & SELL NEW MEMORY CHIPS AND MATH COPROCESSORS !!!!!!!!!!!!!!!!!!!!!!

PRINTERS

Brother 1509	$ 369
Citizen 120D	$ 167
Citizen 180D	$ 185
Epson FX-286E	$ 485
Epson LQ-1050	$ 799
HP Series II	$ 1785
HP 7475A Plotter	$ 1399
NEC LC890	$ 3485
NEC P2200	$ 365
NEC P5200	$ 565
NEC P5300	$ 749
Okidata 321	$ 485
Okidata 391	$ 665
Okidata 393	$ 975
Toshiba 321 SL	$ 490
Toshiba 341 SL	$ 665
Toshiba 351 SX	$ 1083

MONITORS

Amdek 310A	$ 90
IBM 8503	$ 195
IBM 8512	$ 445
IBM 8513	$ 505
NEC Multisync II	$ 569
Samsung 2571 (Paper White)	$ 99
Samsung Monochrome	$ 75
Samsung RGB Color	$ 245
Samsung EGA Color	$ 355
Zenith 1490 (Flat Screen)	$ 620

BOARDS

Hayes 2400 Ext. Modem	$ 465
Hayes 2400B Int. Modem	$ 429
Comp. Peripherals 2400B	$ 135
Everex 1200 Internal	$ 95
Everex EVGA Card	$ 270
Paradise VGA + Board	$ 279
Orchid Tiny Turbo 286	$ 305
Vega VGA Card	$ 285
Vega Deluxe	$ 205
Intel Above Board 286	$ 340
AST SixPakPlus w/64k	$ 135
AST Rampage 286 w/512k.	$ 330
Intel Inboard 386	$ 1115

DRIVES

Archive 40MB Tape B/U	$ 330
Plus Hardcard 20	$ 550
Plus Hardcard 40	$ 820
Priam 60 MB 18ms	$ 815
Seagate ST-225 Kit	$ 265
Seagate ST-238 Kit	$ 295
Seagate ST-251-1 28ms	$ 455
Toshiba 360K	$ 85
Toshiba 3.5" 720K	$ 115
Toshiba 3.5" 1.44mg	$ 145

SOFTWARE

Aldus Pagemaker 3.0	$ 499
Clipper	$ 415
DBASE III Plus	$ 385
Lotus Freelance	$ 325
Lotus 1-2-3 (Free CPA Plus)	$ 305
Macola Accounting	CALL
Microsoft Word 4.0	$ 225
Microsoft Dos 3.3	$ 90
Multimate Advantage II	$ 265
PFS First Choice	$ 85
Q & A	$ 215
RBase 5000	$ 350
Lotus Symphony 1.2	$ 435
Ventura Desktop Publisher	$ 495
Wordperfect 5.0	$ 245

ACCESSORIES

256K 150ns Chips (Each)	$ 11.90
256K 120ns Chips (Each)	$ 12.25
Quantity Discounts Available !!!	
RAY-O-VAC AT Battery	$ 21.00
Monochrome Graphics Printer Card	$ 55.00
Color Graphics Printer Card	$ 60.00
Game Card	$ 20.00
Serial Card	$ 30.00
Clock Card	$ 30.00
XT Multi I/O S/P/Clk/G	$ 65.00
AT I/O Card S/P	$ 65.00
Logitech Serial Mouse	$ 79.00
Logitech Bus Mouse	$ 79.00
Gravis Joystick	$ 35.00
Mighty Mouse	$ 45.00

VISA® MasterCard

MANUFACTURER'S GUARANTEE APPLIES
15% Restocking fee on non-defective items. PRICES SUBJECT TO CHANGE BASED UPON AVAILABILITY. All returns must have prior authorization by calling 404-455-6394. Returns must be in new condition within original shipping container.

1-800-634-9198

5855 BUFORD HIGHWAY
ATLANTA, GA 30340
FAX: 404-455-8230

MONDAY - FRIDAY
9:00 AM - 6:00 PM
SATURDAY 10:00 AM - 4:00 PM

Circle 164 on reader service card

CELEBRATING OUR 20TH YEAR 1968-1988

MONTGOMERY GRANT

PC WORLD 10/88

Retail Outlet: Penn Station, Main Concourse
(Beneath Madison Square Garden) NYC,N.Y.10001
Store Hours: Mon-Fri 8:30-8/Sat-Sun 9:30-7

OUTSIDE USA---CALL
(718)692-0071
FOR CUSTOMER SERVICE
Call Mon-Fri:9:30am-4:30pm
(718) 692-1148

FOR ORDERS & INFORMATION CALL TOLL FREE
1-800-759-6565

OR WRITE TO:
Montgomery Grant Mail Order Dept.
P.O. Box 58 Brooklyn,NY 11230
FAX NO. 7186923372
TELEX 422132 MGRANT

OPEN 7 DAYS A WEEK FOR ORDERS: Monday-Friday9am-7:30pm/Saturday & Sunday 9:30am-6pm (EDT)
NO SURCHARGE FOR CREDIT CARD ORDERS / WE INVITE CORPORATE & EDUCATIONAL CUSTOMERS
CORPORATE LEASING AVAILABLE

LAPTOPS

AMSTRAD PPC-640 SD
640 K
720 K Floppy Drive
Built-in 2400 Baud Modem
$799

NEC MULTISPEED EL.....$1299
NEC MULTISPEED EL.II.....$1449
NEC MULTISPEED HD.....$2179

TOSHIBA 1000.....$729
TOSHIBA 1200 H.....$2199
TOSHIBA 3100/20.....$2929
TOSHIBA 3200.....$3695
TOSHIBA 5100.....$4740

ZENITH 184 SUPERSPORTS
W/ 2FLOPPYS.....$1469
ZENITH 184-2 SUPERSPORTS
W/ 20MB.....$2199

SPARK by DATAVUE
640K w/2 720K DRIVES.....$949
SPARK EL.....$1099

MODEMS, EXTERNAL DRIVES & ACCESSORIES available for all laptops

NEC PowerMate 1

IBM PC/XT/AT COMPATIBLE PACKAGE
• 80286 10 MHz Processor 640K RAM-1.2 MB Floppy Drive 12" Monitor
$1249

Same Package with NEC 20 MB Hard Drive $1479
Powermate II with Monitor $1679

COMPAQ DESKPRO 386 MODEL 40

Hard Drive Package
• Keyboard • 80386 16 MHz Microprocessor-1 MB RAM-40 MB Hard Drive-1.2 MB Floppy Drive (monitor optional)
$4295

SEAGATE
20,30,40,60,80
MB HARD DRIVES
IN STOCK

commodore

128 PACKAGE
Commodore 128 Computer - Commodore 1571 Disk Drive - Commodore 1902 Color RGB Monitor - Commodore 1515 Column Printer $699

64 c PACKAGE
Commodore 64/c Computer - Commodore 1541 Disk Drive - Computer Printer - 12" Computer Monitor $399

VISA · MasterCard · DISCOVER

Rush Service Available
Call For Details

EPSON

EPSON EQUITY 1+ Package
IBM PC/XT COMPATIBLE
• 640K RAM w/Clock Calendar 360K Drive • Keyboard • Serial & Parallel Ports • 12" High Resolution Monitor • Box of 10 Diskettes
$769

Same Pkg. w/One Floppy & 20 MB Hard Drive $1029
Same Pkg. w/Two 360K Floppy Drives $849

EPSON EQUITY III+
40 MB Hard Drive Package
IBM AT Compatible
• Keyboard • 80286 Processor 640K RAM-6/8/10 MHz • 1.2 MB Floppy Drive • 40 MB Hard Drive 12" Monitor • 8 Expansion Slots Serial and Parallel Ports
$1899

EPSON EQUITY II+
IBM AT Compatible Hard Drive Package
Keyboard • 640K RAM • 80286 Microprocessor • 1.2 MB Floppy Drive • 20 MB Hard Drive • Mono Monitor
$1399

LOGITECH MOUSE M-7 $59.95

IBM XT

Hard Drive Package
• IBM XT Computer • IBM Keyboard 256K RAM Expandable to 640K • 360K Disk Drive • 20MB Hard Drive • Package of 10 Diskettes (Monitor Optional)
$1199

IBM XT Package with 2 360K Floppy Drives $999

PACKARD-BELL 386
40 MB Hard DriveSystem
IBM AT Compatible

• 1 MB RAM • 80386 16 MHz Microproccessor • 1.2 MB Floppy Drive • 40 MB Hard Drive 8 Expansion Slots • Enhanced Keyboard • Serial & Parallel Ports • 12" Monitor
$2699

We Can Reconfigure Any Of Our Computer Packages To Your Specifications. Call For Information. We Carry Modems, Drives, Cards, Color Monitors & All Other Accessories For Your Computer.

apple PACKAGES

APPLE IIC W/ 12" MONITOR.....$529
APPLE IIE W/ 5.25 DISK DRIVE & 12" MONITOR.....$749

Apple IIGS Computer • 3.5" Disk Drive • Apple RGB Color Monitor Package of 10 Diskettes • All Cables & Adaptors • Package of 10 Diskettes Apple Software
$1379

MAC PLUS Computer Package.....$1279
IMAGEWRITER II Pinter.....$449
IMAGEWRITER LQ.....$1049
MAC SE Computer w/ Dual Drive.....$1949
MAC SE Computer w/20MB APPLE Hard Drive.....$2599
APPLE MAC II w/ Keyboard.....$2799

PRINTERS

EPSON		PANASONIC	
FX-1050	$489.95	1080i-II	$159.95
FX-850	$349.95	1092i	$299.95
LQ-500	$315.95	1091i-II	$189.95
LQ-800	$329.95	KXP-1524	$499.95
LQ-850	$509.95	KXP-1595	$409.95
LQ-1050	$709.95	KXP-4450 Laser	$1549
LQ-2500	$829.95	TOSHIBA	
EX-800	$419.95	321-SL	$449.95
LX-800	$199.95	341-SL	$629.95

commodore AMIGA

AMIGA 500 Computer w/ 1084 RGB Monitor $799
AMIGA 500 Computer w/ 1084 Monitor &1010 3.5" Floppy Drive $999

ALL PERIPHERALS IN STOCK
AMIGA 2000 IN STOCK

VENDEX HEADSTART

IBM PC/XT Compatible
10 MHz Dual Floppy Drives 7 Expansion Slots • 512K Expandable to 768K • Parallel & Serial Ports Mouse • Available in Color or Mono System. • Over $1000 Worth of Software - NO CHARGE!

Mono System $849
Color System $999

LEADING EDGE

MODEL D Package
IBM PC/XT Compatible
512K RAM Keyboard 4.7-7.16 MHz. 360K Floppy Drive 12" Monitor 8088-2 Processor

$729
Same Package w/ 20MB Hard Drive $989
Same Package w/ 30MB Hard Drive $1039

PRINTERS

STAR		OKIDATA	
NX-1000		OKI-120	$189.95
RAINBOW	$219.95	Okimate 20	$119.95
NX-1000	$169.95	Okidata 180	$219.95
NX-15	$299.95	Okidata 183	$299.95
NX-2400	$339.95	NEC	
NB-2410	$409.95	P-2200	$339.95

Citizen Printers IN STOCK
Diconix Printer For Laptops.....$289.95

AMIGA 2000

IBM PC/XT COMPATIBLE
RGB COLOR PACKAGE

- A-2000 Computer w/ Keyboard
- 1 MB Exp. to 9 MB
- Built-in 3.5" D. Dr.
- RGB Color Monitor
- 2088 iBM Compat. Bridge Card w/5.25" Floppy Disk Drive

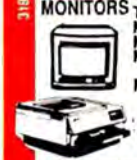
$2049
INCLUDES FREE MOUSE AND SOFTWARE

IBM PERSONAL SYSTEM 2

MODEL 50
640 K RAM 1.44MB Floppy Drive 20 MB Hard Drive
$2499
Monitor Optional

PS/II Model 30	$1199
PS/II Model 30 w/ 20 MB	$1599
PS/II Model 50 w/ 30 MB & 1.44MB Floppy	$2849
PS/II Model 60 w/ 44 MB & 1.44MB Floppy	$3299
PS/II Model 60 w/ 70 MB & 1.44MB Floppy	$3619
PS/II Model 70 w/ 60MB & 1.44MB Floppy	$4299
PS/II Model 80 w/ 44 MB & 1.44MB Floppy	$4295
PS/II Model 80 w/ 70MB & 1.44MB Floppy	$4795
5.25 External Drive for PS/II	$169
IBM PERSONAL SYSTEM II MONITORS	
8503 Monochrome Monitor	$199
8512 Color Monitor	$449
8513 Color Monitor	$519
IBM Proprinter II	$369

MONITORS



THOMSON 14"CGA Monitor....$299
MAGNAVOX 13" RGB Color Monitor.....$199
MAGNAVOX EGA Monitor.....$339
w/ EGA Card.....$459
MAGNAVOX VGA Monitor.....$449
w/ VGA Card.....$669

Laserjet SeriesII $1629

1 MB Expander.$349 HP DESKJET PRINTER.$719

LEADING EDGE D2

IBM AT COMPATIBLE 20MB HARD DRIVE PKG.
Keyboard 1.2MB Floppy 20MB Hard Drive 80286 Processor 12" Mono Monitor $1499

Same Package w/ 30 MB Hard Drive $1549

NEW PC1640

Keyboard 640K RAM Turbo Speed 1.360K Drive Mono Monitor Free Mouse & Software
$649
w/ 20MB.....$899

commodore COLT

IBM PC/XT COMPAT. PACKAGE

Keyboard
Two 360K Floppy Drives
Serial & parallel Ports
Mono Monitor
MS DOS
$799

commodore PC10-1

IBM PC/XT Compatible PACKAGE

• PC10-1 Computer • 512K RAM Expandable to 640K • 360K Disk Drive Enhanced Keyboard • Serial & Parallel Ports • 12" Monitor • AC Adaptors • All Hook-up Cables Pkg. of 10 Diskettes
$499

Same Package with 20 MB Hard Drive $749

Certified Checks, Bank Checks, Money Orders, MasterCard, Visa, Amex, Diners Club, Carte Blanche, Discover Card, C.O.D.'s and approved P.O.'s accepted. No additional surcharge for credit card orders. Non certified checks must wait 2-5 weeks for clearance. Please add 5% for shipping and handling. APO/FPO addresses add 10% for shipping and handling. All APO/FPO are shipped first class priority air. N.Y. residents add applicable sales tax. Prices subject to change without notice. Not responsible for typographical errors. Return of defective merchandise must have prior return authorization number or returns will not be accepted. IBM PC XT AT are registered trademarks of International Machine Corp. Allendors can be shipped Air Express etc. Call for details. For your protection we check for credit card theft. NYC DCA #08233

NO ADDITIONAL SURCHARGE FOR CREDIT CARD ORDERS WE WELCOME CORPORATE & EDUCATIONAL ACCOUNTS

Circle 65 on reader service card

F&W Communications

CAD, GRAPHICS, AND DESKTOP PUBLISHING

THE COMPLEAT* GRAPHIC ARTIST

We have the world's lowest prices on 19-inch color monitors!

Hitachi CM3719 1024X800 . . . . . **$990.00**
State-of-the-art 1280X1024 Amtron 19" color,
Model C1920 . . . . . **$1600.00**
Mitsubishi 3919 with analog RGB inputs for TV,
and TTL inputs for EGA and CGA **$999.00**
Philips 19" monochrome for publishing **$400.00**
True VGA (IBM 8514 emulation) 19" color Hitachi . . **$1099.00**
Many used color monitors, from $499.00

F&W has all the equipment and software you need for truly professional publishing, TV editing, and drafting. We offer substantial discounts on all brands of equipment. The workstation at left shows:

Houston Instrument DMP 62 plotter; size to 36"X48" . . . . . **$CALL**
The monitor is a 19" Hitachi at **$990.00**
The digitizer is a Summagraphics 12" X 18" at **$650.00**
The console monitor is a Logitech Autosync at $540.00
The computer is a Wyse 386-based system at . . . . . **$CALL**
Many other options are available:
CPU's with hard disks **$999.00**
Sweet-P plotter 7475A compatible 6-pen) **$749.00**
Digitizers from **$340.00**
Microtek MSF-300C Flatbed Scanner: 300dpi,
64 shades of gray **$1560.00**
Blaser 2: full range graphics laser printer; excellent blacks . **$1650.00**
Mural Flatbed Plotter; D-size plots at minimum cost **$1795.00**

Shown at right is our most exciting new product, the Vision Systems "Vision 16" frame grabber. This sytem captures TV images from a camera, VCR, or camcorder, and performs a nearly unlimited menu of manipulations. Its 512 X 480 pixel display, with 16 bits/pixel, gives extraordinary color rendition and clarity. There are conversion programs for VGA, CGA, EGA. **"Vision 16" lists for $1795: CALL!**

State-Of-The-Art controller cards from F&W ensure system compatibility:

Video 7 VGA, 640X480, 256 color **$249.00**
QDP 1000/16, 16 color, 1024X1024 . . . . . **$649.00**
QDP 256 color **$1249.00**
Imagraph 1280X1024, 1 Meg Videoram, 16 color . . **$1200.00**
QDP 2000, 2048X2048 virtual display **$1995.00**

Telecommunications Special! In our experience of upgrading our own telephone system, we discovered that we could procure the required equipment for 1/2 to 1/3 the price that Ma Bell or the leasing companies charge; installing it is as simple as adding a printer to your computer system. The Southwestern Bell Freedom Phone includes:

FS900 Telephone Station (shown at left) **$132.00**
FS246 Key Service Unit (shown at left) 2 lines, 4 phones . . **$284.00**
FS10 Cartridge adds 4 phones **$41.00**
FS20 Cartridge adds 2 lines **$80.00**
FS30 Cartridge (one required) **$123.00**

ALL MAJOR CREDIT CARDS ACCEPTED

* SEE I. WALTON (1590-1680)

FARADAY & WHEATSTONE COMMUNICATIONS
194 MAIN STREET, MARLBOROUGH MA 01752 USA (617) 485-1144

Circle 255 on reader service card

The Not-So-Rapidly-Changing Marketplace

Dan Lavin

Many users have reached a point where they're reasonably happy with their software. Sure, there's always room for improvement. But most of us are satisfied with the kind of productivity gains we're already realizing. I'm writing this with *WordPerfect 4.2*, and I don't need high-end page-layout features to get the job done. I may never need them.

But the computer industry is marching right past people like us, constantly updating, constantly adding new features—many solely to suit the limited interests of isolated groups of multiple-unit buyers. Software is generally being weighed down by too many versions with an overabundance of features. In fact, software may become too heavy for software vendors to support in the future.

1-2-3 release 2.01, *dBASE III Plus*, DOS 3.00, and *WordPerfect 5.0* are definitive products that provide most users with all the functionality they'll ever need. Even so, the vendors of those products seem to focus on adding power-user features for maximum marketing sizzle in future releases.

How long will they be able to provide technical support for older versions? What will happen to the business customer who uses the same version for 5, 10, or 15 years?

Today's software companies are structurally unprepared for this not-so-rapidly-changing marketplace. They are creating too many new versions, and their corporate cost structures are out of line. High salaries, lavish offices, and "unique corporate cultures" simply waste needed capital.

Sure, many companies were wildly profitable during the early years of this industry. But too often, software executives credit their own genius for the success of their companies, rather than the inevitable boom of an industry in its infancy. Software is no different from any other commodity: Market forces will intervene to bring profit margins in line, just as they did for oil, steel, automobiles, telephones, and railroads.

Technical support is expensive, and much of the money being squandered today should be redirected into reserves for tomorrow's support. That's the price vendors should pay for $500 products that cost $20 to manufacture. We users are partly to blame for this situation. User-group leaders tend to egg the manufacturer on for product improvements. No one at the Lotus Week event asked when the bugs in *1-2-3* release 2.01 would be fixed, only when release 3.0 would ship. Even user-oriented magazines such as *PC World* seem more interested in news of updates than in support.

Most computer users aren't activists or power users, but we're still vitally interested in maintaining and improving our productivity. At the average small company, 20 employees sit on 10-year-old furniture. They may eventually need new computers and software, but don't expect them to buy every year or so. If a program works, it will be around as long as the furniture.

The not-so-rapidly-changing segment of the market may not be shrill or militant, but we do control our own budgets. If the current market leaders ignore us, other companies will get our business—companies with reasonable ambitions and sensible cost structures. Their products, designed for the long haul, will push current companies out of all but the high end of the market.

This process could be a long one, and it could cause major upheavals. A better route would be for today's market leaders to begin changing direction now. It took vendors four years to learn that copy protection is a bad idea. They don't have four years to resolve this issue. ●

Dan Lavin is associate director of the IBM PC Users Group of the Boston Computer Society.

Have a different perspective? Write Mike Hogan, PC World, 501 Second St., San Francisco, CA 94107.

Switch on a serious surge suppressor.

With test after test proving that 70-90% of all PC malfunctions can be traced to power problems, a surge suppressor is the first accessory you should buy for your PC. But don't put your trust in just any surge suppressor. Get one that gives your whole system superior protection. One that's engineered to the highest specifications.

Meets IEEE 587-1980 Category A	✓
Meets IEEE 587-1980 Category B	✓
UL Listed	✓

The right surge suppressor passes all the tests.

Get a Kensington Master Piece® or Master Piece Plus. They're the most popular PC surge suppressors. And the most serious. Because at Kensington, we're dedicated to giving your PC the best possible protection.

That's why Master Piece and Master Piece Plus are equipped with our unique two-stage surge suppression circuit, containing a high-speed silicon semiconductor for the quick reaction necessary and heavy-duty metal oxide varistors for the brute force required to keep even the largest surges from penetrating into your system.

That's why the plus in Master Piece Plus is additional modem surge suppression circuitry to protect your modem from surges, spikes and noise on the telephone line.

And that's why the circuitry in both models can handle anything an electrical storm or your local power company can offer—up to 6,000 volts with a 3,000 amp follow-on current. (That's the kind of superior performance that passes not only UL* testing, but Categories A and B of the strict IEEE† specification 587-1980 as well.)

Now, this may look to you like we're taking more than the necessary precautions. And actually, we are. But after all, isn't that what you expect from a serious surge suppressor?

Master Piece ($149.95) and Master Piece Plus ($159.95). For more info, or a dealer near you, call (800) 535-4242. In NY (212) 475-5200.

KENSINGTON

*Underwriters Laboratories Inc. †The Institute of Electrical and Electronics Engineers. © 1987 Kensington Microware Ltd.

Circle 98 on reader service card

What we have here is a failure to communicate.

Until now.

Ven-Tel would like to congratulate all IBM PS/2™ users. Now let's talk. Because a complete communications system for the IBM PS/2 has arrived.

Introducing the Ven-Tel 24/2™ Internal Modem for IBM PS/2 models 50, 60 and 80. This 2400 bps modem is fully Micro Channel™ and OS/2™ compatible. It's automatically configured by the system, so no option switches are needed. And, as an option, you can buy the 24/2 bundled with Crosstalk XVI® software.

Like all Ven-Tel 2400 & 1200 bps modems, quality and reliability are guaranteed by a *free* five-year warranty.

The new Ven-Tel 24/2 Internal Modem is in stock now. For the name of your nearest Ven-Tel dealer or distributor, call 1-800-538-5121.

And start communicating.

Ven-Tel
Modems

Micro Channel, PS/2 and OS/2 are registered trademarks of IBM Corporation. Crosstalk XVI is a registered trademark of DCA.

Circle 11 on reader service card