

1988 HARDWARE UPDATE • OVER 450 PRODUCTS IN THIS ISSUE!

# PCWORLD

DECEMBER 1988 \$2.95 CANADA \$3.95

## BEST BUYS IN HARDWARE



**AMÍ**  
Samna's hot new  
Windows word processor

**20-MHz 386s**  
More muscle for the OS/2 era

**HARD DISK LAPTOPS**  
Speed and storage for the road

**VGA MONITORS**  
Great graphics, low prices

**BUYERS' GUIDE**  
PS/2 memory boards,  
modems, hard disks, and tape  
drives





WHY YOU SHOULD  
CONSIDER A  
DELL 386 SYSTEM,  
DESPITE ITS  
SUSPICIOUSLY LOW  
PRICE.





Our 386-based System 310 is priced about 35% less than comparable systems. Which may make you wonder if we've left something important out. Like high performance. Well we haven't.

This advanced 32-bit machine is fully IBM PC compatible. And has all the latest technology. Including a cache memory controller and high performance drives. So it's among the fastest 386-based systems available. With more advanced features than you'd get in systems that list for up to \$3000 more.

Like Compaq's.

If you take a closer look at our specifications, you'll see what we mean. Because this is the system that PC Magazine (6/14/88) described as "fast enough to burn the sand off a desert floor."

But as you'll soon see, speed isn't the only reason to buy from us. Or even the best.

### THE FIRST PERSONAL COMPUTER THAT'S TRULY PERSONAL.

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

**TOLL-FREE SUPPORT  
AND ON-SITE SERVICE  
INCLUDED IN THE PRICE.**

Every Dell system includes the

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

And if your system requires hands-on service, a technician from Honeywell Bull will be at your location the next business day. At absolutely no charge to you? Because included in the price of your system is a full year of on-site service.

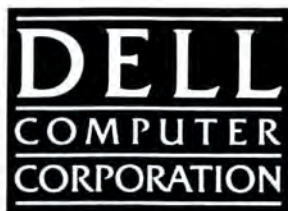
But that's not all. You also get our 30-day money-back guarantee. As well as our one-year limited warranty on parts and workmanship.

### AND IF YOU STILL THINK YOU GET WHAT YOU PAY FOR, CONSIDER THIS.

When you buy or lease from Dell, you buy directly from our manufacturing facility in Austin, Texas. Which means we eliminate dealer markups, allowing us to give you a lot more 386 for less. We can even design a custom lease plan for your business, which gives you another way to save.

Of course, giving you more computer for less money is the idea behind every Dell system.

Review all of them in detail. Then call us at (800) 426-5150 to order the system that's right for you.





# TO ALLAY YOUR SUSPICIONS



**THE DELL 20 MHz  
386 SYSTEM 310.**

For business users who need a 386 system, this is the best combination of performance and value available. Running at 20 MHz, this 32-bit system is faster than the IBM PS/2 Model 80 and the Compaq 386/20. With its high performance disk drives and Intel Advanced 82385 Cache Memory Controller, it brings a new level of performance to complex spreadsheets and databases. As you might expect, it runs windowed software at extremely high speed. It's also well-suited for desktop publishing applications, or as a network file server.

#### STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- 1 MB of RAM\* expandable to 16 MB† using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

#### OPTIONS:

- 20 MHz Intel 80387 math coprocessor.
- 20 MHz WEITEK 3167 math coprocessor.
- 1 MB or 8 MB† memory upgrade kit.
- 2 MB or 8 MB† memory expansion board kit.

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

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



**THE DELL 20 MHz  
286 SYSTEM 220.**

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

#### STANDARD FEATURES:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM\* expandable to 16 MB† (8 MB† on system board).
- Page mode interleaved memory architecture.
- Integrated diskette and VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports integrated on system board.
- 3 full-sized industry standard expansion slots available.

#### OPTIONS:

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

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

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



**THE DELL 12.5 MHz  
SYSTEM 200.**

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

#### STANDARD FEATURES:

- 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB† (4.6 MB† on system board).
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 6 industry standard expansion slots.

#### OPTIONS:

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

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

#### \*PERFORMANCE ENHANCEMENTS (SYSTEMS 310 AND 220):

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

†Using 1 MB SIMMs. Inquire as to availability.

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



# PLEASE CALL 800-426-5150.

## YOUR TOTAL SATISFACTION IS GUARANTEED.

Dell offers a complete line of systems, peripherals and software.

And whatever you choose, you must be absolutely, totally satisfied with it. If not, simply return it within the first 30 days for a money-back refund. No questions asked. We call this our Total Satisfaction Guarantee. And it's just one facet of a service, support, warranty and leasing program that's the most comprehensive in the industry.

## SUPPORT IS A FREE PHONE CALL AWAY.

Also included in your system price is our toll-free support line, where our team of technical experts can answer your questions, or diagnose problems. The support line is open every business day from 7AM to 7PM (CT). Simply dial (800) 624-9896.

## ON-SITE SERVICE IS INCLUDED IN YOUR SYSTEM PRICE.

For those rare problems that can't be handled over the phone, we'll send a service technician to your location by the next business day. At absolutely no charge to you.<sup>2</sup> Because included in your system price is a year's worth of on-site service from Honeywell Bull's nationwide network. Economical service extensions are also available.

## ONE-YEAR WARRANTY.

Dell offers a one-year limited warranty, which warrants each system we manufacture to be free of defects in materials and workmanship for one full year. During that period we will repair or replace any defective products returned to our factory.

## MAYBE YOU SHOULDN'T BUY ONE, AFTER ALL.

For a lot of companies, leasing our systems is an even better idea. It gives you 100% financing, so you don't tie up your working capital. Or your available credit lines. (As you know, leasing often lets you enjoy tax advantages.) And we guarantee fixed rates, so you know exactly how much to budget every month. We can even custom design a lease plan to fit the exact needs of your business.

So for the complete terms of our Honeywell Bull Service

Contract, Satisfaction Guarantee, Warranty, and leasing plans, write: Dell Computer Corporation, 9505 Arboretum Blvd., Austin, Texas 78759-7299.

## LASER PRINTERS AND MORE.

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

### LASER PRINTERS.

Laser System 150, 15 pages per minute:	\$5,995.
Laser System 80, 8 pages per minute:	\$3,295.
Laser System 60, 6 pages per minute:	\$2,195.

All Dell laser printers come with 1.5 MB RAM, full-page 300 DPI graphics, and have 31 standard fonts (7 resident and 24 down-loadable from diskette). Dell laser printers also provide Hewlett-Packard LaserJet, Epson/FX, IBM Proprinter and Diablo 630 emulations.

### DOT MATRIX PRINTERS.

Printer System 800:	\$699.95.
Our highest resolution text and graphics, 24-pin dot matrix printer. Draft quality at 200 cps. Letter quality at 66 cps. Parallel and serial interfaces. Wide carriage.	
Printer System 600:	\$499.95.
9-pin dot matrix. Draft quality at 240 cps. Near-letter quality at 60 cps. Parallel interface. Wide carriage.	
Printer System 300:	\$199.95.
9-pin dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Parallel interface. Narrow carriage.	

### OPERATING SYSTEM SOFTWARE.

Dell Enhanced Microsoft® MS-DOS® 3.3:	\$119.95
Dell Enhanced Microsoft MS-DOS 4.0:	\$149.95
(Both MS-DOS versions with disk cache and other utilities)	
Dell Enhanced MS® OS/2 Standard Edition 1.0:	\$324.95

TO ORDER, PLEASE CALL  
**800-426-5150**  
IN CANADA, CALL 800-387-5752



## REVIEW



The best hardware buys of the year: Everex, Zenith, and Paradise combine in PC World's 20-MHz Dream Machine

### 118 **Surprise Values at 20 MHz**

*Eric Knorr*

Ready to make the jump to a 386? *PC World* puts six 20-MHz systems to the test and comes up with some surprising winners.

### 134 **Laptops With Storage to Spare**

*John Diebold*

Hit the road, Jack—and bring your data with you. We take seven battery-powered laptops for a spin, each packing a 20MB hard disk and desktop power.

### 146 **VGA Boards—The Second Generation**

*TJ Byers*

Want VGA quality without a PS/2? Don't sweat it—you can get high resolution and a broad color palette with one of ten adapters for under \$800.

### 154 **VGA Monitors—Cheap and Smart**

*TJ Byers*

*PC World* takes a hard look at 15 VGA monitors and comes up with no less than 4 Best Buys.

### 170 **The Software Shelf**

*Edited by William Rodarmor*

- *Agenda*—a personal information manager with power, if you can harness it
- Costly but capable, *IBM Interleaf Publisher* suits LAN work groups
- *Framework III* performs brilliantly in the integrated ring
- *Flight Simulator 3.0* adds thrills and scenery to the ride
- For a mere \$8, *Mah Jongg* provides hours of pleasant distraction
- *Test Drive* lets you unleash your wildest driving fantasies
- Armchair astronauts: Blast off with *Apollo 18* on a mission to the moon

## NEWS

### 13 **Top of the News**

*Mike Hogan*

- AMD challenges Intel with 286 chip
- Lotus launches DOS shell/text-search package
- The MarqSystem combines mouse, scanner, and OCR device in one
- *Alpha/four* will bring relational capabilities to flat-file management

### 81 **Industry Outlook**

*Edited by Eric Bender*

- Major vendors unveil EISA spec that threatens Micro Channel
- OS/2 sales are slow, applications sparse
- WordPerfect's marketing smarts spell profits
- Acer takes a fighting stance on clone sales

### 92 **Preview**

- Low on features but a breeze to use, Samna's *Ami* word processor/desktop publisher proves that less can be more
- Graphics importing, page previews, and deft document handling are just a few of the nice touches Microsoft brings to *Word 5.0*

### 98 **Product Outlook**

*Edited by Mike Hogan*

- The HP LaserJet IID spiffs up paper handling while keeping a lid on price
- The ALPS Allegro 24 flat-platen printer takes on odd-size items with nary a paper jam
- *Ronstadt's Financials* offers budgeting and financial projection tools for small businesses
- Emerald Systems' tape backups squeeze full-height capacity onto half-height boards

### 106 **Briefly Noted**

- Epson's new FX printers are faster, smarter, and quieter than their forebears but don't cost a penny more
- *Windows* users can whip files into shape with *PubTech File Organizer*
- Flat-file manager *OnTrak* makes light work of list keeping
- HDC's *Windows Manager* turns you into a desktop efficiency expert

### 110 **Update**

- AboveBoard Plus, AboveBoard Plus I/O, AboveBoard 2 Plus
- *PC-Write 3.0*
- *DeskMate 3.0*, *DeskMate Workgroup Companion*
- *LetterMaster 4.0*
- *Publisher's Type 1.1*
- *pcANYWHERE III*



## FEATURE

### 196 Who Likes the PS/2?

*Marina Hirsch*

Twenty months after the PS/2's splashy debut, more than a million users have taken the plunge. How do they like the ride on the MCA bus?

### 200 Buyers' Guide: Everything You Need to Upgrade Your PS/2

*Scott Spanbauer*

More than 350 boards and storage devices help you get the most out of your PS/2.

### 210 Buyers' Guide: 20-MHz 386 Systems

*Eric Knorr*

In a market rife with 20-MHz 386s, this survey of 60 systems will help you choose the one that fits your price/performance needs.

### 218 Sun's 386i: Promise for Professionals

*Michael Goodwin*

Setting up a network doesn't have to mean suffering. Sun's workstation alternative has potential for offices that can afford hardware but not downtime.



New VGA boards offer dazzling displays and a generous assortment of extended modes, page 146



Desktop power in truly transportable packages, page 134

Cover photograph by  
Fred Stimson

## PERSPECTIVES

### 21 Richard Landry

The Editor's wish list for 1989.

### 29 Letters

Reviewing the reviewers.

### 45 David Bunnell

1988 was not a vintage year.

### 65 Stewart Alsop

The graphic user interface re-vamps the way we think about computing.

### 71 On IBM

*William F. Zachmann*

Will the MCA bus keep IBM in the driver's seat? 1989 should tell.

### 322 Another Angle

*Brian Camenker*

Why can't they design a PC that's truly easy to use?

## DEPARTMENTS

### 6 In This Issue

Our special hardware issue proves that high end doesn't have to mean high price.

### 225 Consumer Watch

*Anita Amirrezvani*

Learn how to avoid ambleware and protect yourself when vendors don't deliver.

### 237 The Help Screen

*Karl Koessel*

Searching backward through data bases isn't as simple as ABC.

### 247 Star-Dot-Star

*Edited by Tom Swan*

New debuggers tap the speed of the 386.

### 260 PC World Catalog

A convenient buying guide to PC products and services.

### 281 Advertisers Index

### 283 Products Featured in Editorial

More information for PC World readers.

### 289 PC World Computer Products Shopping Guide

A handy mail-order shopping guide.



**John Griffin**  
President & Publisher

**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 Editors:** Eric Brown, 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 Assistants:** Nancy Endy, Susan Lusty  
**Contributing Editors:** Stewart Alsop, Stephen A. Blumenthal, TJ Byers, Robert M. Carr, Steven Cook, Dennis Dykstra, Judy Getts, Ken Greenberg, Michael Harper, Mark Henricks, 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:** Claudia Steenberg  
**Associate Art Director:** Gregory Silva  
**Assistant Art Director:** Robert Kanes  
**Senior Design Associates:** Barbara Adamson, Matthew Nielsen

## 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 Director:** Heather Martin  
**Single Copy Sales Director:** 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 Analyst:** Ray Petsche  
**Research Assistants:** Joe Capko, Bill Segovia

## Marketing

**Director:** JoEllen Bokar  
**Administrative Assistant:** Sumie Nimomiya  
**Copywriter:** Doug Green  
**Marketing/Events Coordinator:** Kim Kurata

## Administration

**Director:** Janet McGinnis  
**Director of Finance:** Vicki Peilen  
**Accounting Mgr.:** Pat Murphy  
**Admin. Services Mgr.:** Joseph Wollenweber  
**Employee Relations Mgr.:** Shelly Ginenthal

## Corporate PCW Communications, Inc.

**David Bunnell**  
Chairman

**Lee Vidmer**  
President

**James E. Martin**  
Vice President

**Jacqueline Poirier**  
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 80322-5029. 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/336-1141, 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.





# Touch The Cutting Edge Every Month-Only \$6.65

## Software to Sharpen Your PC Skills

BIG BLUE DISK is one 3 1/2" disk or two 5 1/4" disks full of quality software for your IBM® PC or compatible, delivered to your door every month for only \$6.65 an issue. BIG BLUE DISK keeps you on the cutting edge of the rapidly changing world of software for your PC. Every issue brings you new useful applications for home or work as well as entertaining games and features. Each month you'll receive from five to ten quality, original programs (not public domain) depending on the size of each program.

## Get the Most From Your PC

Every month you can rely on the vast experience of our editors and programmers to provide you with carefully selected software **you can use**. Each monthly issue contains valuable features such as: home financial programs, recipe organizers, accounting packages, word processing applications, educational programs and games. With our easy-to-follow documentation on disk and our unique menu system, you'll master each new application with confidence and ease.

## Your Best Software Value

Without investing a fortune, BIG BLUE DISK will convince you that your personal computer is the most versatile and powerful tool you own. You'll learn more about your PC, its capabilities, and available software than you now believe possible. At \$6.65 an issue—you just can't find a better software value for your PC.

## FREE SOFTWARE— With a 3-Month Trial Subscription

BIG BLUE DISK is sent to you each month on one 3 1/2" disk or two 5 1/4" disks. Try us for three months for only \$19.95 (that's only \$6.65 an issue) and receive free the "Best of BIG BLUE DISK". This disk contains the very best programs from past issues of BIG BLUE DISK.

IBM is a trademark of International Business Machines Inc.  
PrintShop is a trademark of Brotherbund Software

**Circle 66 on reader service card**

## Guaranteed Satisfaction or Your Money Back

As software publishers since 1981, we at SOFTDISK, INC. guarantee the quality of all our software products. If you are not fully satisfied with our software, return your first issue for a full refund. The "Best of BIG BLUE DISK" is yours to keep. You can't lose. Order today with the attached coupon or call toll free 1-800-831-2694.

**Call Toll Free 1-800-831-2694**

### Contents of Issue #24 (Available as a back issue)

**Small Business Accounting System • Poker Solitaire  
Mandelbrot Microscope • Calorie Calculator  
Advanced Algebra Toolbox • PrintShop™ Graphics  
Marketplace • plus much more!**

**YES!** Please rush me my free *Best of BIG BLUE DISK* and start my three-month trial subscription for only \$19.95 postage paid. (Canada/Mexico U.S. \$24.95, Overseas U.S. \$27.95). Make checks payable to Softdisk, Inc. (Louisiana residents add 4% sales tax).

☐ BIG BLUE DISK™ for IBM® PC and compatibles (Two 5 1/4" disks)

☐ BIG BLUE DISK™ for IBM® PC and compatibles (One 3 1/2" disk)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip + 4 \_\_\_\_\_

Home Phone (\_\_\_\_) \_\_\_\_\_ Ext. \_\_\_\_\_

☒ Discover ☐ AmEx ☐ VISA/MC ☐ Payment Enclosed (U.S. funds only!)

Card # \_\_\_\_\_ Exp. \_\_\_\_\_

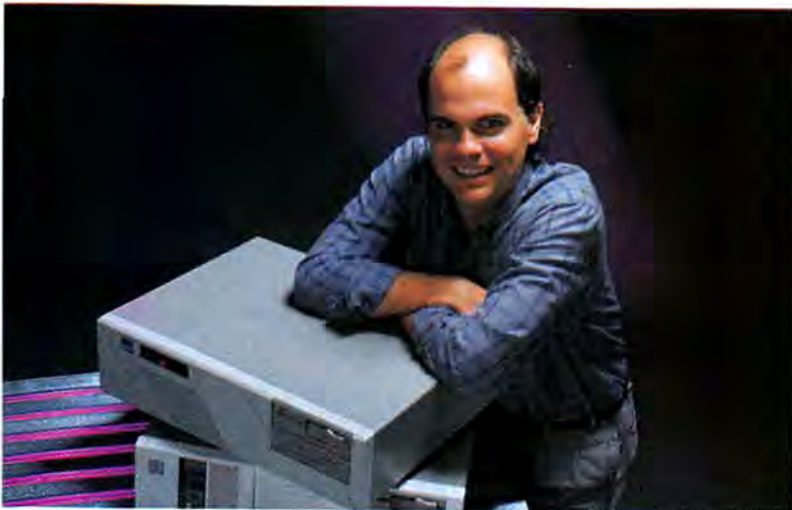
Signature \_\_\_\_\_

**SOFTDISK, INC.**

**P.O. Box 30008 • Shreveport, La. • 71130-0008 PW128**



# The Stuff Dreams Are Made Of



Senior Editor  
Eric Knorr

**S**ix 20-MHz 80386 systems; 15 VGA monitors; 10 VGA boards; 7 battery-powered, hard disk-equipped laptops. No doubt about it—our end-of-the-year all-hardware issue covers the high end.

Of course, high end doesn't necessarily mean high price. When we assembled the best from this special issue into the dream system that graces this month's cover, we found some unexpected values.

To Senior Editor Eric Knorr, for example, the high-powered systems that square off in our lead review represent some of the best bargains in the world of computing.

Knorr knows his way around a 386 motherboard: In the past two years, he's reviewed virtually every important new system that uses Intel's 32-bit pride and joy, including Compaq's Deskpro 386 and 386/20, the IBM PS/2 Model 80, Dell's System 310, the AST Premium/386, and many more. That's some high-powered hardware, especially for someone who once told a group of industry analysts that his favorite word processor was EDLIN.

"These systems are almost a commodity item now," says Knorr. "And the high-performance Everex isn't even the most expensive system we looked at. More important, the 386

is a stable platform for the future. If you're serious about multitasking—with *Windows* or with *OS/2*—you need that much power."

So, in many ways, a 20-MHz 386 is the safest investment in personal computing.

And that's not the only hardware bargain we found. Our dream system's VGA display adapter/monitor combination represents another good buy. "The VGA as a standard promises to be around a long time," Knorr says, "especially with the extended modes of most VGA cards today. And the VGA monitors we looked at cost significantly less than multiscan monitors."

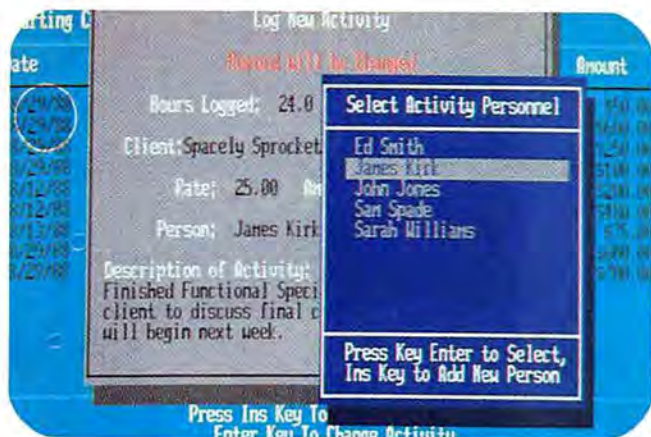
In the final analysis, it's value that counts. After all, the *real* dream system is the one that won't give you nightmares a year from now.

Also in this issue: Marina Hirsch measures the satisfaction of users who voted with their pocketbooks for IBM's MCA bus ("Who Likes the PS/2?"). If you fall into that category, don't miss this month's bonus Buyers' Guide, "Everything You Need to Upgrade Your PS/2"—the most complete collection of PS/2 peripherals ever assembled. And we've got the perfect antidote to the year-end number-crunching blues: *Software Shelf* reviews of five dazzling new games, including Microsoft's long-awaited update to *Flight Simulator*. Happy landings! ●

*Ed Bott*

Ed Bott  
Managing Editor





Create your own programs.

Or recreate ours.

## Introducing The Clarion Personal Developer. A program generator for the non-programmer.

Clarion's Personal Developer is a software package that lets you conceive and create your very own programs. Or customize the eight applications that come as part of the Personal Developer package.

So you no longer have to settle for someone else's idea of how to manage your files. Or track your investments. Or process your orders.

Screens like you like 'em. Calculations without equal. Reports worth writing home about. All without writing a single line of code.

### Quick Start.

With Personal Developer's Quick-Start module, fill in the blanks on a single screen, and in minutes you have created your own complete, running applications.

For more complex applications, Quick-Start develops a powerful foundation you can always embellish.

### Remember fingerpainting?

If a magenta menu is on your menu, indulge yourself. Make a screen green. Or create a scrolling look-up you'll like to look at. Even screens in monochrome never looked better.

With Personal Developer's palette, you'll make programs that are as beautiful on the outside as they are on the inside, modify them whenever you want – and have fun doing it.



### What's beauty without brains?

Personal Developer lets you do things only a programmer could do before. Relate data from multiple files. Incorporate locate and filter functions. Use computed fields, memory variables and "hot-keys." Even produce customized reports and forms.

**Eight ready-to-run applications – as is, or as you like 'em.**

Use them right out of the box. Or use them as models for programs you'll create with Personal Developer. Or use Personal Developer to change them, rearrange them, and turn them into a library of proven programs tailored to your needs.

### Copy and distribute free.

Every program you create with Personal Developer can be copied and distributed at absolutely no cost. So you can give them away to your close friends – or work out different arrangements for your not so close friends.

But first, you'll have to contact your Clarion dealer. For the one nearest you, call toll free, 1-800-354-5444.

# CLARION

*Personal* DEVELOPER™

#### System Requirements:

Requires an IBM PC/XT, PC/AT, or PS/2, or true compatible, with 512KB of memory, a hard disk file and a diskette drive. (Copies of your programs may be made for diskette-only systems.) The Clarion Personal Developer supports the following monitors: monochrome, CGA, EGA, and VGA. DOS 2.1 or higher is also required. IBM is a registered trademark of International Business Machines Corporation. PC/AT, PC/XT, PS/2 are trademarks of International Business Machines Corporation. Clarion Personal Developer and Clarion Software are trademarks of Clarion Software.

Copyright 1988 Clarion Software. Clarion Software, 150 East Sample Road, Pompano Beach, FL 33064

Suggested retail price \$169 SPECIAL INTRODUCTORY PRICE \$139

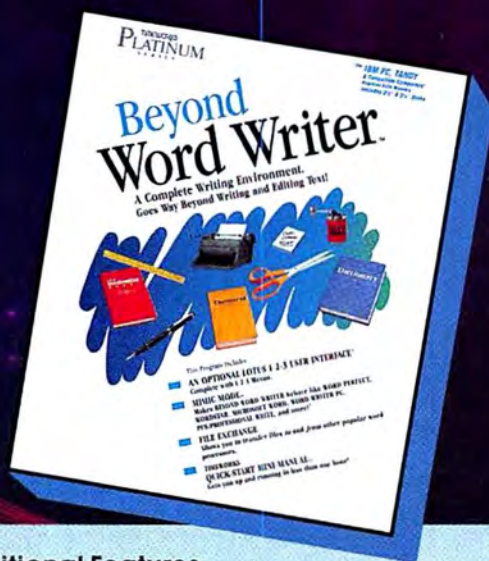
Circle 38 on reader service card



# Nobody in this world needs another word processor.

So enter a world beyond that.

**Beyond Word Writer...**  
A Complete Writing Environment.  
Goes way beyond writing and editing text.



## At a Glance:

BEYOND WORD WRITER is not your typical word processor. It places you in a highly intuitive writing environment which takes you far beyond simply writing, editing and printing documents.

This includes:

- **An Optional Lotus 1-2-3 Interface, complete with 1-2-3 menus.**
- **A Mimic Mode**—Makes this program behave like most other popular word processors. No need to learn new commands.
- **A Transparent User Interface** that gives you clear passage from function to function, making BEYOND WORD WRITER an extremely fast and highly efficient program to use.
- **A File Exchange Feature** that allows you to easily transfer files to and from other popular word processors.
- **Unique Time-Saving Features** such as 3-Way OOPS! Control; multiple document windows; and built-in Macros.
- **Writing Shortcuts** that match your "speed of write" to your "speed of thought."
- **Multiple Document Windows** that let you work on several documents simultaneously—even while you're printing out!

Plus, simply press the key and you have 3 Spell Checkers (with a 100,000-word dictionary); a 240,000 synonym Thesaurus; an on-screen Outliner; a Proofreader; and so much more.

By using BEYOND WORD WRITER's advanced formatting features—for example, proportional spacing, and as many font styles as your printer supports—your documents become polished and professional.

## No Word Processing or Computer Experience Necessary

For all its technical brilliance, BEYOND WORD WRITER is refreshingly easy to use. No prior experience is really necessary. Its transparent User Interface, Special Time-Saving Features, and the Quick-Start Mini-Manual all combine to get both the novice and power computer user up and running in less than one hour!

Circle 151 on reader service card

## Additional Features:

- **A Readability (Fog) Index**—Shows the educational level required to understand your writing.
- **Sorting**—in ascending or descending alphabetical order.
- **User-Defined Abbreviations**—Reduces long names and phrases to 2 keystrokes.
- **Background Printing**—Prints while you work.
- **Bookmarks**—Tells you where you left off.
- **Automatic Timed Back-up**—Safeguards against lost data.
- **Advanced File Management**
- **Title Pages**
- **On-Screen Multiple Columns**
- **Line and Box Drawing**
- **Document Linking**
- **Automatic Index Generation**
- **Automatic Table-of-Contents Generation**
- **Widow & Orphan Control**
- **WYSIWYG Display**
- **Automatic Footnote Numbering**
- **Automatic Page Numbering**
- **International Characters**
- **Ruler Bars**
- **Column Addition**
- **Automatic Date Entry**
- **Cut, Copy & Paste**
- **Password Protection**
- **Prints Multiple Copies**
- **Book Printout with Special Margins**
- **Variable Line Spacing**
- **Soft & Hard Hyphenation**
- **User-Defined Page Breaks**
- **Integrated Mouse Support**
- **On-Screen Centering**
- **On-Screen Right Justification**
- **Decimal Tabs**
- **Context Sensitive Help Screens**
- **File Unerase**
- **And much, much more**

Suggested Retail Price ... \$199.95 Includes 5¼" & 3½" disks.

Ask your Dealer for a demonstration today—  
or order direct from Timeworks: 1-312-948-9202.



444 Lake Cook Rd.,  
Deerfield, IL. 60015-4919,  
312-948-9200

©1988 Timeworks, Inc. All Rights Reserved.

With Timeworks You Get:  
• Free Customer Technical Support  
• A Money Back Guarantee



# "Dear Santa, Anything from Curtis!"



**Typing Made Easy**  
Curtis Clip:  
CC-1 Retail...\$6.95



**Printing Made Easy**  
Universal Printer Stand: PS-1 Retail...\$24.95



**Protection Made Easy**  
Safe-Strip Surge Protectors: Retail... (SP-3) \$29.95  
SPF-3 (EMI-RFI Filtered) \$39.95



**Fixing Made Easy**  
Computer Tool Kit:  
TK-1 Retail...\$29.95



**Organization Made Easy** 5 1/4 & 3 1/2 Files  
DB-1, 2 (non-locking) \$9.95  
DBL 1, 2 (locking) \$12.95



**Maintenance Made Easy**  
Cleaning Kits: Retail... \$19.95  
(CK-1, 5 1/4) (CK-2, 3 1/2)

Curtis' special \$6.95 to \$39.95 gift selection of microcomputer accessories is perfect for anyone who uses a computer. If you're buying for a computer-user, or would just like to drop a hint, check out the great gift ideas from Curtis at the dealer nearest you. When you give a gift from Curtis you'll be as popular as Santa. Thank you for thinking of Curtis.

Curtis products are available nationally from leading Dealers, Distributors, and Retail Chains.  
In Canada: Personal Computer Assoc. Inc., P.O. Box 235, Ajax, ONT, L1S 3C3, (416) 427-6612  
**For the Curtis dealer nearest you call (603) 532-4123 Ext. 99**

Manufacturing Company, Inc.

CURTIS

30 Fitzgerald Drive, Jaffrey, NH 03452  
A subsidiary of Rolodex Corporation

An  
Insilco  
International  
Specialty  
Company



# What you've been doing.



*On your 286,  
you've been making any task look complicated.*



*On your 386,  
it hasn't been incredibly exciting having all that power.*

If the screens on the right look more intriguing to you than those on the left, you're ready for Microsoft® Windows.

Windows opens up the world of visual thinking to all 286 and 386 owners by offering the power of graphics.

Everything you can do on your PC, you can now do better, faster and with greater imagination. Whether you're creating documents or trying to get a clearer picture of your work.

What used to take complicated key-strokes can now be accomplished with the simple click of a mouse. With Microsoft Windows, you access pull-down menus. Simultaneously work with different programs as well as cut and paste between them to create graphic examples within different bodies of text. And what you see on the screen will appear on your printed page.

And once you've learned Microsoft Windows, you'll have the basis for scores of other programs because all the countless new Windows applications are based on the same easy, logical format.

Since Microsoft Windows virtually looks and works like MS® OS/2 Presentation Manager, you won't have to worry about it becoming obsolete in a couple years. We made both systems compatible. So, in the future, you'll be able to share

data between them. And your knowledge of Windows will give you a jump on learning MS OS/2 Presentation Manager.

You'd expect a program this powerful to require a more powerful machine. But we consistently create software that makes

*Stop playing with  
ancient instruments.  
Now cutting and pasting is  
a simple point and click  
with the Microsoft Mouse.*



# What you could have been doing.



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



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

the best use of your present hardware.

For example, Microsoft Windows/286 will work with as little as 640K and instantly make your machine more sensitive, intuitive and highly visual. It gives you the ability to run every Windows application available.

And with access to all those powerful programs, you'll be able to extend the life and usefulness of your 286 well beyond the introduction of MS OS/2 Presentation Manager. With version 2.1 you also get the benefit of increased speed. So you'll blaze through Windows applications up to 87% faster.

Microsoft Windows/386 will give you everything that Windows/286 gives you. Plus multitasking with most DOS applications. Now you can finally utilize the speed and power of any 386 machine.

Imagine creating a complicated spreadsheet. Then while a macro is being run, open up a word processor. Type a document, open and work with a graphics program. Cut and paste between programs and even call up electronic mail. And still be able to check on the status of your spreadsheet at any time.

Considering all you can do with Microsoft Windows, you have only one question to ask yourself.

What have you been doing without it?

**Microsoft®**





Feature:	dBASE	ORACLE
SQL	Promises, no dates	IBM DB2 Compatible
Mainframes	No Way	IBM MVS & VM/CMS
Minis	Nope	DEC, HP, Sun, etc.
PCs	All, PC Jr. too	286 & 386 PCs
MS/DOS	<640K programs	>640K programs
OS/2	Still waiting	Shipping
Multituser	Primitive	Mainframe quality
Networking	PC Nets only	PC, mini & mainframe
Fault Tolerant	You must be kidding	CPU & Disk Recovery

# Back By Popular Demand The Last DBMS

Only \$199\*

(Offer ends December 31, 1988)

**ORACLE®**  
COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-ORACLE1, ext. 4617 or  
an Oracle MasterVAR today.

\*Licensed for development only.  
Copyright © 1988 by Oracle Corporation.  
ORACLE and SQL\*Forms are registered trademarks and SQL\*Calc, SQL\*Plus, and Pro\*C are trademarks of Oracle Corporation. The other companies mentioned own numerous registered trademarks. TRBA

20 Davis Drive, Belmont, CA 94002 • World Headquarters (415) 598-8000 • Calgary (403) 265-2822 • 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 852-5-266846

ORACLE has just climbed past Ashton-Tate in a plan-to-purchase survey conducted by Datamation. ORACLE® is the #1 PC database product at IBM mainframe sites, outpolling dBASE by 3 to 2.

Surprising? Not really. Oracle delivers power, not promises.

For Ashton-Tate, the SQL database world is a lot of talk. They're struggling to shoehorn SQL into their strategies, or talking about offering SQL translators on top of rudimentary file managers. Ashton-Tate's dBASE IV doesn't talk to SQL database products. Not even SQL Server.

ORACLE talks a lot, too. Except when we talk, it's to IBM mainframes. And minicomputers from DEC, HP, DG, Wang, Prime and others. Or UNIX computers from Sun, Apollo, Sequent, AT&T, Pyramid, and 50 others. Not to mention PC and Macintosh LANs.

Talk is only cheap when you have nothing to offer. But Professional ORACLE has a lot to offer.

The same full-function database manager and network-ready architecture that runs on our mini and mainframe products. And a wealth of productivity tools for building portable applications:

- SQL\*Forms® — A 4th-generation application development environment
- SQL\*Calc™ — A Lotus work-alike with a built-in ORACLE gateway
- SQL\*Plus™ — An interactive SQL interface for DBA and reporting tasks
- Pro\*C™ — For customizing ORACLE applications with C programs

So bail out of dBASE and all the others, and talk to Oracle instead. We'll talk about products, not promises. Call today for your copy of full-function Professional ORACLE for \$1295 with a 30-day money back guarantee, or the Developer's version for only \$199.\*

**Dear** Oracle Direct • 20 Davis Drive  
Belmont, CA 94002  
**Call 1-800-ORACLE1 ext. 4617**

Enclosed is my ☐ check or ☐ VISA ☐ MC ☐ AmEX credit card authorization. I have a hard-disk 286/386 PC running DOS 3.0+ in 640 KB, with at least 1.5 MB of Extended Memory. Please send me the following:

- \$\_\_\_\_\_ \$199 Developers' version\*  
\$\_\_\_\_\_ \$1295 Professional Oracle  
\$\_\_\_\_\_ Please add appropriate sales tax.  
\$\_\_\_\_\_ Total enclosed/authorized  
(Offer valid only in U.S.)

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET (No P.O. Boxes, please) \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE \_\_\_\_\_

CREDIT CARD NO. \_\_\_\_\_ CARD EXPIRATION DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_ TODAY'S DATE \_\_\_\_\_ PC WORLD



## TOP OF THE NEWS

## AMD Attacks Intel

*Rival Chip  
Maker Takes  
Aim at the  
80286 Market  
and Intel's  
80386SX Chip*

While the Intel 80386 chip is rapidly replacing the 80286, the industry still expects 19 million of the latter to ship over the next two years, and Advanced Micro Devices (AMD) hopes to increase its 35 percent share of that market. AMD is scheduled to deliver 12-MHz, 16-MHz, 20-MHz, and 25-MHz CMOS versions of its 80286 processor by mid-1989. A second source for 286s that serves virtually every major PC maker in the world, AMD expects its customers to announce as many as 50 computers based on its current 16-MHz NMOS 286 before year-end. The company is pitting its processor line directly against Intel's 16-MHz 80386SX chip, which can run 32-bit software but has the same external data pathways and addressable memory range as the 80286. Optimized for 16-bit

software, the AMD 80286/16 runs such programs 20 to 25 percent faster than the 80386SX and 5 to 10 percent faster than a full-fledged 80386, claims AMD marketing manager Glen Burchers. Additionally, 80286/16 chips cost system builders about half as much as 80386SX chips. Burchers says his customers predict that systems based on the former should be \$500 to \$1000 cheaper than similarly configured 386SX machines. AMD also has sued Intel, claiming that a 1982 cross-licensing agreement gives it the right to manufacture the 80386 chip (which Intel has refused to second-source). Until that issue is settled, says Burchers, "we want to make it a real painful choice to switch to the 80386SX in terms of price."

## Magellan Aims for Hard Disk Mastery

*Utility Combines DOS  
Shell, Search  
Capabilities*

Lotus Development is launching a DOS shell/information-retrieval utility that incorporates powerful navigation tools designed to let users quickly locate information that may be temporarily "off the map" on a hard disk. Shipping in the first quarter, *Magellan* is a \$149 stand-alone package that employs "fuzzy searching" of indexed files to find specific items of interest that may be lost somewhere out on the hard disk. Rather than building a structured Boolean query, as text-search packages typically require, users start their searches by typing in a series of words likely to appear in the file. (All files to be searched must be indexed with a scheme dreamed up by *HAL* author Bill Gross that builds unusually compact index files, thus saving disk

space.) Because *Magellan* incorporates translation facilities for popular applications, users also can quickly scan the contents of groups of files (say, all 1-2-3 files) one by one in an on-screen window. Once the file of interest is located, a single keystroke brings up the appropriate application with the file already loaded. Alternately, multiple files can be gathered and imported into an application. *Magellan's* DOS shell includes a tree-structure directory, a macro language, and point-and-shoot DOS command execution. Lotus decided that making *Magellan* RAM-resident would increase RAM-cram, as well as the likelihood of incompatibility, and hopes that many users will make *Magellan* their central working environment.

## Integrated Input System Ships

*Hand-Held Device Uses the  
Three Most  
Popular Data  
Input Methods*

San Diego start-up Marq Technologies has introduced an input system that combines a high-resolution mouse, a hand-held scanner, and a hand-held optical character recognition (OCR) device. Marq, which wants to focus on entry of data rather than of text, began shipping the \$199 mouse portion of its modular tool in November along with its \$149 *MarqNavigator*, a windowed user interface for 1-2-3 that remains character based. The vendor plans to ship the OCR and scanner portions of the MarqSystem before April. The four-button Marq-Mouse, which is compatible with market leaders, has two pointer-movement speeds that the user

can toggle between, and a resolution of 600 dpi, compared to the standard of slightly over 300 dpi. Inserting a transparent optics cartridge turns the MarqMouse into the MarqScanner. The user waves the transparent scanning window over an image in a "paintbrush" movement to capture up to 16 shades of gray at 300 dpi. Inserting an OCR cartridge and pushing the left mouse button turns on a reading light and activates the MarqReader. Marq claims a high level of accuracy for its OCR device, partly because the software recognizes any type style between 6 and 14 points.



## Alpha/four Coming

*Alpha Software Prepares a Relational Version of Its File Manager*

**A**lpha Software will ship a new version of its *Alpha/three* flat-file data base in February, but this one will be relational (see *Top of the News*, *PCW*, April 1988). However, *Alpha/four* still won't include the procedural language and open-ended programming capabilities of high-end relational products such as *dBASE IV*, reveals Alpha President Richard Rabins. The package won't even include a traditional application generator—instead, its macro generator recognizes menu selections and imbues them with many common relational data base functions. For example, *Alpha/four* is programmed with 50 of the most common data entry field rules pertaining to field validation and computation, as well as the ability to build smart forms in which

the cursor moves to different fields depending on the data entered in a prior field. Instead of writing their own data base applications, users simply link as many as ten open files to common data base action items via point-and-shoot menus. These user-created sets of open data bases will be capable of one-to-one or one-to-many relationships among their fields. "Programmability is not necessarily a requirement for relational capability," insists Executive Vice President Selwyn Rabins. "The goal is to design a program that can do many of the things that a powerful relational data base can do without forcing the user to write code." The data base should retail for \$495 to \$595 (compared to \$395 for *Alpha/three*, which will still be sold).

## Fax/Modem/Voice Combo Available

*Complete Communicator Covers Telecom Bases*

**T**he Complete PC has validated its corporate name with the introduction of a combination fax, modem, and voice-mail card for \$899. The Complete Communicator includes a 9600-bps group III facsimile board that fits in any 8-bit slot. The board is equipped with version 2.1 of the company's memory-resident fax software—a fax menu that can pop up in most word processors and graphics applications, permitting users to transmit a fax by typing a name and phone number and then hitting the "send" key. The Complete Communicator carries a daughterboard with a 2400-bps Hayes-compatible modem and *Bitcom* communications software. It also has the hardware and software to

support 999 password-protected voice mailboxes. The board sends voice and fax messages and receives them in the background using a single phone line, alerting the user to incoming messages via an on-screen prompt. William Grubb, president of The Complete PC, promises compatibility with the DCA/Intel Communicating Applications Specification (CAS). CAS will provide a standard for application vendors who want to add limited communications capabilities to their programs. The Complete PC also offers the fax board as a stand-alone that can be combined with the modem or the voice-mail answering machine, or both. All will be available during the first quarter of 1989.

## Toshiba Debuts Printers

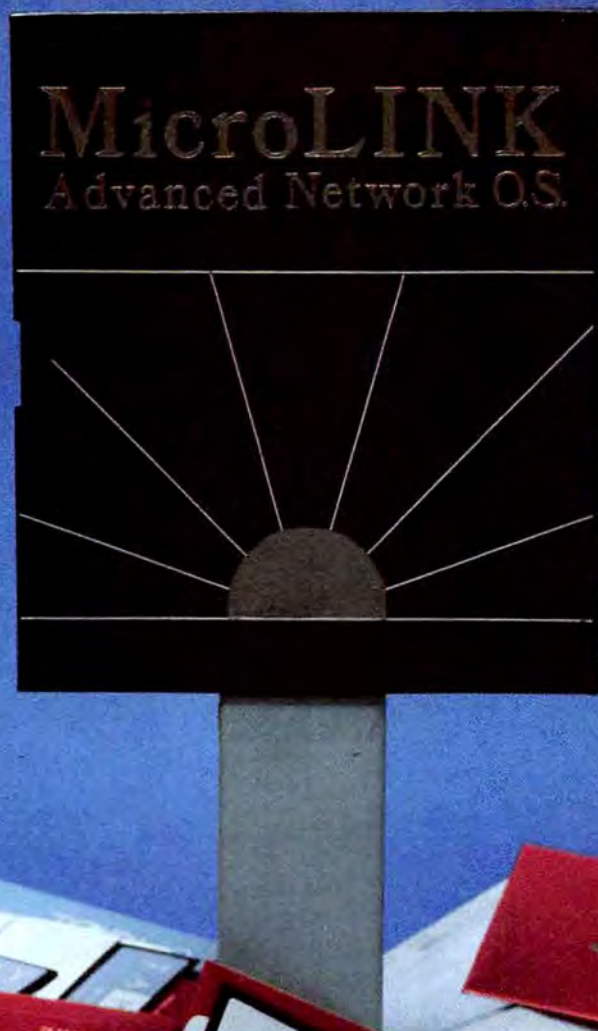
*Dot Matrix Models Offer Portable Letter Quality Printing*

**T**oshiba America has married its two most successful product lines—portable computers and letter quality printers—to create two new downsized 24-pin printers. The ExpressWriter311 transportable printer and ExpressWriter301 portable printer were unveiled in October along with two high-end laptop computers. Scheduled to ship in February, the ExpressWriter301 is a 24-pin dot matrix device that weighs only four pounds, measures about 12 by 5 by 3 inches, and retails for \$489. It is equipped with both built-in rechargeable NiCad batteries and a 12-volt AC adapter/recharger. It gives up only a little speed to desktops: 60 cps draft and 42 cps letter quality printing. On the other hand, its big brother, the ExpressWriter311, prints 180 cps in draft and 60 cps in letter quality mode. Already available, the \$589 24-pin Express-

Writer311 has a trim 12.7-by-16-by-4.8-inch footprint, weighs only 11 pounds, and has a retractable handle. Like the ExpressWriter301, it includes five resident fonts but also accepts 16 optional font cards and has a 16K buffer. In its product sweep, Toshiba also introduced the high-end T5200/100—a 20-MHz version of its popular 80386-based portable with a VGA-compatible gas plasma display and a 100MB hard disk for \$10,999. Similarly, the T1600 becomes Toshiba's most powerful battery-powered portable. Equipped with a 12-MHz 80C286 processor, an EGA-compatible super-twist LCD screen, and battery conservation features, the \$4999 T1600 ships with a fast 27ms 20MB hard drive and 1MB of memory that can be expanded to 5MB. ●



# Are you tired of seeing **RED?**



## **Very High Performance**

If you are tired of seeing red, then you should consider **MicroLINK**.

**MicroLINK** is a very high performance network operating system. In most environments it is 75% faster than the so-called industry leader.

## **Easy to Install & Use**

Unlike most network O.S.'s on the market today, **MicroLINK** is very easy to install and use. Installing a non-dedicated server is no harder than installing a user. Installation takes about 20 minutes for each node.

## **SMB Network Compatibility**

One feature that we feel you will like is **MicroLINK**'s SMB server capabilities. **MicroLINK** will talk directly to any SMB server. (NetPCLan, 3COM, CBIS, Tapestry, etc.). Adding to your existing system has never been so easy.

**For networking without the headache, you should be using  
MicroLINK Advanced Network O.S.**

*For more complete details about MicroLINK call Simple NET Systems, Inc.*

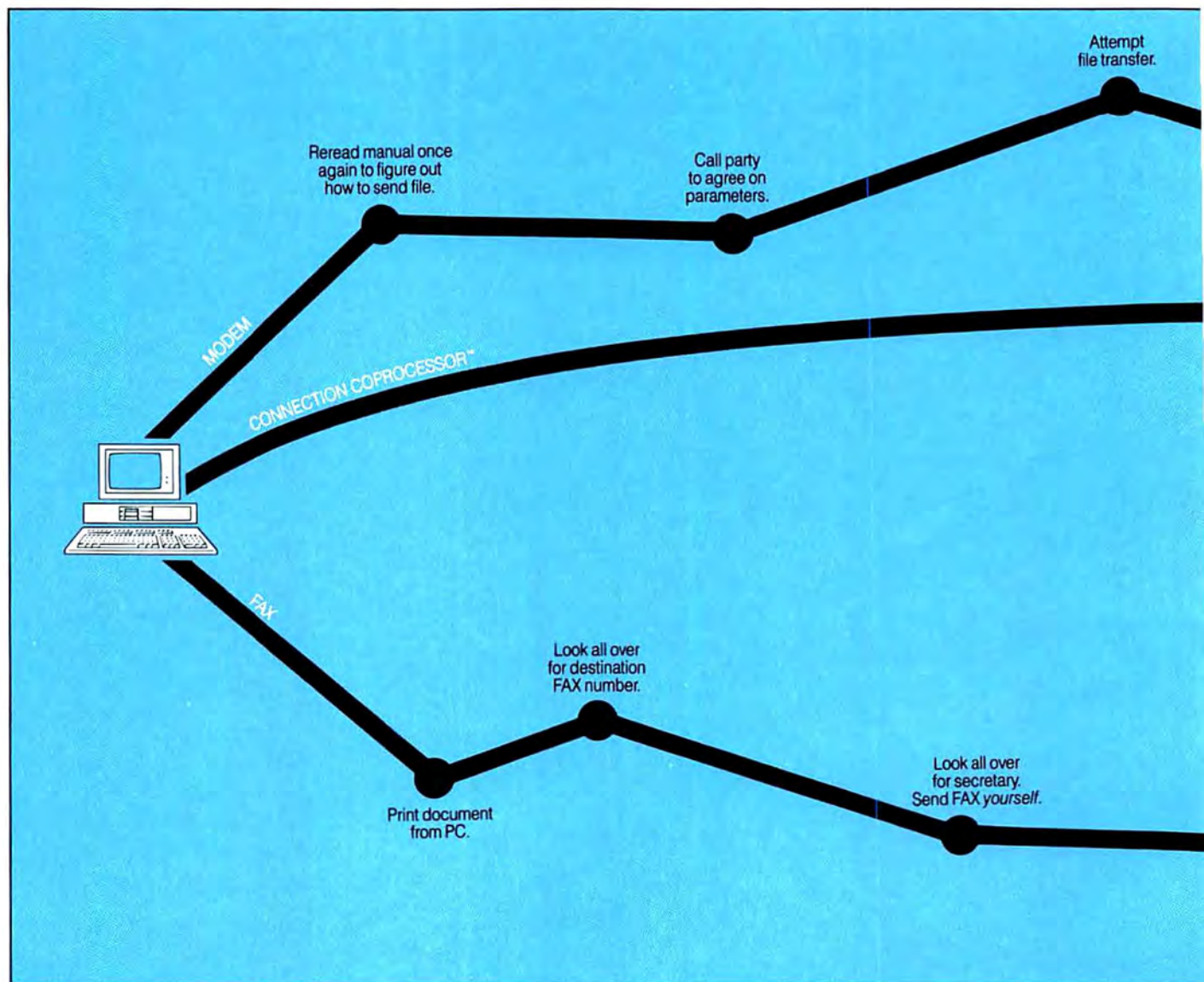
**(800) 262-8010 • IN CALIFORNIA (714) 529-8850 • FAX (714) 529-2413**

**Simple NET Systems, Inc. • 545 West Lambert Road • Suite A • Brea, California 92621**

MicroLINK is a registered trademark of BCSoft Corp. Other brand and product names are trademarks of their respective holders.



# 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.

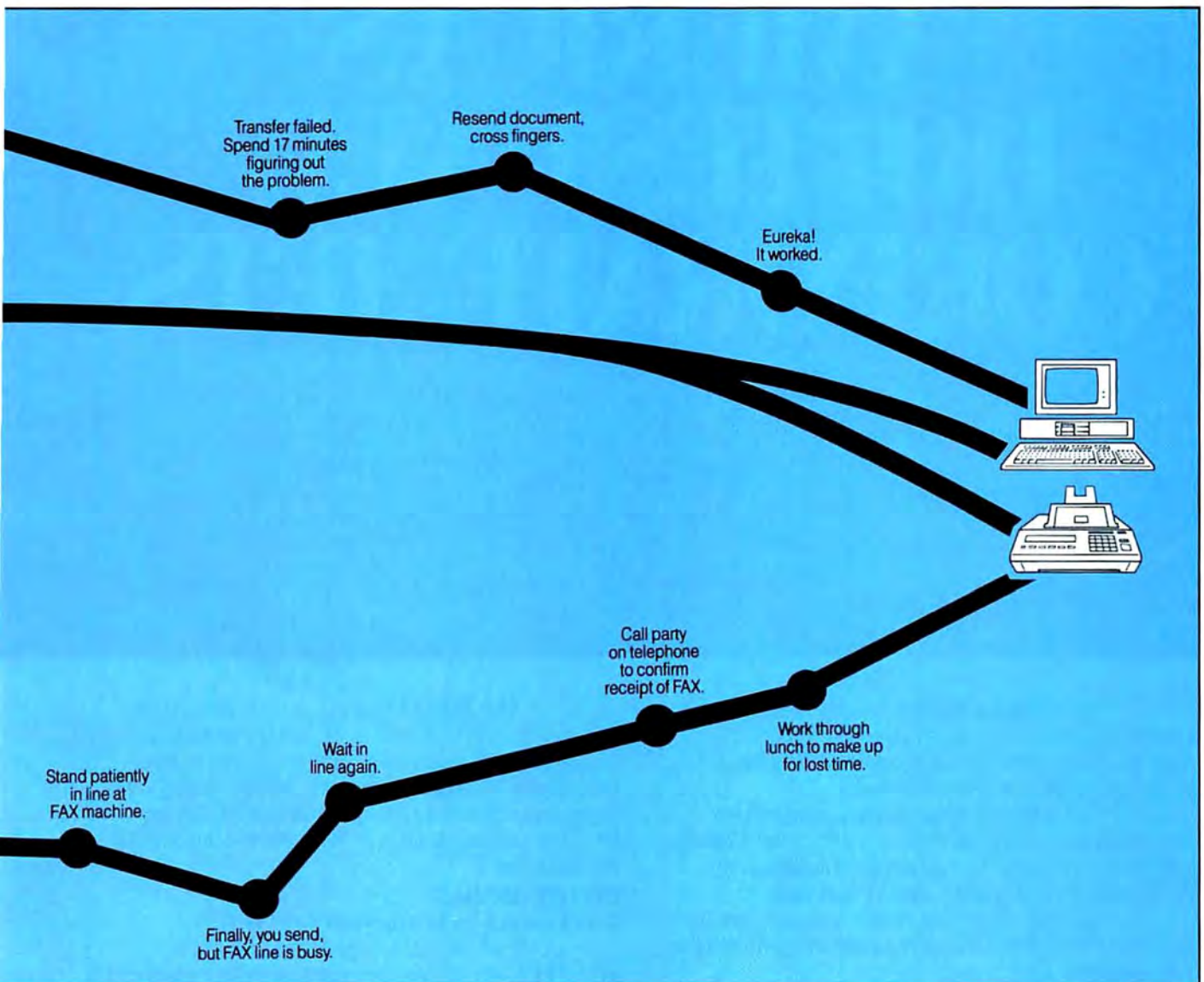
Now your faxes or files can fly cross country. And you can still be zooming around in your flight simulator. Or writing that letter to your biggest account. Or recalculating your spreadsheets for tomorrow's meeting. Without interruption or downtime.

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





# 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 Symantec,<sup>™</sup> Borland,<sup>®</sup> DCA,<sup>®</sup> Microsoft<sup>®</sup>, and WordPerfect<sup>®</sup>. 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<sup>®</sup>**

Corporation. DCA is a registered trademark of Digital Communications Associates, Inc. Microsoft is a registered

**Circle 143 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.*



# 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

1303 Arapaho • Richardson, TX 75081  
214/234-1769 • 800/272-3729  
Telex 650309-3890 • FAX 2142342410



# Wish List for 1989

1988 promised to usher in the next generation of personal computing, but instead it turned out to be a dud.

Here's a five-part prescription for a more fulfilling 1989.



**Richard  
Landry**

**F**unny how reality gets in the way of the most ambitious marketing plans. Nineteen eighty-eight was supposed to be the year when users dropped DOS like a hot potato and made the great leap forward to OS/2. Instead, the RAM drought stopped OS/2 in its tracks. Lowball clone makers were destined to wither away, thanks to the Micro Channel and Big Blue's protective licensing measures. Instead, Dell introduced a Micro Channel clone only to drop it due to lack of customer demand, and Compaq bushwhacked IBM with a high-performance, multimaster bus that's free for the asking. Meanwhile, the PC industry as a whole got a rude shock from customers who decided to wait for the dust to settle before they bet their pocketbooks on new hardware and software standards.

There's no doubt that industry infighting has confused the computing scene more than ever before. So here's my wish list for 1989—five steps the major players could take to clear the air and start us all rolling again.

*IBM gets real about OS/2 and the PS/2.* Big Blue's been taking a beating for the PS/2's lack of substance, and users are miffed by the low level of compatibility

between OS/2 and their previous investments in DOS software. IBM should hustle to provide the fix—a 386 version of OS/2 that lets users multitask their old DOS applications. Then what about the multimaster network, printer, and graphics boards that are lurking around in Big Blue's labs? Get 'em out here, fast!

*Compaq gets real about EISA.* There's been a lot of talk that EISA is really nothing more than Compaq's way of telling IBM it wants a bigger discount for Micro Channel technology. Let's hope not! Competing bus standards are actually a good thing for users, especially in an era of top-heavy operating systems like OS/2 and UNIX. The standard that gets the nod from add-on board manufacturers is likely to be the one that offers the best performance at the lowest price. So why not NuBus too?

*Microsoft bundles Windows with DOS.* Microsoft knows that one reason software developers won't support Windows is they don't want to add any more dollars to Bill Gates's war chest. So  
(continues)



# Give this to and you hear from

Upgrading mass storage used to mean one interruption after the other.

Your users were very easily confused.

And you weren't always free to answer questions like, "How do I set up a subdirectory?" Or, "How do I upgrade the DOS on my hard disk?"

But, all that's changed. With Plus Hardcard™ 40 you can upgrade your users to 40MB easily and never have to worry about it again.

Because Plus Hardcard has been specifically designed with the end user in

**Plus Technical  
Support Line**

**1-800-826-8022**

mind. It's completely different from other hard disks. For example, you won't have to personally install the Hardcard. Most of your users can do it in minutes. There's no system reconfiguration. No connector cables or adapter cards. And there's plenty of simple documentation ready to help those who don't know their keyboards from their clipboards.

There's even a toll-free technical support number for installation and user information. So if any of your



# your users will never them again.

people have immediate  
questions, you won't have

compatible with some  
of the biggest names in the

**Hardcard™ 40**



to be the one with all the  
immediate answers.

More importantly, Plus  
Hardcard is the most reliable  
(40,000 hours MTBF) fixed  
disk available. It also  
happens to be extremely  
fast (access time 35ms) and  
durable (100 Gs). And it's

business. IBM®. COMPAQ®. Wyse®.  
And more. So if upgrade  
interruptions have kept you  
from getting to bigger issues,  
call us for complete compati-  
bility and other technical  
information  
at 1-800-  
826-8022.

**Plus** 

Machines Corporation; COMPAQ/Compaq Computer Corporation; Wyse/Wyse Technology. © 1988 Plus Development Corp.

**Circle 141 on reader service card**



# BLACKSHIP

Your BEST BUY Company!



## The Blackship 286

"... its price/performance ratio easily justifies PC World's Best Buy recommendation."

- PC World, August '88

**16MHz - Only \$2180\***

(1/2 wait, SI = 18.0)

**12MHz - Only \$1980\***

(0 wait, SI = 15.3)

## The Blackship 386

"... remarkably strong performance at bargain prices." -- A Best Buy!

- PC World, June '88

**16MHz - Only \$2895\***

(0 wait, SI = 18.7)

**"Push" 20MHz - \$3195\***

(0 wait, SI = 24.0)

**"True" 20MHz - \$3390\***

(0 wait, SI = 24.0)

\* Complete system price includes:

1Mb RAM, 43Mb/28ms hard disk, 1.2 Mb floppy, serial/parallel/joystick ports, mono video, Key Tronic keyboard, 8 slots and more!

In addition to our high-performance, high-value AT™ compatible 286/386 computers, Blackship has supplies and accessories for all your needs! Call us today for printers, modems, diskettes, ribbons, hard/floppy/tape drives and much, much more!

Visa, MasterCard, American Express accepted



**BLACKSHIP**

**Computer Systems, Inc.**

4031 Clipper Court

Fremont, CA 94538

415-770-9300

800-431-6249 (USA)

800-654-7955 (Calif.)

Please Call or Write for our FREE Catalog!

why doesn't Microsoft do the obvious and make *Windows* a part of the operating system? IBM is already bundling *Windows* with DOS 4.0 in a special college edition. Can Microsoft afford to forgo the extra bucks that *Windows* brings in? Sure—especially since it stands to gain the most from sales of *Windows* applications like *Excel* and its rumored upcoming word processor, data base, and E-mail packages.

*Ashton-Tate makes the dBASE language an open standard.* Ashton-Tate put a devilish thought in the air recently when it introduced a product that converts code created by *dBASE* clones into *dBASE IV* code. Now Oracle and Borland are rumored to be working on products that return the favor. Guess what—in the world of multiuser, networked data bases, both *Paradox* and *Oracle* have a big lead on *dBASE*. The only way Ashton-Tate can preserve its franchise is to encourage as many vendors as possible to support the *dBASE* language. That means embracing clones like *Clipper*, *Forbase*, and *DBXL*, not flattening them with legal challenges. Otherwise, get set for a rerun of the Micro Channel story—this time in data base software.

*Lotus discovers the meaning of customer service.* It's amazing how fear motivates. Lotus is terrified that delays in the shipment of 1-2-3 release 3 will cause buyers to shift to *Excel* or *Quattro*, so it's laying on a host of goodies for prospective buyers, including a limited period of toll-free support. Great! Let's hope that when release 3 finally ships in 1989, the new support policies

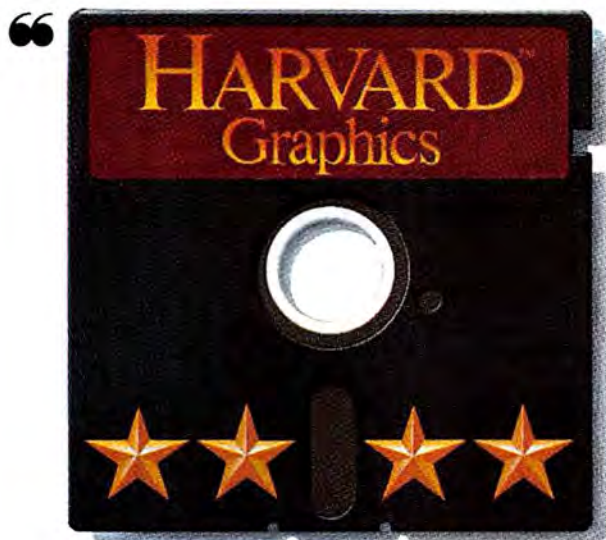
don't magically disappear. Better yet, why don't Lotus, Microsoft, and Borland get into a brawl over which can provide the best customer support? That's the kind of battle nobody can lose.

Call me crazy, but it seems obvious that if the big players thought less in 1989 about cornering their respective markets and more about sharing the wealth, we'd all walk away a little richer. And next year would be more exciting than this year's batch of false starts and empty promises.

**S**adly, 1988 also marks David Bunnell's departure as chairman of PCW Communications, the parent company of *PC World*. For those of you who don't know the historic role he's played in the personal computer industry, David founded three of the four most important PC publications around today: *Personal Computing*, *PC Magazine*, and *PC World*. This is the kind of success that would make publishing moguls like Henry Luce turn green with envy. David will continue to write his monthly column for *PC World*, but he'll also be starting a new company and working on future success stories. Everyone on the *PC World* staff will miss him deeply. Good luck, David!

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





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

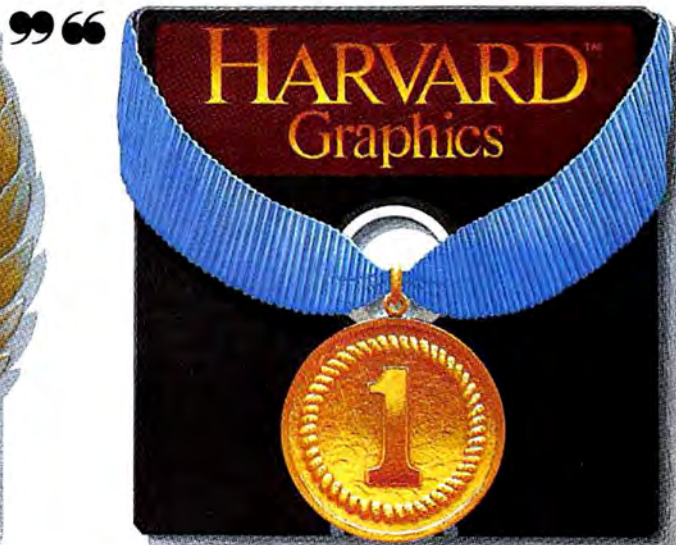


"They (Harvard Graphics)...made the best even better."

—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.

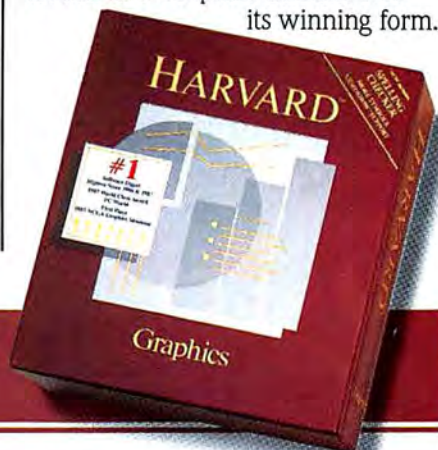
There's one more recommendation we'd like to have. Yours.

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.

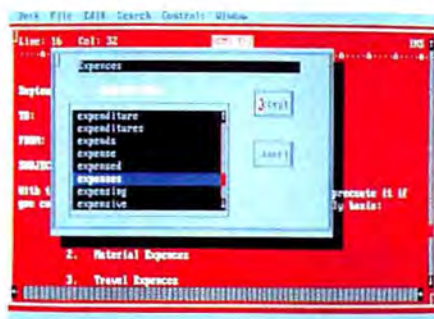




# 12 Reasons Why



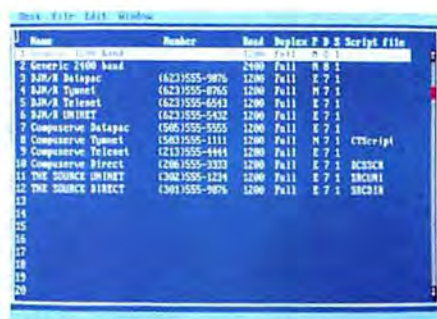
Use a better DOS shell than DOS  
4.0—Copy files with just a point  
and click of the mouse.



Write a memo—even spell-check  
and cut and paste from other documents.



Organize your thoughts with  
an outliner.



Send or receive files by modem even  
while you run other programs.



Optimize your hard disk for  
better performance.



Back up your hard disk—fast.

These are just some of the great reasons to get PC Tools Deluxe™—and here's an excellent reason to get it now.

Buy before December 31, 1988 and you'll get our special introductory price of just \$79. Or, if you own any of our competitor's products, we'll update you to the full PC Tools Deluxe package for just \$25 plus \$3 shipping & handling (with your order, send us the original manual page 1 or any other proof-of-purchase from Norton™ Utilities or Commander, Sidekick® or Sidekick Plus, X-TREE™, Fastback™, Disk Optimizer or Mace™ Utilities).

See why hundreds of thousands of people

**Central Point  
Software**  
INCORPORATED

15220 N.W. Greenbrier Pkwy. #200  
Beaverton, Oregon 97006  
(503) 690-8090



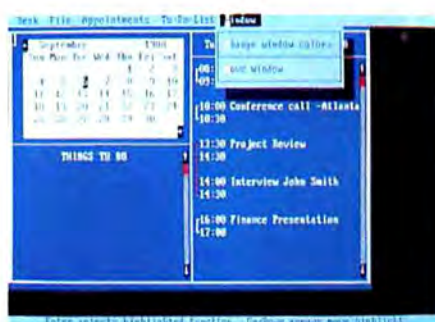
# PC Tools Is #1.



Look at your dBASE files  
(or create new ones).



Use any one of our financial, algebraic,  
or programmer's calculators.



Keep track of appointments  
and activities.



Undelete accidentally erased files.



Password protect your sensitive data.



Or everything all at once.

have made PC Tools the world's best-selling  
utilities package. And why P.C. Magazine says,  
"There's no reason to look beyond PC Tools."  
**For the dealer nearest you, or to order  
direct, call (503) 690-8090 M-F,  
8:00 a.m.-5:00 p.m. (West Coast time).**

# Introducing Version 5.

PC Tools is a trademark of Central Point Software. All other product names are trademarks of their manufacturers.

Circle 155 on reader service card





Not just  
another  
pretty  
face

Now Available  
for PS/2 Computers



**S**ure, 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.

**Q**uite 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.

**P**ut 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.

Circle 97 on reader service card

**W**ant 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 is a Registered Trademark of LaserData, Inc. IBM, International Business Machines Corp. Macintosh, TM Apple Computer, Inc. Ventura Publisher, TM Ventura Software Inc. Pagemaker, Aldus Corp. Microsoft Excel, Microsoft Corp.

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





## LETTERS

### Reactions and responses from the PC World community

#### Good News, Bad News

After some time away from the magazine, I was pleasantly surprised by *PC World's* August 1988 issue. I particularly appreciated the no-punches-pulled reviews of monitors and XT and AT clones ["Viewers' Choice: 13 Monochrome Monitors," "XTs for Bargain Hunters," "Business-Class ATs"].

Computer stores typically tout the items they have in stock, and magazine publishers often seem more interested in protecting their advertising revenues than in protecting their readers. These articles were a refreshing change, and in the long run will help the poorly rated manufacturers by encouraging them to improve their products. Now, with the September issue's coverage of 24-pin printers, I'm ready to go out and buy myself a system.

One quibble, however, with the August review of the Epson LQ-1050 dot matrix printer in *The Hardware Shelf*: The reviewer raved about the printer's speed and print quality while blithely sailing over "an unfortunate tendency toward paper jams." Don't speed and print quality approach zero during a paper jam? I think the reviewer's decision to list "advanced paper handling" under *PROS* was a mistake.

Gregg Calkins  
Jackson, California

ANTHONY RUSSO

#### WordPerfect Takes a Turn for the Worse

From the cheerleading cover teaser to the last sentence, Eric Alderman's glowing review of *WordPerfect 5.0* ["WordPerfect Gets Better!" *PCW*, September 1988] reads like an unrestrained press release. While I hesitate to step out of the ranks of the *WordPerfect* faithful, the closing sentence contains an unintended criticism that I sadly agree with: "*WordPerfect's* colossal improvements recommend it to power users of all stripes."

Unfortunately, many of us are not power users. One of *WordPerfect's* many saving graces was its relative simplicity. Now it has evolved from a good word processing program into a complex combination word processing/desktop publishing program, and the low learning curve—once a selling point—has taken a sharp turn upward.

Mark Flint  
Central Point, Oregon

#### Perfect, but Out of Print

Had Eric Alderman tried to print a document using downloadable fonts on a NEC P560XL printer, he would have toned down his *WordPerfect 5.0* adulations considerably. Although the program has been trumpeted to the heavens for its printing capabilities, it lacks a driver for this popular printer. How many other  
(continues)



WordPerfect users are fuming because the program doesn't support theirs?

Jan R. Harrington  
New York, New York

### Where Are the Bugs?

I have just finished reading Eric Alderman's rave review of *WordPerfect 5.0*, and I wonder why he made no mention of several obvious bugs in the program. *WordPerfect's* Canadian distributor recently informed our computing center of the following problems: the auto-install program doesn't work; lesson six of the tutorial program doesn't work; the dictionary file must be renamed so that *WordPerfect* can find it; and last, the device driver for the IBM Personal Pageprinter must be modified to work properly.

Did Mr. Alderman encounter any of these bugs? If so, he should have warned his readers before exhorting them to pay \$495 for the program. If not, he should review his reviewing skills.

Laurens Verkade  
McGill University  
Montreal, Quebec

*My review of WordPerfect did point out several problems with the program, including its poor manual, deficient macro stepping, and limited Document Compare facility. Although it did not mention the problems indicated by Mr. Verkade, they are generally minor in nature and have since been corrected in an update from WordPerfect Corporation. Nonetheless, it has become apparent that several of the printer definition files shipped with the initial release*

*of version 5.0 are incomplete. I would have mentioned this in the review had I been able to test the program with those printers.*  
—Eric Alderman

### Consultant's-Eye View of Standards

This letter is in response to Richard Landry's July *PC World* column ["Beyond the Speed Trap"]. My company, a business development and marketing firm, frequently makes computer purchase recommendations to its clients. Currently, we recommend nothing but 8086- and 80386-based machines; we consider the 80286 a waste of capital.

With respect to OS/2, we offer our clients an unambiguous *no*. I  
(continues)

## Prevent Computer Theft!

### Käblit Systems

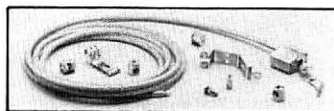
Unique Käblit fasteners attach to equipment without drilling, using existing screws. Cable passes through fasteners preventing removal. Cable is then locked. When ordering multiples, specify locks keyed differently or alike. Installs in 10 min. Over 80 college installations.



Heavy duty 10' steel cable secures computer, other equipment, up to 6 units.

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



# TELL ME MORE!

**FREE** information on the products featured or advertised in *PC World* can be requested using the postage-paid Reader Service Card found in this issue.

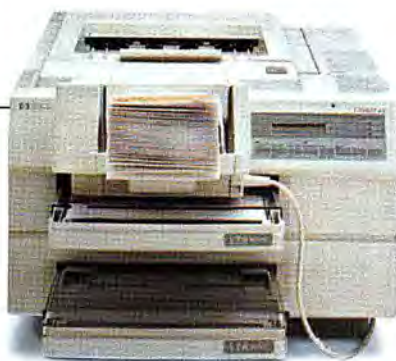
**PC WORLD**



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



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



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

The LaserJet IID printer is full of new ideas for making paper-handling easier and more efficient.

An envelope feeder accessory, for one. Instead of having to feed envelopes manually, our new printer does it automatically.

You wanted more paper trays. So the LaserJet IID printer has two of them, each with a 200-sheet capacity. Give us more fonts, you said. And LaserJet

Series II compatibility. Done!

So now you have a choice of two HP LaserJet printers. Both with that superb quality for text and graphics you've come to expect from Hewlett-Packard.

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



**HEWLETT  
PACKARD**



GIVE

PC WORLD

FOR THE  
HOLIDAYS.

Turn page for gift details. ▶

Give more...save more  
and enjoy a free gift  
with our compliments.

## Power Packed

YES. I want to give my colleagues 12 power-packed issues covering everything from spreadsheets to scanners. Now only \$17.97 for my first gift subscription — and \$14.97 for every gift after that. (This includes renewing or entering my own subscription.) THAT'S AN INCREDIBLE 58% SAVINGS OFF THE NEWSSTAND PRICE!

▶ FROM:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

☐ Please renew or enter my subscription.

Annual newsstand price is \$35.40

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

PC WORLD

2AN92

## Power Savings

YES. I want to reap power savings by giving my friends 12 issues of the one magazine no PC user should be without. I'll pay only \$17.97 for my first gift subscription — and \$14.97 for every gift after that. (This includes renewing or entering my own subscription.) THAT'S AN INCREDIBLE 58% SAVINGS OFF THE NEWSSTAND PRICE!

▶ FROM:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

☐ Please renew or enter my subscription.

Annual newsstand price is \$35.40

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

PC WORLD

2AN84

## Power Giving

YES. Please spare me hours of frantic holiday shopping. I want to give 12 issues of the power gift that will provide my friends with the tips and techniques professional managers rely on most! Now only \$17.97 for my first gift subscription — and \$14.97 for every gift after that. (This includes renewing or entering my own subscription.) THAT'S AN INCREDIBLE 58% SAVINGS OFF THE NEWSSTAND PRICE.

▶ FROM:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

▶ TO:

NAME

ADDRESS

CITY

STATE

ZIP

☐ Please renew or enter my subscription.

Annual newsstand price is \$35.40

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

PC WORLD

2AN76



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

## Free tool kit



Give all the PC users on your holiday gift list subscriptions to PC World: the indispensable "tools of the trade." Save up to 49% on your first gift subscription, 58% on every gift after that. As soon as we receive your order, we'll send everyone on your list handsome cards announcing your gift.

And as our way of saying thanks, we'll send you your own FREE "ALL IN ONE" TOOL KIT. This compact lifesaver consists of 8 sockets, popular screwdriver attachments plus a powerful ratchet driver. Nothing will stay broken for long. Made of drop-forged steel, your professional tool kit is compact enough to fit anywhere and versatile enough to fix just about anything.

**PC WORLD**



cannot, in good conscience, recommend that anyone purchase thousands of dollars' worth of hardware just to run ported versions of existing DOS applications. And on the subject of new bus technologies, we think all the ado is just advertising hype. We ignore it, advise our clients to ignore it, and will stay with conservative, tried-and-true technology until a new standard comes along.

Our biggest complaint, however, is with software companies. Why can't they get together and create some standard printer drivers? Software Publishing Corporation, for example, includes good drivers for the Toshiba P351 in *Harvard Graphics*, but not in *PFS: Professional Write*. Microsoft Project doesn't acknowledge any Toshiba printer

in the 321/341/351 series, and neither does 1-2-3.

Daniel A. Morgan  
Mercer Island, Washington

### The Straight Skinny on Shareware

I find it appalling that Tom Smith's defense of shareware was relegated to the *Another Angle* column [*PCW*, September 1988]. I always thought that was the only angle.

Michael de la Maza  
Irvine, California

### Give Shareware a Fair Shake

As you pointed out in your flat-file manager review ["Five Flat-File Favorites," *PCW*, August 1988], all of the products re-

viewed have good features and merit consideration for purchase. However, you left out what in my opinion is one of the best file managers available: ButtonWare's *PC-File+*.

This shareware product can't be touched in features, ease of use, and ease of learning. I find it ironic that in the same issue of *PC World*, author Judy Getts ["Shareware Comes of Age"] states, "Many magazines balk at reviewing such packages." I guess the proof is in the pudding.

Richard Curry  
Columbus, Ohio

*PC World reviewed PC-File+ in December 1987's The Software Shelf, and although our round-up reviews usually cover the top products in a given field, they have on occasion intentionally omitted products recently re-*  
(continues)

# Q.

"Where Do I Turn For More Information?"

# A.

1. Turn to the Reader Service Card at the back of this issue of *PC World*.
2. Find the Reader Service number of the product you want in the product or advertiser indexes.
3. Circle the number, fill out the postage-paid card and send it in. It's that simple.

In return, our advertisers will send you more information on the products you want. It's just another way that *PC World* helps you make the best buying decisions for your company.

# PC WORLD



CompuServe is offering  
on these

**TOPS ADOBE ALI  
AUTODESK CADK  
BUTTONWARE BR  
CROSSTALK DIGIT  
MANSFIELD SOFT  
DATASTORM NAI  
SOFTWARE PUBLI  
GROUP BORLAND**

Product support for your IBM  
or compatible.



# ng inside information companies.

US ASHTON-TATE  
Y WORDPERFECT  
ODERBUND LOTUS  
AL RESEARCH FOX  
VARE MICROSOFT  
TUCKET NOVELL  
SHING SOFTWARE  
AND MANY MORE

Access CompuServe's forums, and you'll find invaluable product support maintained by all these companies. Often, company decision makers are online to discuss the next generation of products, or to put software updates on CompuServe before they hit the market.

When you run into a problem, there's a good chance you can quickly find the solution online in one of CompuServe's many forums. Or, you can leave a message. You'll get answers fast, often from the person who actually developed the product you are using. Either way, you save yourself time and frustration

finding the answers you need when you need them.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. In Ohio and Canada, call 614 457-0802.

**CompuServe®**  
An H&R Block Company

Circle 28 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**

*viewed in the magazine. Future PC World roundups won't be constrained by this policy, however, and we hope readers won't be dismayed by the occasional repetition. —Ed.*

## In Need of Some Pointers

I really enjoyed the "Best of Shareware" Buyers' Guide [*PCW*, August 1988]. I'm a college student and bit of a programmer myself, and I'd like to share some of my programs with other computer users. However, I have no idea how to go about it. Where can I find out how to copyright and distribute my software?

*David Saylor  
Johnson City, Tennessee*

*Try contacting the Association of Shareware Professionals (ASP) at 325 118th Ave. SE #200, Bellevue, WA 98005. You can also find lots of helpful folks—many of them ASP members—in the IBM software forums on CompuServe and The Source, or through a local bulletin board in your area. —Ed.*

## It's Gotta Have That Click

I enjoyed the review of AT clones ["Business Class ATs," *PCW*, August 1988] but was disappointed that you didn't include keyboards in the "ergonomic design" section of the Features Evaluation.

It's great to be able to reset the computer without reaching around to the back, and to be able to adjust the viewing angle of the monitor. But if the keyboard stinks, it doesn't matter how many other wonderful features the machine has. I'm still looking for a keyboard manufac-

turer who has figured out that stiff, sticky, flat keys are not the way to go. I mean, if we can come up with an IBM-compatible computer, why can't we do the same with keyboards?

*John V. Hedtke  
Bellevue, Washington*

## COBOL Alive and Well Under DOS

I noted with great interest your coverage of a topic that rarely surfaces in the major PC magazines: COBOL [*Top of the News*, *PCW*, September 1988]. OS/2 may prove important to corporate and government users at some point in the future, but Mr. Lobdell's comments imply that you need OS/2 to do any significant application development in COBOL. This is just not true.

COBOL-compiled object code, like that produced by any high-level language compiler, is only as fast and efficient as the compiler that creates it. OS/2 will certainly allow inefficient compilers to get away with a lot more than they otherwise could under DOS's 640K memory limit. However, COBOL will work for you now—under DOS—if you choose the right compiler.

*Michael N. Dodas  
Salt Lake City, Utah*

## We Stand Corrected

In your May 1988 *Letters* column, Robert Luhn described the COMDEX attendees who adorned the cover of *PC World's* January issue as "subscribers, businesspeople, programmers, doctors, bureaucrats, and other law-abiding folk." I wanted to let  
(continues)



# THE BUS STOPS HERE!

## CompuStar: PS/2 and PC/AT Compatibility.

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 microprocessor 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.

### A 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. No matter which bus becomes the

next industry "standard," you'll have peace of mind knowing your investment in a CompuStar will be protected.

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 will leave *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 pre-configured CompuStar or custom design one yourself. Just unlock the

front panel and literally "snap-in" a bus, CPU, memory 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 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, South Carolina 29169 • 803/796-7800  
TWX510-601-2645 • FAX 803/796-7029





# BUY SMART. USE SMART.

*PC World* guides business buyers through the entire buying process, from purchase to integration to upgrade to trade-in. First, we deliver the essential product information and unbiased reviews they need to make smart PC buying decisions. Then we follow up, month after month, with the answers, power tips, and advice they need to use their PCs more productively. To them, *PC World* delivers more value than other PC books.

**No wonder more business buyers  
depend on *PC World* than any  
other PC publication.**

*PC World* delivers more to its advertisers, too. More objective reviews. More receptive business buyers. More sales. Which makes *PC World* a very smart place to sell your product.

**PC WORLD**  
Find out what's in it for you.



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

WordPerfect is the most feature-laden  
we ever seen."  
Personal Publishing

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

"Beyond any question,  
WordPerfect 5.0 is a fine program.  
By the best in the world."  
- William Harrington  
Personal Law

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

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

The question is whether  
h the wait. The answer is an  
WordPerfect 5.0 is a wordproces  
erpiece." - Jon Pepper, PC Week

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

ect 5.0 I  
the kingpin  
desktop publishing word pr  
- Jim Seymour, PC Computin

# Introducing the most highly acclaimed word processor since WordPerfect 4.2.

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

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

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



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

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

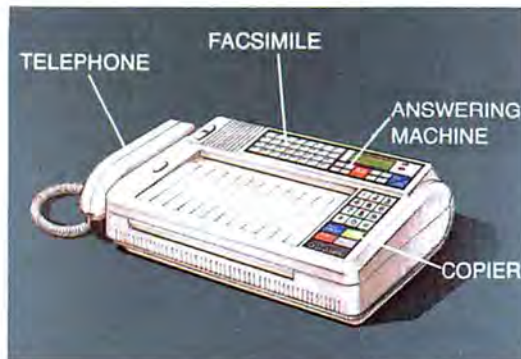
**WordPerfect**  
CORPORATION



NEW ANNOUNCED  
Meet you in the  
COMDEX Fall 88 CASHMAN FIELD CENTER  
Booth A542

**GUIS**

## PERSONAL FAX



US\$1,195

4 functions in 1 unit

*You surely have a dream to hold every single message around the world to catch up with this high-tech era. In order to get closer to your friends, clients, and lover, you must own her—*

*GUIS Personal Fax:*

*She never strikes, never stops.  
She never sleeps, never spys.*

*She performs as:*

*CCITT G3/G2, 9600 bps; Auto Fallback  
Hand free speed dialing for easily sending  
Auto redial for efficiency increasing  
32 one-touch dialing for friendly using  
Auto power off for cost saving  
Normal/Fine mode for best quality  
Text/Halftone to secure the colorful result  
LCD for clear display of all essential information.*

*She is your secretary to auto answer your incoming fax and telephone call.*

*She is a recorder to record messages, when you are away.*

*She is an answering machine to leave message to your partners and colleagues.*

*And she is so fantastic, considerate and lovely that you can't miss her.*

**GUIS**

A Little Giant in Telecommunications

Distributor  
wanted

**Glorious Union Information Systems Inc.**

14th Fl., 207 Tun-Hwa N. Rd., Taipei, Taiwan, R.O.C.  
TEL: 2-7171740, 2-7153356 TLX: 22651 GUIS  
FAX: 2-7134572

Circle 118 on reader service card

you know that I, too, was at COMDEX, although I won't be again for a few years. So don't count us non-law-abiding folk out.

*Name withheld  
Federal Correctional  
Institution  
Pleasanton, California*

### Corrections

The caption accompanying the *Product Outlook* screen shot on page 98 of *PC World's* August 1988 issue says that Brown Bag Software's *MindReader 2.0* has a new interface. In fact, the program mistakenly gained the interface of Mind Path Technologies' *IntelliForm*, described on page 90. We regret the mix-up. Brown Bag also informs us that the multilevel registration policy for *Homebase 2.5* described in the same issue's "Best of Shareware" Buyers' Guide has been discontinued. The current registration fee with printed manual and one year of toll-free phone support is \$89.95.

Our September 1988 Buyers' Guide, "30 Templates for 1-2-3," contains an error. The *Professional Corporate Financial Planning Models* produced by Stephen Archer Associates include model horizons of 4, 5, 8, 10, and 12 months. And in our review of *Forecast Pro (The Software Shelf, October 1988)*, the vendor's address was wrong. The correct address is Business Forecast Systems, 68 Leonard St., Belmont, MA 02178; 617/484-5050. *PC World* regrets these errors.

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



# Push your software to the limit.



If you want to get the most out of today's new, high-powered software applications, we have a few words of advice:

Use a Microsoft® Mouse.



*The Microsoft Mouse gives you easy access to all the powerful features today's software has to offer.*



*It looks innocent enough here, but wait until you see how the Mouse makes your software scream.*

The Mouse can unleash your software—and take full advantage of the features intended to make your work easier.

With the Mouse you can effortlessly manipulate menu-driven applications without taking your eyes off your screen. You can pull down menus. Highlight text in one fell swoop. Copy, cut and paste formulas in spreadsheets easily. And move things from here to there without any command-key mumbo jumbo.

Literally hundreds of applications support the Mouse. But as the leading software developer for personal computers (and one of the first to bring a graphical interface to PC screens), we've gone a step further:

Microsoft Windows/286 with PC Paintbrush® for Windows, Microsoft Paintbrush or EasyCAD™2 actually come with the Mouse (or vice versa).

Already, the Microsoft Mouse has made its way into the hands of over one million personal computer users. And that number is sure to grow even faster. After all, graphically oriented software is the driving force behind improved productivity.

But it's the Microsoft Mouse that puts you in the driver's seat.

**Microsoft®**  
Making it all make sense.™

©1988 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks, and the Microsoft Mouse design and Making it all make sense are trademarks of Microsoft Corporation. EasyCAD is a trademark of Evolution Computing. PC Paintbrush is a registered trademark of ZSoft Corporation. For more information, call (800) 541-1261. Customers in Canada call 1-416-673-7638, outside North America, 1-206-882-8661.



**What turns four  
useless, disconnected  
monochrome monitors  
and keyboards into  
four speedy,  
graphic workstations  
for about the cost of  
an executive desk?**





# The Brand New, Very Affordable, Absolutely Indispensable VNA.™

There's nothing quite like a desk that's perfectly suited to your needs. Or a networking system that's perfectly suited to your applications.

Introducing the revolutionary Video Network Adapter.

VNA's new approach to connectivity gives you full graphics capabilities with programs like

Lotus 1-2-3,™ AutoCAD,™ and Ventura Publisher.™ It gives you the full flexibility of a multi-user, multi-tasking environment. And, since it lets you use PC-compatible monitors and keyboards, your additional hardware costs go down dramatically.

VNA comes complete with the hardware, PC-MOS operating

system, cabling, and easy-to-follow instructions for a quick installation. And like everything else from The Software Link, your satisfaction with the VNA is guaranteed, or your money back.

So get VNA into your office, and sit back and put your feet up. You've just made an executive decision of real value.



**THE SOFTWARE LINK**

3577 PARKWAY LANE • NORCROSS, GEORGIA 30092 • FAX: 404-263-6474

For more information about VNA, contact the authorized distributor nearest you.

Prowest, Inc. Albuquerque, NM 800/825-8375 • Digital Solutions Atlanta, GA 800/241-6651 • 404/955-4488 inside Georgia

Network Consulting Associates Chicago, IL 312/641-1893 • Data Quest Hawaii Honolulu, HI 808/988-7813 • Incon Ft. Lauderdale, FL 305/564-6633

Data Equipment/Communications Carrollton, TX 214/960-2585 • L. K. H., Inc. Los Angeles, CA 805/268-1256 • Information Engineers Scotts Valley, CA 408/438-3339

Corporate Micro, Inc. New York, NY 212/315-2853

Video Network Adapter is a trademark of The Software Link, Inc. All other brand names are the trademarks of their respective holders.

**Circle 173 on reader service card**



## PC EXPERTS AGREE:

# Proteus® offers the fastest for the least, and supports them the most.

Proteus® sells the fastest personal computers you'll find. But as experts from BYTE, InfoWorld, Personal Computing, and others have discovered, our computers are more than just fast.

They're also an excellent value. You can't find better performing computers at lower prices.

And Proteus allows you to custom configure a system to your exact specifications.

Finally, Proteus provides you with 15 months of Free on-site service and support. And if you're not

satisfied with Proteus equipment within 30 days, you can return it for a full refund.

These are the reasons why the experts are so impressed with Proteus. And they're not alone. NASA, Xerox, GE, RCA, Dupont, GM, Revlon, General Dynamics, the U.S. Government, the U.N., MIT, Harvard, and Cornell have all become big Proteus users.

For the fastest, most economical, best supported computers available, follow the experts to Proteus.

**"This IBM-compatible is so fast I have had trouble measuring its speed."**

Business Computer Digest

**"The Proteus is one of the fastest desktop computer systems we tested, a zero-wait-state hot rod."**

InfoWorld Magazine

**"Proteus is markedly faster than any other personal computer we've worked with, including Deskpro 386/20."**

Personal Computing Magazine

**"...the favorite system of our technicians because of its speed."**

InfoWorld Magazine

### PROTEUS-286GTX

#### 12MHz, ZERO WAIT STATE

- Intel 80286-12 CPU
- 640K RAM expandable to 16MB
- 32KB cache memory
- 8 expansion slots
- 2 serial & 1 parallel port
- 1.2MB floppy drive or 3.5" microfloppy
- Dual HD & floppy controller
- 200W power supply, 110/220V
- 101 key tactile keyboard
- 15-month free on-site service
- Made in U.S.A.

#### Complete Systems

##### with Hard Disk and Monitor:

- 20MB mono \$1,995
- 20MB VGA color \$2,395
- 20MB VGA plus \$2,780
- for 40MB add \$142
- for 80MB add \$445



### PROTEUS 386/16

#### 16 MHz opt. 20MHz ZERO WAIT STATE

- Intel 80386 CPU at 16 MHz
- Optional 80386-20MHz
- 1MB RAM-Expandable to 16MB.
- Disk cache
- 8 expansion slots
- 2 serial & 1 parallel port
- 1.2MB floppy drive
- Dual HD & floppy controller
- 200W power supply, 110/220V
- 101 key tactile keyboard
- 15-month free on-site service
- Made in U.S.A.

#### Complete Systems

##### with Hard Disk and Monitor:

- 40MB 28ms mono \$2,899
- 40MB 28ms VGA color \$3,299
- 40MB 28ms VGA plus \$3,699
- for 80MB add \$185
- for 100MB add \$614
- for 150MB add \$1,420
- for 340MB add \$2,675



### PROTEUS 386/25

#### 25MHz, ZERO WAIT STATE

- Intel 80386 CPU at 25MHz
- 1MB RAM expandable to 32MB
- 8 expansion slots
- 387 coprocessor support
- Cache memory
- 2 serial & 1 parallel port
- Dual HD & floppy controller
- 200W power supply, 110/220V
- 1.2MB floppy drive
- 101 key tactile keyboard
- 15-month free on-site service
- Made in U.S.A.

#### Complete Systems

##### with Hard Disk and Monitor:

- 40MB 28ms mono \$5,395
- 40MB 28ms VGA color \$5,814
- 40MB 28ms VGA plus \$6,195
- for 80MB add \$185
- for 90MB add \$1,129
- for 150MB add \$1,545
- for 340MB add \$2,675



### PROTEUS POWER

#### EXTRA PROTEUS POWER WITH CUSTOMIZATION

- 1:1 interleave controller
- ESDI HD up to 700MB
- microfloppy drives
- tape streamers, 40MB to 225MB
- coprocessors
- brand name monitors and cards
- tower configuration on all models
- custom configuration on all models



**To order, call us direct. 1-800-782-8387**

For 24 hr catalog, call 1-201-288-8577 using your modem set at 1200B/N/8/1.

Technical Support Hotline: 1-800-541-8933 Reseller/VAR programs available.

All trademarks recognized. © Proteus is a registered trademark of Proteus Technology Corp. All prices, terms, specs subject to change.

Circle 276 on reader service card

**proteus**  
THE INTELLIGENT CONCLUSION  
377 Route 17S, Airport 17 Center  
Hasbrouck Heights, NJ 07604



# The Year That Wasn't

1988 held a lot of promise(s).

Here's a recap of the abundant lows and all-too-few highs.



David  
Bunnell

**T**he end of the year is a great time to stop and take a reading of where, and how far, we've come in the last 12 months. In the case of 1988, I've got to say that PC users lived through a pretty disappointing year. As usual, we were promised a good deal but got short shrift when it came to reality. We had to listen endlessly to the pros and cons of what were touted as major developments in the PC market. More than a few not-ready-for-prime-time products saw shrink-wrap. More groundbreaking products were announced than could dance on the head of a pin, and some were actually available for sale.

Let the grouchiness begin. I give thumbs down to:

- Microsoft and IBM for going only halfway with the Presentation Manager, which is just not stylish, exciting, or enough of a departure from the old interface. In fact, it's simply a bad version of *Windows*. The poor strategy and marketing that accompany the Presentation Manager can only hurt these two companies, which stand to benefit most from better graphics development. Meanwhile, developers aren't able to move ahead with *Windows*-based applications—and that slows graphics progress for us all. Why didn't Microsoft and

IBM do it right in the first place, like Hewlett-Packard did with *NewWave*?

- OS/2 itself, a.k.a. the vapor operating system. The whole personal computer world would have been better off not hearing about it at all in 1988. The speculation, debate, and unsubstantiated claims surrounding it have given users much angst, especially since OS/2 can't run very well at all on AT-class machines. I'd have thought a megacompany like IBM would have its eye on the ball with something as important as this, but I guess it blinked.

- IBM, for not supporting its own promising development, Micro Channel Architecture. Though Big Old Blue claims to be selling lots of PS/2 machines, it isn't admitting that most PS/2 sales are of Models 25 and 30, which don't have MCA, and not the higher end machines (which are saddled with very slow hard disks, by the way). Why couldn't IBM create a zippy bus that also used existing boards? I think the PS/2 slogan should be, "Tomorrow's technology today, but you can't use it just yet."

- Dell Computer, for releasing hardware just a little before its time, as Orson Welles would say. *(continues)*



# FINALLY!

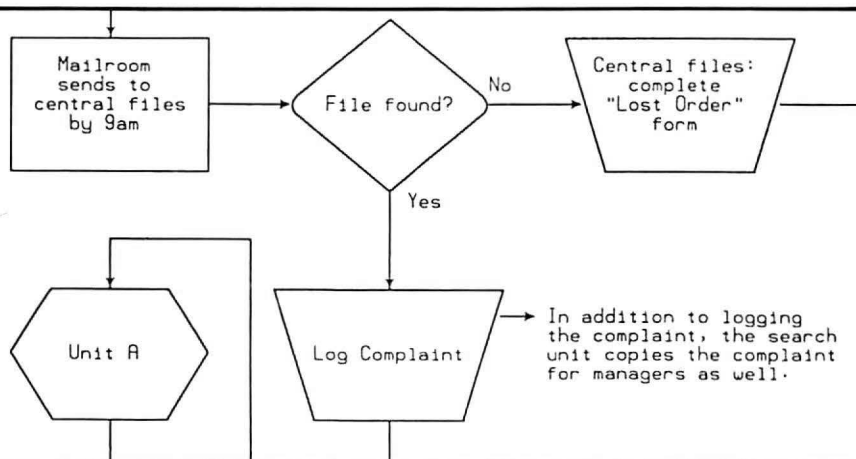
# EASYFLOW

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

DAVID BUNNELL

There seem to be lots of promises before delivery dates, and delays on shipments. We don't need the aggravation. Michael Dell pioneered the high-quality mail-order-clone business. Is Dell resting on its laurels? Say it ain't so!

● Ziff-Davis's new *PC Computing* magazine. It's for people who would rather read about computers than use them.

Although it hardly seems like 12 months' worth, I have to admit there were a few bright spots this year. Let me hasten to give kudos to:

● Compaq Computer, which has taken the leadership position away from IBM. Instead of jumping on the PS/2 bandwagon, Compaq had the foresight to continue down its well-considered path with faster, more effective 386 machines. In the early '90s, I wouldn't be surprised to see Compaq with a larger market share than IBM.

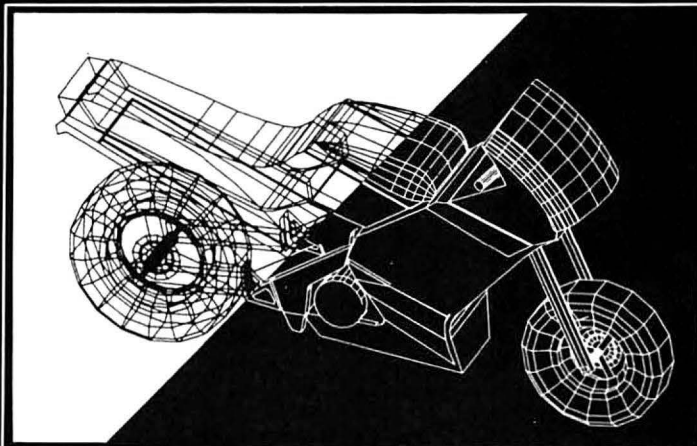
● The "Gang of Nine" (AST Research, Compaq, Epson, Hewlett-Packard, NEC, Olivetti, Tandy, Wyse Technology, and Zenith Data Systems). This savvy group has developed EISA (Extended Industry Standard Architecture), which will allow them all to use existing bus structures with some new add-in cards, extending the life of their products. They're refusing to be sheep, so we don't have to be either.

● Two major software programs that add new capabilities and functions to the PC: Aldus's *PageMaker*, an elegant port of Macintosh software; and Lotus's *Agenda*, which gives us a very useful new species, information management software.

(continues)



# AW...WHAT THE HECK!



The first question asked by many people is, "Why is *DesignCAD 3-D* priced so low?" The answer? After developing *DesignCAD 3-D* we were unable to decide how the product should be priced. We consulted experts. We used the finest spreadsheets on the market. We took employee polls. We asked our lawyers and accountants for their opinion. We even asked our Mothers, Wives, and childhood Sweethearts! Finally in the greatest American Tradition, we said, "Aw... What the Heck! Let's see the other guys beat this price!" *DesignCAD 3-D* sells for \$299 complete. No add-ons, nothing else to buy!

*DesignCAD 3-D* is a complete 3-Dimensional CAD system. It offers most, if not all, the features found on programs costing more than \$3000! In fact, *PC Magazine* says, "For a low-cost, self-contained 3-D package *DesignCAD*'s range of features steals the show. The package offers more than adequate features for a wide range of professionals and hobbyists alike."

Once again, American Small Business Computers has proved that you don't have to spend a lot of money to get quality software. *DesignCAD 3-D* provides features such as Shading, Solid Object Modeling, Hidden Line Removal, Cross Sectioning capability, ability to output shaded drawings to laser printers, dot-matrix printers, or pen plotters, extensive file transfer capability, all for only \$299! No other 3-Dimensional CAD system can come close to providing the price/performance of *DesignCAD 3-D*.

There is a very important reason to buy *DesignCAD 3-D* other than price: PERFORMANCE! *DesignCAD 3-D* provides complete 3-Dimensional drawing capabilities. It's not a "warmed-over" 2-D program. *DesignCAD 3-D* allows you to draw any entity in 3-D space. This means, for example, that you can draw a curve in the shape of a spring. You can draw a circle or arc at ANY angle on ANY plane.

*DesignCAD 3-D* allows up to 4 simultaneous views - any angle or perspective - on the screen. *DesignCAD 3-D* also provides complex extrusions—linear, scalar, and circular. Extensive 3-D text capabilities and auto-dimensioning are provided, at no extra charge, of course!

*DesignCAD 3-D* almost certainly is compatible with the computer system you now own. *DesignCAD 3-D* supports more than 200 dot-matrix printers, at high resolution. *DesignCAD 3-D* supports more than 80 plotters, and most digitizers, mice, and graphics adapters available for "PC and PC Compatible" systems. Shaded and wireframe models can be output to the printer or plotter YOU own.

*DesignCAD 3-D* provides the capability to read drawings from most other CAD systems (*DesignCAD/ProDesign II*, *AutoCAD*'s DXF, *Hewlett Packard*'s HPGL, and IGES). *DesignCAD 3-D* will also write GE, and POSTSCRIPT files. This file exchange utility is included at no extra charge, of course.

*DesignCAD 3-D* does not require expensive graphics adapters and monitors - even shading can be done on ordinary displays, such as the Enhanced Graphics Adapter (EGA), Color Graphics Adapter (CGA) and Hercules Monochrome Adapter. *DesignCAD* also supports many of the ultra high resolution graphics adapters, with more hardware being supported daily.

However, the best reason to buy *DesignCAD 3-D* is not the low price. It's not the outstanding performance. It's not the extensive hardware compatibility. The best reason to buy *DesignCAD 3-D* is for its amazing ease of use!

What else do you need to know about *DesignCAD 3-D*? Only this: "Included at No Extra Charge." What is included at no extra charge? EVERYTHING! \$299 BUYS IT ALL!

# \$299

# DesignCAD 3-D

Oh yes, we also market a 2-Dimensional version of *DesignCAD 3-D* with special drafting and design functions. Can they work together? Naturally... Our Mothers, Wives, and childhood Sweethearts would see it no other way! The price?... \$299, of course!

How do you get one? See your local computer store or dealer, or contact:

To quote *PC Magazine*...

"*DesignCAD 3-D*, the latest feature-packed, low-cost CADD package from American Small Business Computers, delivers more bang per buck than any of its low-cost competitors and threatens programs costing ten times as much."

**American**  
Small Business Computers, Inc.

327 So. Mill Street • Pryor, OK 74361  
Phone: (918) 825-4844 Fax: 01-918-825-6359  
Telex: 9102400302

Write or phone us for FREE DEMO DISK and information on *DesignCAD 3-D* and *DesignCAD 2-D* products.

Circle 306 on reader service card



# TurboTax

## THE BEST GETS BETTER!



### Still the Critics Choice!

"It makes doing your taxes almost fun."  
—PC Magazine

"The only thing TurboTax can't do is print the money."  
—PC World

"Triple Crown: form preparation, tax planning and elegantly written software."  
—Money Magazine

### TurboTax does states, too!!



Complete the chore with TurboTax state software. TurboTax is THE ONLY system with 41 state packages available!!  
Only \$40. ea.

### DEPENDABLE

The #1 selling tax software continues to be the overwhelming choice of taxpayers everywhere! And with over 1,500,000 tax returns filed last year, you know you're getting software on which YOU CAN DEPEND.

Here's how TurboTax helps you this year:

- The famous "Quick-Look Tax Window"
- **NEW!** 1040A Short Form
- **FAST**—calculates tax return under 3 seconds
- Over 40 forms—all the forms you'll need
- On-line IRS Instructions
- Quick-Link Forms Finder—to find forms by subject
- Pop-up Calculator and Notepad
- On-line help
- **NEW!** Auto-Interview—helps you select the tax forms you need
- 1989 Tax Planning included FREE!
- Data Examiner—to help pinpoint any omissions
- IRS Approved DOT MATRIX 1040 with list of printers expanded—includes Laser Jet

### NEW!

### PROFESSIONAL REFERRAL SERVICE

Consult a tax professional with your TurboTax data file as the starting point! Over 8,000 TurboTax ProSeries/1040 accountants now available for strategic tax planning, finishing your return or a financial tune-up. Write for the name of the TurboTax professional nearest you!

### NEW!



### VISUAL 1040

You have to see it to believe it!

### COMING SOON!

### PERSONAL FINANCE MANAGER

Complete personal finance manager with direct link to TurboTax. Checking and portfolio management. Investment Advisor. Household Inventory. Budget Analysis. And Much More! Coming first quarter 1989. Under \$100. The **only** way to count **your** beans.

CREDIT CARD ORDERS CALL

1-800-782-1120 (OUTSIDE CALIFORNIA)

STILL ONLY

# \$75

SEE YOUR LOCAL DEALER. Or order direct. Shipping included (Continental US only). CA residents add 6 1/2% tax. VISA/MC.

**FREE!!** While supplies last, copy of the latest Price Waterhouse Personal Tax Advisor included with your direct order.

**CHIPSOFT, Inc.**  
5045 Shoreham Place  
San Diego, CA 92122  
(619) 453-8722

• Seymour Rubinstein, for facing the giants and winning, business-style. Formerly chair of MicroPro, Rubinstein started a company on a shoestring this year to develop a spreadsheet program called *Surpass*. How far could a one-product company expect to go in an application area dominated by Lotus, Microsoft, and Borland? Apparently far enough, because Borland bought *Surpass*, thereby eliminating it as competition and giving Rubinstein the dollars to pursue his next entrepreneurial dream.

• Finally, Sun Microsystems, for thinking ahead. The first company to make UNIX usable, its 386i dedicated workstation—which can also run DOS programs—is selling like crazy. Sun's painless and automatic LAN setup is going to be a dream come true. President Scott McNealy has hinted that in 1989 Sun may break into the retail market, possibly with its "puny UNIX," which would be usable on all PCs. In addition, Sun is supposed to be working on "Jackintosh," a new workstation that might bring a reasonably priced level of functionality and power to the average user. Thanks, Sun, for thinking of the rest of us.

So there you have it: the year of living less than dangerously. From a user's viewpoint, 1988 gets very low marks. Come on, people, let's put a little muscle behind that "the future is here" hype we know so well! Next year, do you think we might see a few more products that relate to how we actually work with computers, and do so in snappier, more creative, more effective ways? You can't blame a guy for asking. ●

Circle 262 on reader service card



The future of  
personal computing  
now rests  
on just one thing.



final focus that original Microsoft vision. Through Windows, any number of software applications will seamlessly integrate. Sophisticated spreadsheet programs.

Powerful word processors. Interactive databases. All effortlessly accessible.

And in MS<sup>®</sup> OS/2, the new operating system we developed jointly with IBM, the Windows technology (called Presentation Manager) gets even more exciting. Opening up megamounts of power and memory. Opening up your screen to do several tasks at once. And opening up endless possibilities for developers using the Microsoft family of languages.

But all this doesn't end at the desktop. With Microsoft OS/2 LAN (local area network) Manager, it's as easy and natural to work on a network as it is to work alone.

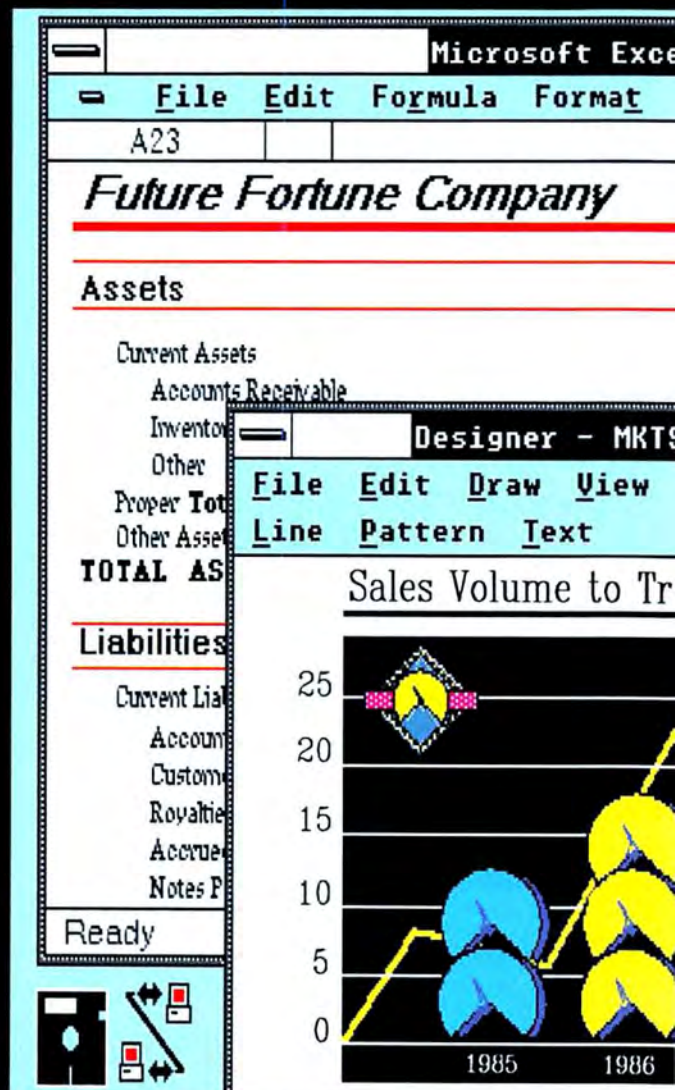
By linking users via software, information can be shared and exchanged by members of a group. Projects are worked on together, instead of bit by bit. And it's amazing how a company communicates once it's joined by electronic mail.

There is no question that the advanced productivity springing from today's personal computer is the direct result of our continued commitment to superior technology.

But even so, that's only half of the equation.



iving the network.





# At Microsoft, first we make it possible.

If you happened to catch the January 1975 issue of *Popular Electronics*, you were one of the lucky few to witness the debut of the personal computer.

Impossible as it seems, a magazine with less than one-tenth the readership of *Time* or *Newsweek* launched a technology race roughly parallel to that of the space program.

It also launched a company that immediately assumed center stage in the exciting new world of personal computing. The company was Microsoft, and the tenet upon which it was founded was a simple one. To see a computer on every desk and in every home.

To take that rudimentary new

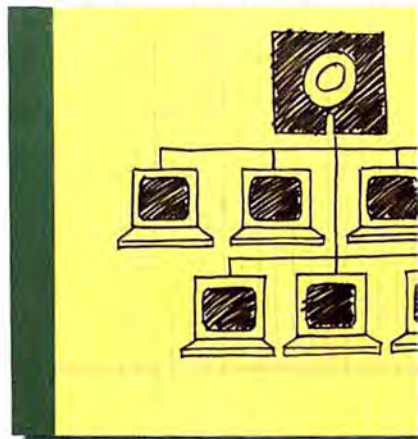
contraption that was the early personal computer and turn it into the powerful machine that has literally changed the way we work, required some important

steps. The first order of business was to create not simply products, but standards. Microsoft® BASIC became the first universal programming language for the personal computer. And set a standard upon which an industry could grow.

Next came what is now the world standard PC operating system, MS-DOS®, developed by us and chosen by IBM for its first personal computers. Today, 20 million machines run on it, and so does a billion-dollar software industry.

And when the Macintosh® was

being developed, we were there. That early participation allowed us to write its richest and most important software. These crucial pieces include the powerful



*Networking made practical, with software a*

Microsoft Word, the much-applauded Microsoft Excel, and Microsoft Works, the single-solution program for the diverse needs of small business.

As we were contributing to the development of the Mac®, we were also developing a system to put graphics interface technology into the world of IBM® PCs and compatibles.

The introduction of Microsoft Windows in 1985 meant that an easy-to-understand desktop graphical environment now appeared on PCs. Ultimately, this friendly screen will forever replace the cold theater of character-based computing.

But Windows is more than just a useful tool. It is an important technological feat, one that becomes critical to bringing into



*The world wasn't waiting. We were. The PC makes its debut.*



*MS-DOS with Windows. Mac. MS OS/2. Three ways to go. One driver. Microsoft.*



MAKING IT ALL



MAKE SENSE



# e make ctical.

working with pictures makes the work you turn out much more interesting. Which is why the introduction of Microsoft Windows to the IBM PC and compatibles brought with it a whole new category of software with impressive credentials. Like

a more finished look. And no matter what application you're using, Windows will take over the job of running your printer.

There is also a hardware complement to graphical applications: the Microsoft Mouse. An unprecedented 1.5 million users have found that a simple point and click eliminates complicated keyboard commands.

Our Windows spreadsheet

macros from other programs.

The new generation of PCs will run OS/2 with Presentation



*A simple point and click replaces mumbo-jumbo keyboard commands.*

Manager, taking our graphical screen to even greater heights. By unlocking the capability of these machines, users can easily switch between programs almost instantly. Members of a workgroup can work together on an unlimited number of tasks.

And finally, every kind of program, from spreadsheets to electronic mail to word processing, works in a common way. To the user, learning one is a quick step toward learning them all. To the corporate bottom line, it means far less valuable time and money are spent on training.

But the real practicality of the graphical user interface comes to life when, inevitably, it appears on every computer screen, everywhere. And networking becomes not only possible, but required in this competitive world.

When you think about it, the goal Microsoft set in 1975 of seeing a computer on every desk and in every home seems close at hand. Because, at Microsoft, our fierce pursuit of technology comes with a promise to keep.

Making it all make sense.

**Microsoft®**  
Making it all make sense.™



*WYSIWYG, as in What You See  
Is What You Get.  
No translation needed.*

program, Microsoft Excel, goes so far beyond just simple number-crunching that it has received

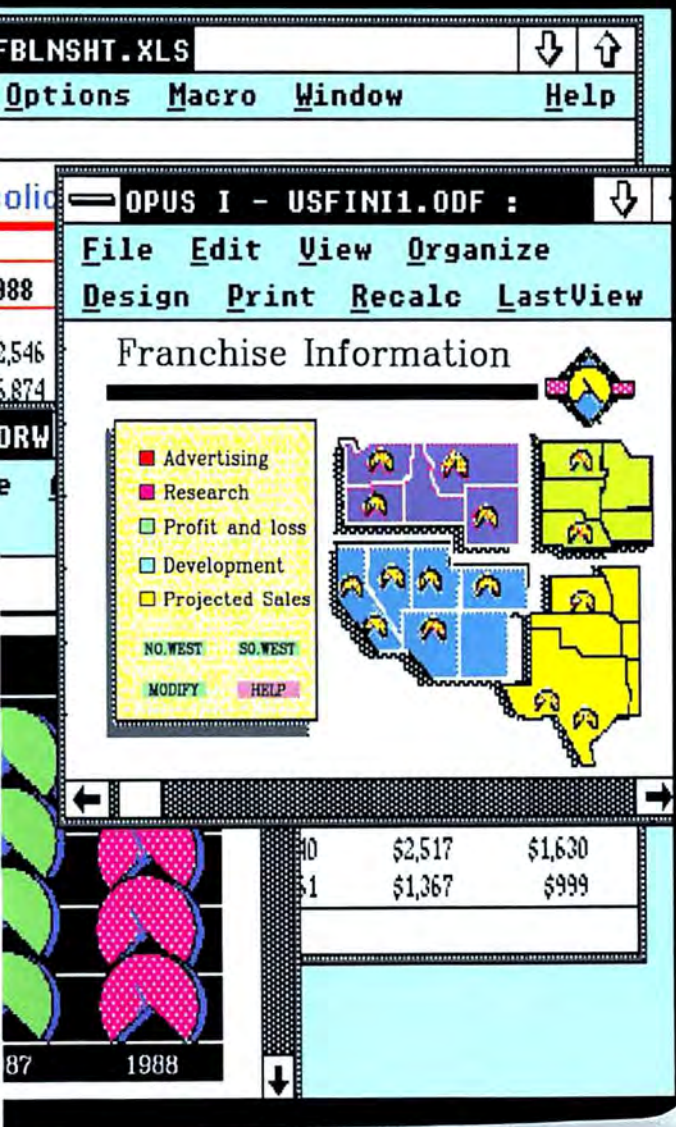
unparalleled acceptance in corporate America. More powerful than any other, it also easily delivers sophisticated charts, graphs, text and data pulled simultaneously from several sources. And to make it even easier, we built it to graciously accept files and

desktop publishing. And presentation applications that let you create a sophisticated graphics show, from your office instead of the art studio's.

With Windows giving laser printers their marching orders, all manner of documents take on



# Then w it prac



The philosophy behind Micro-  
soft includes another, equally

important, notion. That all the tech-  
nology in the  
world doesn't  
add up to a  
hill of beans  
unless it is  
practical,  
useful and,  
above all,  
easy.

*Easy commands from  
pull-down menus make  
window-shopping easy.*

Unless it makes sense.

That's why, whether you're  
using a Microsoft application  
on a Mac, an MS-DOS or even  
an OS/2 machine, it will have a  
comforting familiarity. Because  
today's computers share a  
common software guardian.  
Microsoft.

Thanks to our ground-  
breaking work on the graph-  
ical interface for the IBM  
PC and its compati-  
bles, virtually every  
personal computer  
can give its user a  
simpler way to  
get a lot more  
done. With a  
screen that  
thinks in pic-  
tures instead of words, arranged  
like papers on a desk. Naturally,







**Microsoft®**  
Making it all make sense.

*For the first in a series of articles detailing Bill Gates' perspectives on personal computing into the 1990s, call Microsoft at (800) 323-3577.  
In Canada call (416) 673-9811, outside North America, (206) 882-8661.*



1024X768 IBM COMPATIBLE VGA VIDEO CARD

# VGAWONDER™

T H E   S E C O N D   W O N D E R

# 1024X768

## Plus: VGA, EGA, CGA, MDA & Hercules on Standard MULTISYNC monitors

**Y**es! the Phenomenal VGAWONDER does it all at IBM Hardware level compatibility with automatic monitor detect and no dip switches or jumpers to set. A HOT CARD for the 286/386 POWER USER with AUTO BUS DETECT for 8 or 16 bit slots, running with a 16 bit datapath with 1:1 interleave. 100% IBM HARDWARE LEVEL COMPATIBILITY means that ALL software and operating systems designed for IBM systems will run. 1024 WILL BE DISPLAYED IN COLOR ON STANDARD MULTI-FREQUENCY MONITORS. Although these features are expected from ATI they are NOT AVAILABLE from other manufacturers. EGA on all monitors including RGB & TTL means a perfect card for networks. MOUSE ON BOARD! ATI built the mouse right in to this one, why not? No extra charge! VGAWONDER is available in both 512K and 256K Versions. Ask your dealer for more information.



Circle 302 on reader service card

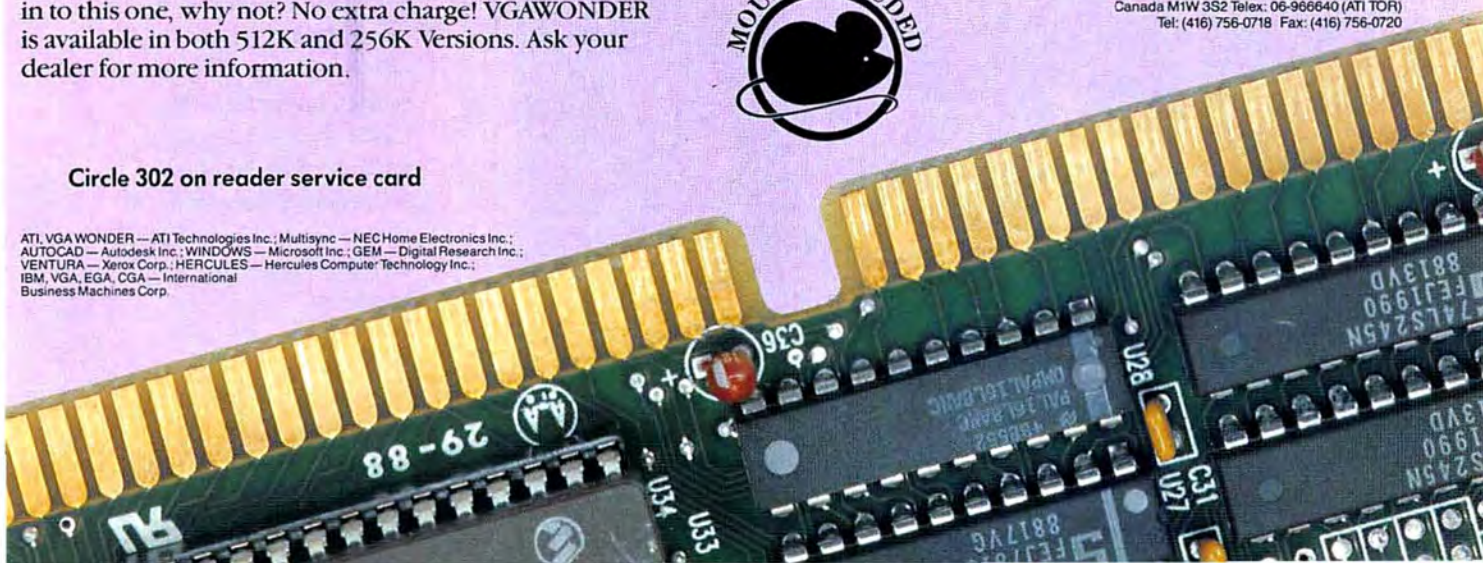


**TECHNOLOGIES INC.**

**Technology you can Trust.**

ATI Technologies Inc.  
3761 Victoria Park Ave., Scarborough, Ontario  
Canada M1W 3S2 Telex: 06-966640 (ATI TOR)  
Tel: (416) 756-0718 Fax: (416) 756-0720

ATI, VGA WONDER — ATI Technologies Inc.; Multisync — NEC Home Electronics Inc.;  
AUTOCAD — Autodesk Inc.; WINDOWS — Microsoft Inc.; GEM — Digital Research Inc.;  
VENTURA — Xerox Corp.; HERCULES — Hercules Computer Technology Inc.;  
IBM, VGA, EGA, CGA — International  
Business Machines Corp.







The original AnthroCart. Mobile.  
Incredibly strong. So many ways to solve  
your space and equipment problems.  
Choose different sizes. Move  
shelves around. Add space saving  
options.

AnthroCart. Well designed  
Technology Furniture.

Look for our name.

# AnthroCart®

Call us for more information: 800-325-3841



Made in U.S.A.  
All steel frame construction  
Easily holds up to 150 lbs.



AnthroCart and Technology Furniture are  
registered trademarks of Anthro.

**Anthro®  
Technology Furniture®**

3221 N.W. Yeon St.  
Portland, OR 97210  
503-241-7113  
Telex: 940103

Next  
in

## PC WORLD

January

### Windows Special Report

Senior Editor Robert Luhn spearheads the latest in our continuing series of editorial supplements. Packed with reviews and previews of Windows applications, the report also tackles the big questions: Is Windows a good investment? And will the Presentation Manager pay off?

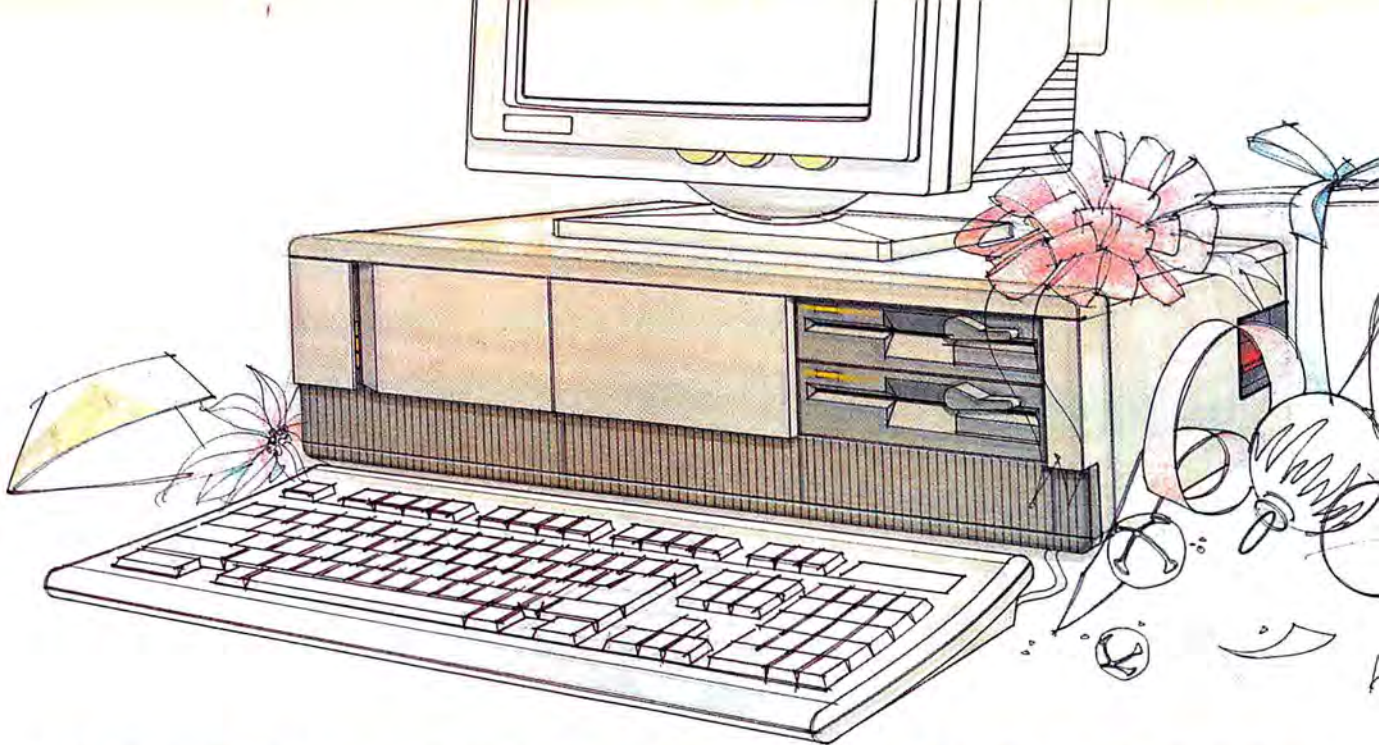
### More How To's

January kicks off our new, expanded How To section with 20 pages of hands-on productivity boosters. The roster includes step-by-step time-saving techniques for 1-2-3 users, LaserJet owners, WordStar aficionados, and a host of others.

### The Best Annual Index Ever

If you know you read it in *PC World* in 1988, you can find it fast in our all-new index, organized by subject. Just look up the topic or product category for a complete list of every review, feature, and how to—even Power Tips and Help Screen questions!





## Eltech Research Proudly Introduces

A new series of our own manufactured 386 and 286 based computers. These models are 9770, 9671, 8662 and 8362. This new line of computers also includes a nation-wide on-site service warranty, which covers parts and labor for one year. Eltech Research supplies you with quality and performance at a very good price.

### **Eltech 9770 . . . . . \$3,288.00**

80386-20 CPU, 8/20MHz clock speed, zero wait state, 1MB 32-bit RAM on board, two serial & one parallel ports, AMI BIOS, two 32-bit, five 16-bit and one 8-bit expansion slots, 80387 socket, 1.2MB and 1.44 MB floppy drives, HD/FD controller, 40MB hard disk (28ns access time), VGA card, full size AT case, 101 keyboard, VGA color monitor, free Wordstar 2000 plus or Professional 5.0 software; a \$495.00 value.

### **Eltech 9671 . . . . . \$2,903.00**

80386-16 CPU, 6/16MHz clock speed, zero wait state, 1MB 32-bit RAM on board, two serial & one parallel ports, AMI BIOS, two 32-bit, five 16-bit and one 8-bit expansion slots, 80387 socket, 1.2MB and 360K floppy drives, HD/FD controller, 40MB hard disk (28ns access time), EGA card, full size AT case, 101 keyboard, EGA color monitor, free Wordstar 2000 Plus or Professional 5.0 software; a \$495.00 value.



1725 McCandless Drive, Milpitas, CA. 95035  
**(408) 942-0990 (Sales).**  
**(408) 942-1067 Technical Support**

### **Eltech 8662 . . . . . \$2,179.00**

80286-16 CPU, 8/16 clock speed, zero wait state, 1 MB RAM on board (can populate to 4MB on motherboard), Phoenix BIOS, one 16-bit dedicated memory slot, five 16-bit and two 8-bit expansion slots, 80287 socket, 1.2MB floppy drive, HD/FD controller, 20MB hard disk (40ns access time), Hercules compatible monochrome card, small footprint case, 101 keyboard, amber monitor, free Wordstar 2000 Plus or Professional 5.0 software; a \$495.00 value.

### **Eltech 8382 . . . . . \$1,899.00**

80286-12 CPU, 8/12 MHz clock speed, zero wait state, 1MB RAM on board, AMI BIOS, four 16-bit and four 8-bit expansion slots, 80287 socket, 1.2MB floppy drive, HD/FD controller, 20MB hard disk (40ns access time), Hercules compatible monochrome card, small footprint case, 101 enhanced keyboard, amber monitor, free Wordstar 2000 Plus or professional 5.0 software; a \$495.00 value.

### **Eltech Laser Printer**

#### **PR100 . . . . . \$1,550.00**

100% HP Laser Jet II compatible, comes with 90 day on-site service.

#### **Optional extended on-site service**

**after 90 days . . . . . \$85.00**

Canadian Customers Please Call Our Canadian Distributor TOPOWER at (604) 275-1119  
 All prices are subject to change without notice. HP, Hercules, Wordstar, and MicroPro are trademarks or registered trademarks of their respective companies.



# telemart

Doing Business Since 1980 A Division of CW Marketing, Inc.

## LOGITECH MICE

LogiMouse	\$65
LogiMouse w/Paint Show	88
Logi Buss Mouse w/Paint Show	88
Logi Buss w/Publisher	105

LogiMouse w/Logi Cadd	\$105
Logi Buss Mouse w/Logi Cadd	105
LogiMouse w/Publisher	105
LogiTech Hi-Res Mouse	83
Logi Scan Man	Call

## SOFTWARE

### DATA BASE MANAGEMENT

Clipper	\$405
dBase IV	Call
dBase IV LAN	Call
DB-XL Diamond	107
Eureka	Call
Genifer	188
Nutshell	123
Nutshell Plus	185
Paradox 2.0	403
PFS: Professional File	Call
Q & A	185
Q & A Write	105
R:Base For DOS	425
Reflex	Call
VP Expert	115
VP Info	56

### MONEY MANAGEMENT

Dollars & Sense w/Forecast	\$91
Tobias	
Managing Your Money 4.0	114

### UTILITIES

1 DIR Plus	\$46
Brooklyn Bridge	69
Carousel 2.0	43
Copy II PC	18
Copywrite	40
Corefast	85
Cruise Control	29
Direct Access	48
Disk Optimizer 4.0	37
Disk Technician	56
Disk Technician Plus	69
DS Back-Up Plus	45
Fastback	75
Fastback Plus	Call
Keyworks	53
Laplink +	73
Mace Utilities	47
Microsoft Windows 286	54

### ACCESSORIES

Copy II	
Option Board Deluxe	\$99
MS Mach 20 Memory Plus	294
MS Mach 20 Baseboard	294
Masterpiece	79
Masterpiece Plus	92

Microsoft Windows 386	110
Norton Commander	43
Norton Editor	35
Norton Utilities 4.0	46
PC Tools Deluxe	36
Printworks for Dot Matrix	39
Printworks for Lasers	67
Sidekick Plus	125
Sideways	37
Smart Notes	43
SQZ Plus	53
Superkey	58
Unlock D Plus	52
Unlock Masterkey	99
XTree	34
XTree Professional	61

### WORD PROCESSORS

Easy Extra	\$53
Grandview	165
Multimate Advantage II	259
PFS: Professional Write	102
Volkswriter 3	132
Volkswriter Deluxe Plus	63
<b>Webster</b>	
NewWorld Writer	53
Prof. Spell Checker	32
New World Thesaurus	37
Word (Microsoft)	179
Word Perfect 4.2	198
Word Perfect 5.0	219
Word Perfect Executive	117
Word Perfect Library	58
Wordstar Pro Pack 5.0	Call
Wordstar 2000 Plus 3.0	Call

### TRAINING

Chuck Yeager	
Adv. Flight Simulator	\$25
<b>DISKETTES</b>	
Sony 3 1/2 S/S (100)	\$125
Sony 3 1/2 DS/DD (100)	179
Sony 3 1/2 High Density (100)	379
Sony 5 1/4 DS/DD (100)	65
Sony 5 1/4 High Density (100)	160
Lets C	38
Mavis Beacon Teaches Typing	28
MS Learning DOS	29
MS Flight Simulator	29
PC Logo	79
Turbo Tutor	42
Typing Instructor Encore	25
Typing Tutor IV	27



MEMBER  
**MMC**  
MICROCOMPUTER  
MARKETING COUNCIL  
of the  
Direct Marketing Association Inc.

- 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.

- No Charge for VISA and Mastercard.
- We Do Not Charge Your Card Until Your Order is Shipped.
- You Pay The Ground Shipping 1-10# \$6.00; 11-20# \$10.00 (Except Alaska & Hawaii). We Pay the Air Difference.
- Free Air Applies ONLY to Orders Over \$100.
- All products carry only manufacturer's warranties. We do not honor guarantees, rebates, trial period privileges or promotional programs offered by manufacturers.



ORDER LINE

# 1-800-634-9270

**Microsoft PC Excel SPECIALS Microsoft Word 4.0**  
**\$269 \$179**

**Microsoft PC Works Microsoft Windows 286**  
**\$76 \$269**

## SOFTWARE

### INTEGRATIVE SOFTWARE

Ability Plus ..... \$137  
 Enable 2.0 ..... 352  
 Framework III ..... 419  
 MS Works ..... 76  
 PFS: 1st Choice ..... 76  
 Smart Software System ..... 395  
 Symphony ..... 409

### NOVELL

ANW/286 w/Key Card ... \$1710  
 SFT NW 286 w/Key ... 2975  
 SFT/286 LVL1 w/Key Card 1899  
 All Others ..... Call

### MICE

PC Mouse II w/Paint  
 (Buss or Serial) ..... \$82  
 PC Mouse II w/Autodesk  
 (Buss or Serial) ..... 99  
 Omni Mouse ..... 49  
 Microsoft  
 Buss Mouse 1.0 ..... 89  
 Serial Mouse 1.0 ..... 89  
 Buss Mouse w/CADD ..... 104  
 Serial Mouse w/CADD ..... 104  
 Buss Mouse w/Windows .. 119  
 Serial Mouse w/Windows 119  
 Optomouse (PC Mouse)  
 w/Dr. Halo III ..... 78

### COMMUNICATIONS

Carbon Copy Plus ..... \$107  
 CompuServe  
 Subscription Kit ..... 19  
 Crosstalk XVI ..... 87  
 Crosstalk Mark IV ..... 109  
 Mirror II ..... 33  
 Remote II ..... 87  
 Smartcom II ..... 79  
 Smartcom III ..... 136

### LANGUAGES

MS Basic Compiler ..... \$167  
 C Compiler (Microsoft) ..... 254  
 Cobol Compiler (Microsoft) 508  
 MS Fortran Compiler 4.0 ... 254  
 Lattice C Compiler ..... 209  
 Macro  
 Assembler (Microsoft) .... 84  
 Pascal  
 Compiler (Microsoft) ..... 170  
 Quick Basic 4.0 ..... 56  
 Quick C ..... 56  
 Ryan McFarlan Fortran ... 375  
 Ryan McFarlan Cobol ..... 579  
 Turbo Basic ..... Call  
 Turbo C ..... Call  
 Turbo Pascal 4.0 ..... Call  
 Turbo Pascal Dev. Library .. Call  
 Turbo Prolog ..... Call

### DESKTOP PUBLISHING

Newsmaster II ..... \$38  
 Pagemaker 3.0 ..... 489  
 PFS: First Publisher ..... 65  
 Ventura Publishing ..... 469

### PROJECT MANAGEMENT

Harvard  
 Total Project Manager III .. Call  
 Microsoft Project 4.0 ..... \$279  
 Superproject Expert ..... 409  
 Timeline 3.0 ..... 315

### GRAPHICS

Designer ..... \$399  
 Energraphics ..... 199  
 Freelance Plus ..... 289  
 Generic CAD w/Dot Plot 3.0 72  
 Generic Cadd Level III ..... 97  
 Harvard Graphics 2.1 ..... 249  
 Microsoft Chart 3.0 ..... 223  
 News Room Professional ... 42  
 Printmaster Plus ..... 28  
 PrintShop ..... 32  
 Turbo Graphix Tool Box ... Call  
 VP Graphix ..... 56  
 Windows Draw!! ..... 165

### SPREADSHEET

Cambridge Analyst ..... \$80  
 HAL ..... 89  
 Lotus 1-2-3 Ver. 2.01 ..... 285  
 Lotus Agenda ..... 239  
 Lotus Manuscript ..... 289  
 MS Excel ..... 269  
 MS Excel/Mach 20 Bundle 591  
 MS Multiplan 4.0 ..... 110  
 PFS Professional Plan ..... 51  
 Quattro ..... 140  
 Supercalc 4 ..... 278  
 Twin Advanced ..... 62  
 Twin Classic ..... 32  
 VP Planner ..... Call  
 VP Planner Plus ..... 112

### ACCOUNTING

ACCPAC Easy ..... \$53  
 ACCPAC BPI ..... 229  
 Bedford Accounting ..... 139  
 DAC Easy Accounting ..... 53  
 DAC Easy Payroll ..... 53  
 In-House Accountant ..... 103  
 One Write Plus 2.0 ..... 117  
 One Write  
 A/R, A/P, Payroll ..... 117 ea.  
 Time Slips ..... 69  
 TimeSlips III ..... 108


**FREE**

AIR EXPRESS SHIPPING  
 You Pay The Ground Shipping  
 We Pay The Air Difference

\* To Place An Order: 1-800-634-9270  
 \* To Follow Up On An Order: (602) 944-1037.  
 \* Order Line Hours: Mon.-Fri. 7:00 am-6:00 pm  
 Saturday 9:00 a.m.-1:00 p.m.

Mailing Address:  
 8804 N. 23rd Avenue / Phoenix, Arizona 85021

**telemart**  
**ORDER LINE**

# 1-800-634-9270



# telemart

Doing Business Since 1980 A Division of CW Marketing, Inc.

**The Acknowledged Leader**  
**in the Computer Mail Order Industry**  
*Call About the Availability of Other Products Not Listed.*

## MIT SYSTEMS



Pictured Above PC/XT Turbo ➔

**MIT**  
**PC/XT TURBO**

10MHz, 640K Memory, 150 Watt PWR Supply,  
 AT Style Keyboard, 1-640K Drive, AT Style Case,  
 Monographics Card w/parallel Printer Port,  
 Clock Card w/Serial Port,  
 Mono Monitor w/Swivel Tilt Base

**\$701**

System w/2 Drives . . . . . \$ 777  
 System w/1-20 MG Drive . . . . . 984  
 System w/1-30 MG Drive . . . . . 1011

**MIT**  
**386**

16 MHz, 1024K Memory,  
 200 Watt Power Supply,  
 Enhanced Keyboard,  
 1.2 MG Floppy Drive

**\$1899**

System w/1.2 Floppy & 40 MG Drive . . . \$2285

Pictured Below PC/386 ➔



Pictured Above PC/286 Turbo ➔

**MIT**  
**PC/286 TURBO**

12 MHz, 1024K Memory,  
 200 Watt PWR Supply,  
 1.2 MG Floppy Drive,  
 Enhanced AT-Style Keyboard,  
 EGA Monitor, AT Multi I/O Card, EGA Card

**\$1686**

System w/1.2 Floppy & 40 MG Drive . . . \$2069

## MIT MONITORS, CARDS, MODEMS & KEYBOARDS

Turbo w/640K 1 Drive . . . . .	\$ 550	MIT A B Switch Box (Par/Par) . . . . .	\$ 50
Turbo PC/XT w/640K & 2 Drives . . . . .	625	MIT I/O Serial Clock . . . . .	39
Turbo PC/XT w/640K & 1 Drive & 20 MG . . . . .	825	MIT I/O Serial-Parallel . . . . .	38
Turbo PC/XT w/640K & 1 Drive & 30 MG . . . . .	849	MIT Monographics Card . . . . .	55
PC 286 12 MHz Zero Wait State w/1024K, 1.2 Floppy Drive . . . . .	1190	MIT AT Multi I/O . . . . .	65
PC 286 12 MHz Zero Wait State w/1024K, 1.2 Floppy Drive, 40 MG . . . . .	1575	MIT XT Multi I/O . . . . .	65
MIT Amber Monitor W/SW Tilt . . . . .	95	MIT 1200B Modem (INT) with Software . . . . .	65
MIT Color Monitor . . . . .	235	MIT 1200B Modem (EXT) with Software . . . . .	85
MIT EGA Monitor . . . . .	345	MIT 2400B Modem (INT) with Software . . . . .	129
MIT Auto Switch EGA Card . . . . .	139	MIT 2400B Modem (EXT) with Software . . . . .	145
MIT Color Card . . . . .	55	MIT Enhanced Keyboard . . . . .	65
MIT VGA Card . . . . .	229	MIT VGA Monitor . . . . .	355



ORDER LINE

1-800-634-9270

## HARDWARE

## PRINTERS

<b>Alps</b>		<b>Star Micronics</b>	
Allegro	\$345	NX 1000 Rainbow	235
ALQ224E	599	NX 1000	169
ALQ318	575	NX 15	315
ALQ324E	749	NX 2400	320
2418	885	NB 2410	449
2424	955	<b>Toshiba</b>	
P2000	679	321 SL	489
2100	1095	341 SL	655
Other Models	Call	351 SX	939
<b>AST Turbo Laser</b>	3639	Page Laser	2415
<b>Citizen Printers</b>		<b>Okidata</b>	
120D	149	182 +	209
180D	165	292E	355
MSP 40	299	293E	489
MSP 45	395	294	729
MSP 50	329	320	330
MSP 55	465	321	459
Premier 35	505	390	1569
Tribute 124	475	459	2415
<b>Diconix 150</b>	309	391	625
300	485	Laserline 6	1325
<b>Epson Printers</b>	Call	<b>Panasonic</b>	
<b>FUJITSU</b>		1080 I M2	165
DX2300	445	1091 I M2	189
DX2400	515	1092 I	325
<b>Hewlett-Packard</b>		1524	549
Desk Jet	719	1592	399
Laser Jet Series II	1805	1595	449
Paint Jet	1090	3131	305
Scan Jet	1525	3151	475
<b>NEC</b>		Laser 4450	1635
P2200	350	<b>Anchor</b>	
P5200	515	1200 B w/software	\$60
P5300	679	1200 EXT	85
Other Models	Call	2400 B w/software	115
<b>NOVELL</b>		2400 EXT	130
Altec Passive Hub	\$29	<b>Hayes</b>	
AQUILA 8 Port Active Hub	279	1200	275
AQUILA Arcnet Card	99	1200B	259
SMC Mdl 110 Arcnet Card	129	2400B	399
Other Boards	Call	<b>Prometheus</b>	
<b>TERMINALS</b>		1200B w/Software	70
Wyse		2400B w/Software	125
30	\$285	2400G	149
50	369	<b>US Robotics</b>	
85	439	Password 1200	150
		Courier 2400	289
		Courier 2400E	335
		HST 9600	635
		<b>SPORTSTER 2400 B</b>	
		w/software	125

## HARD CARDS

<b>Plus</b>	
20 MG	\$519
40 MG	659

## COMPUTERS

<b>AST</b>	
Model 80	\$1440
Model 140X	2285
Model 340	3999
Model 390	5409
Other Models	Call
<b>NEC</b>	
Multispeed EL II	1479
Multispeed HD	2329
<b>Toshiba</b>	
T-1000	785
T-1200F	1370
T-1200H	2285
1200FB	1569
1200HB	2415
T-3200	3785
T-5100	4895

## MONITORS

<b>Amdek</b>	
210A	\$80
410	130
432	149
<b>NEC</b>	
Multisync II	595
Multisync Plus	899
Multisync XL	2069
Monographic System	1299
Other Models	Call
<b>Princeton</b>	
Ultrasync	515
Max 12	129
Max 15	199
<b>Samsung</b>	Call
<b>Sony Multiscan (1303)</b>	535
<b>Mitsubishi</b>	
Diamond Scan 14"	499
<b>Zenith</b>	
1490	605

## KEYBOARDS

<b>Keytronics</b>	
KB5151	\$119
KB5153	149
KB101 Plus	85
<b>American Power Supply</b>	
330 XT	275
450 AT	409

## DISK DRIVES

<b>Bernoulli Box</b>	
10 Meg	\$889
20 Meg	1245
40 Meg	1559
Beta Ext, 20 MG	1005
Beta Int, 20 MG	789

<b>Seagate</b>	
20 MG w/WD Controller	275
251-1	469
Other Models	Call

<b>Teac</b>	
1.2 MEG AT	89
Floppy F55 BV	79

<b>Toshiba</b>	
3.5 Dr 720K	89
3.5 Dr 1.4MB	99

## BOARDS

<b>AST</b>	
Hot Shot	\$345
Six Pack Plus w/64K	115
Six Pack Plus w/384K	265
<b>Xformer</b>	579
AT Rampage	385
VGA	239
VGA Plus	305

<b>ATI</b>	
EGA Wonder	220
VIP VGA	260

<b>Hercules</b>	
Color Card	145
Graphics Card Plus	170
Incolor	199

<b>Intel</b>	
Above Board PS/2	259
Inboard 386 PC	760
Inboard 386 AT	1025
4020 Above Board	365
80287-6	155
80387-16	345

<b>Orchid</b>	
Designer VGA	299
Tiny Turbo	259
Twin Turbo	359
VGA	199

<b>Paradise</b>	
Autoswitch 350	155
VGA +	259
VGA Professional	380

<b>Video-7</b>	
Fastwrite VGA	355
VGA	265
Vega Deluxe	199
V-RAM	469

FEDERAL

FREE

AIR EXPRESS SHIPPING  
You Pay The Ground Shipping  
We Pay The Air Difference

ORDER LINE

1-800-634-9270



# The new quality benchmark in powerful computing

Two Year  
Fixed Disk Drive Warranty



While others in the computer industry seem preoccupied with offering cheap technology, Arche Technologies offers something different: Quality Technology.

That's why the Arche Rival 286 and Rival 386 were designed by some of the best engineers in the business, and why each unit is hand assembled in the United States, passing through a rigorous series of tests and inspections.



## QUALITY ABOVE ALL™

### Rival™ 386

- 80386 10/20 MHz
- 2MB RAM Expandable to 16MB
- 80287/80387 Co-processor Socket
- Two 8 Bit and Four 16/8 Bit and Two 32 Bit Expansion Slots
- Battery Backed Real Time Clock/Calendar
- 1.2MB/360KB 5.25" Disk Drive
- Enhanced 101 Keyboard
- 2-Parallel and 2-Serial Ports
- Monochrome and Hercules™ Graphics Compatible Display Adapter
- 14" High-Resolution (1000 line), Flat Screen, Amber Monitor
- 16 Bit FDD/HDD Controller (Supports both 5.25" and 3.5" including the new IBM® 1.44MB PS/2™ Format)
- 200 Watt Switching 110/220V Power Supply
- Small Foot Print 16.5" (D) x 17.125" (W) x 6.18" (H)
- MS-DOS® 3.3 and GW BASIC®
- Two Year Limited Warranty
- **Only \$4,395.00**



1-800-422-4674

Arche Technologies, Inc., Corporate Headquarters and Manufacturing, 48881 Kato Road, Fremont, CA 94539

Arche, Arche Logo, Rival 286, Rival 386, Pro-File 286 Server, Pro-File 386 Server, Station 88, Super Station 286, and Quality Above All are trademarks of Arche Technologies, Inc. ©Arche Technologies, Inc., 1988. The Bettmann Archive, Inc.

Circle 51 on reader service card



# Why the Graphic User Interface Is Important

The graphic user interface is poised to meet the current challenge—

how to merge text and graphics in a way that users understand.



Stewart  
Alsop

**B**y now, even the most die-hard DOS command-line fan knows that the major benefit of graphic user interfaces is that you end up with programs that all perform basic tasks in the same way, so you don't have to think about how each program saves files or sends output to printers. I won't bore you by reciting the benefits of a standardized user interface. What hasn't been talked about much are the more subtle benefits of a graphic user interface and how it will change the way users think of their personal computers.

The central idea about a graphic user interface is that everything on the screen becomes bit-mapped. That means objects can be created and modified on the screen simply by turning pixels (the dots that make up what you see on the screen) on and off.

Text, for instance, is no longer fixed by whatever set of characters is implanted in the machine's innards. With a graphic user interface, you can give text any font or style or size you want. As a result, you gradually begin to think differently about output. The printing process has become a way of trying to get some recalcitrant printer to understand what you see in your mind without your having any way to describe it. With a graph-

ic user interface, you merely change the text on the screen to what you think it should look like, and the machine reproduces what's on the screen. Text becomes a dual weapon for communication: You can use both content and appearance to help communicate your ideas.

Once you begin to think in terms of "graphical" text, you also realize that you can print what's on your screen with anything that supports the notion of putting dots together to form graphics. That includes dot matrix, laser, and ink jet printers; plotters; facsimile machines; typesetting machines; and, of course, other computers with graphic user interfaces and displays. Being able to make pictures on a variety of dot-oriented display or printing devices suddenly turns printing into an abstract notion: sending files. Taking that notion one step further leads to a world where your problem is identifying the right address for the recipient instead of figuring out whether your computer can talk to your printer.

In a similar fashion, graphic user interfaces lead users to think of pictures and graphics as objects that can be modified or  
*(continues)*





## Make them work for only \$19.95

Computers sit idle and software snoozes on the shelf because the manual is so "complete" that it's difficult to find the simple instructions you actually need.

### The Solution

Video Logic presents the most needed answers in easy, graphical and informative video approach:

#### LogicWare™

Sit back, relax and put that VCR to work. We take the notes for you!

#### LogicNotes™

Our exclusive printed companion, creates a new learning approach. That makes the difference.

### Videos ready to order now!

**Lotus 1-2-3® and Work-alikes**, Learn how it works, menu structure, most used commands gives instructions to create simple budgets.

**Computerized Accounting**, Learn it in the easiest way, save time and money good for office and home accounting. **MS-DOS®** how the most commonly used commands manage your files. It gives you easier keystroke directions and ideas to better use DOS.

**Project Management**, LogicWare shows how Gantt, Pert or CPM computerized systems work in your benefit, saving time and money in all projects.

### An Amazing Value!

Each LogicWare (VHS) is only \$19.95 plus \$5.00 shipping and includes your personal LogicNotes - a \$9.95 value - absolutely free and we offer you a **MONEY BACK GUARANTEE**.

If within 10 days of receipt you return the LogicWare and the LogicNotes in good condition, we will gladly return your money minus \$7.50 restocking fee.

**Order now by calling our 24 hours - 7 days a week toll-free #**

**1-800-421-5355**

Please orders only, have your major credit card ready or by mail send your Name, Address, Phone #, Credit Card Type, Number and Expiration date or Check or Money Order to the address below, sorry no COD's or PO's, Texas Residents add 8% Sales Tax.



18111 Preston Road Suite 500  
Dallas, Texas 75252

Phone (214) 931-0024 Fax (214) 931-2310  
Reg. Trade Marks: Lotus and 1-2-3, Lotus Dev. Corp.  
MS-DOS Microsoft, Corp.  
Video Logic, LogicWare and LogicNotes trademarks of M-USA Business Systems, Inc.

created at will, using simple drawing or painting tools. Since many of these tools become available inside other kinds of programs like spreadsheets or word processors, the user faces no penalty for experimenting with graphics. And users begin to use graphics in ways and to a degree they had never previously considered.

The visual nature of the graphic user interface (even when all you're looking at is text) changes the way you think about starting new activities. You interact with a standard DOS computer through commands typed on the keyboard, which means your understanding of what is possible is predefined by how well you can translate what you want to do into keyboard commands. For example, when you want to move a group of files from one directory to another, you need to think about what makes those files similar, translate that similarity and the action into a DOS command (`COPY C:/LETTERS/*.SEP C:/MAIL`), and type it on the keyboard. A graphic user interface liberates you from the keyboard so you can experiment. To move the group of files, you point at the files you want and then drag them to the place you want them. If you miss one, you don't have to retype or reconfigure the command.

This visual, ad hoc approach is called the noun-verb action. With a graphic user interface, you select what you want (noun) and then do what you want (verb). In DOS, you first say what you want to do (verb) and then tell DOS what you want to do it with (noun). Since we have been trained to speak in a noun-verb fashion, the graphic user

interface lets us act naturally without fear of messing up.

In my last column, I bemoaned the shortcomings of the Presentation Manager (see "A Perspective on the Presentation Manager," November 1988). Once IBM and Microsoft bring the Presentation Manager up to par and software developers create a complete set of applications for it, I'm willing to bet that every user is going to feel a lot more productive, better at communicating, and less wary of experimenting. That sure sounds like a good move to me. ●

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

### POWER TIP NO. 22

#### Fast Navigation in 1-2-3

Making changes to a massive 1-2-3 worksheet can require you to travel to a distant cell. If you forget where you started out, finding your way back involves time-consuming keystrokes. Before you begin a worksheet search, tap the <Plus> key. Once you find the data you're looking for, hit <Esc>, and the cursor jumps back to the starting point. Hit <Esc> once more, and the plus sign disappears.

Bruno Terkaly  
Corte Madera, California



# Here's an offer only the most analytical minds in America can appreciate.



Buy 1.

Get 1 free.

After exercising your grey matter with a few hundred "what if's" every day, it's nice to have a no-brainer to deal with. How's this: for every Lotus® 1-2-3® Release 2.01 you buy on or after September 6, 1988<sup>(1)</sup>, you get a free 1-2-3 Release 3 Upgrade as soon as it's available. (Be sure to save your proof of purchase.)

Easy decision.

After all, 1-2-3 Release 2.01 has recently been rated the top-performing

spreadsheet for an unprecedented fifth straight year by the NSTL.<sup>(2)</sup> In fact, 1-2-3 is the backbone of business, with over 7 million users who depend on it everyday.

Plus, the upcoming 1-2-3 Release 3<sup>(3)</sup> will be the most powerful spreadsheet on the market by far, yet it will offer the familiar 1-2-3 interface and be fully compatible with all your present 1-2-3 data, macros and applications.

The new 1-2-3 will offer an exciting

3-dimensional spreadsheet for better organization and consolidation of data. Plus, improved graphics and powerful database enhancements, including the ability to access external databases, like dBase®, from within your spreadsheet.

See your Lotus Authorized Dealer or Lotus sales rep for details.

## Lotus 1-2-3

(1) Upgrade offer valid September 6, 1988 through 30 days after the 1-2-3 Release 3 ship date. (2) National Software Testing Laboratories, Inc. Software Digest Ratings Report, June, 1988. (3) 1-2-3 system requirements will vary from Release 2.01 to Release 3. 1-2-3 Release 3 runs under DOS and OS/2. Hard disk and 640K required. Lotus certified compatible PC with 80286 processor or better recommended. Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. dBase is a registered trademark of Ashton-Tate Corporation.



# REPLACE YO

PC WORLD

"Upgrade product of the year."  
...PC World



**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.**

**I**s 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,



*Multi-task with Lotus 1-2-3 and other applications running side-by-side on the Microsoft Windows/386 desktop.*

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.

EGA or disk controller cards.

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



# 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 sizers 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.**

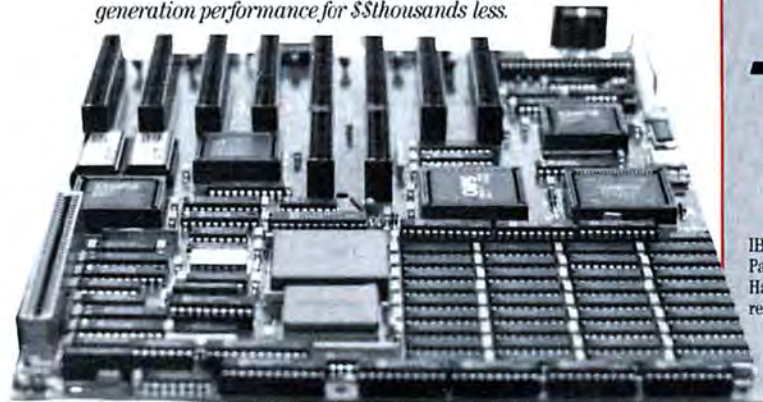
Add up to 15 Mbytes of system memory with Renegade™ expansion modules that plug right into your Renegade 386™ 32-bit expansion slot. *And run with no loss of speed*—something no IBM or Compaq model can match.

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 \$5thousands 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.



# Peter Norton proudly presents more of the same.



Well, here we go again.  
The latest editions of the  
best-selling Norton Utilities  
have arrived.

And they're stuffed with the  
same sort of stuff that put us  
in first place in the first place.

Plus enough new features,  
functions and enhancements  
to keep us there with room  
to spare.

For example, our user  
interface, which *InfoWorld*  
said made the Utilities "as  
easy to use as possible",  
now comes with pop-up  
windows and dialog boxes.

Our new *Norton Control  
Center™* lets you define  
or alter a range of system  
settings—from cursor size to  
screen and palette colors—  
quickly and easily.

While our *Disk Test* helps you  
protect your data *before* you  
have a chance to lose it.

If you *want* to lose it, how-  
ever, you'll be glad to know  
that *WipeFile™* and *WipeDisk™*  
support DoD 5220.22-M  
116b(2).

(That's the Defense  
Department's latest data  
security specification.)  
**One small step for Norton.**

**One giant leap  
for the competition.**

Although many have tried,  
no one has ever come

close to matching our legendary  
*UnErase®* data recovery feature.

So we thought we'd give them  
something new to shoot for.

The *Norton Disk Doctor™* is  
the most significant advance  
in utility software technology



*The Norton Disk Companion is included,  
free, with both editions. The Norton  
Troubleshooter is yours with the Advanced Edition.*

since, well, *UnErase*.

If it can't repair your corrupted  
floppy or hard disk, then Buster,  
you've got one corrupt disk.

In which case, you'll need to  
refer to *The Norton Trouble-  
shooter*, a 158-page guide to find-  
ing and fixing most anything that  
could go wrong.

It's all included with the  
Advanced Edition. Along with  
the world's most powerful disk  
optimizer and a wish list of new  
technology sufficient to satisfy  
all those customers who've been  
politely writing and calling us.

Asking for more of the same.

**Peter Norton**  
COMPUTING



All Utilities now support large hard disks under DOS 4.0, COMPAQ DOS 3.31, and the PC-MOS/386 multi-tasking operating system.  
Designed for the IBM® PS/2® and PC families and 100% compatibles. Available at most software dealers. © 1988 Peter Norton Computing, Inc.

Circle 92 on reader service card



# 1989— A Year of Reckoning

Both IBM and AT&T set industry standards that changed the course of computing.

But how they did it, and why, reveals some truths about the industry.



**William  
F. Zachmann**

It isn't much of an exaggeration to say that 1989 will be a year of reckoning for IBM's personal computer strategy. By this time next year, everyone will know whether the new direction IBM has tried to set is a success or a failure.

If IBM is able to persuade the majority of users in corporate America that an IBM PS/2 with a Micro Channel Architecture bus running IBM OS/2 Extended Edition is a requirement for personal computers in their organizations, the company will be back in the driver's seat. If, however, the majority of those users are satisfied with systems using the Extended Industry Standard Architecture (EISA) based on the original AT bus and running DOS, OS/2, or UNIX, then IBM will have lost control of the desktop just as surely as AT&T lost control of UNIX.

The latter outcome appears more likely, at least partly because of the similarities between IBM's efforts and AT&T's. Both companies, in trying to reach too far, seem to have lost their balance.

In AT&T's case, the initial promises were explicit and egalitarian. AT&T originally positioned UNIX as a would-be multivendor standard that, even though developed and managed by AT&T, would be equally avail-

able to all. The original promise of UNIX was to provide a fair and impartial "level playing field" for all vendors willing to embrace it as a standard.

AT&T's difficulties with UNIX began when the former Ma Bell, instead of treating all suitors equally, began to develop a special and relatively exclusive relationship with one of them—the young, dashing, and rapidly growing Sun Microsystems. The cozy relationship between AT&T and Sun sufficiently roused the ire of other UNIX vendors to encourage them to band together (along with IBM and DEC) to demand a say in UNIX's future.

AT&T, faced with the alternatives of walking down a path nobody else would follow or yielding to the demands of the spurned, made the obvious choice. In doing so, however, AT&T ended up with far less control over UNIX than it had had in the first place. The effort to gain an exclusive advantage from UNIX was viewed by others as a betrayal of AT&T's original promises and resulted in even less of an advantage in the end.

In IBM's case, of course, the externals are quite different. IBM never intended to create an

*(continues)*



# 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. Ask for PROCOMM PLUS at a dealer near you. Or, call 314-474-8461.

## Thank You.



industry standard with the original IBM PC, XT, or, finally, with the AT. *Industry standard* implies a common ground, but IBM no more wanted to create one with the AT or its predecessors than Kimberly-Clark wanted to create a generic standard with Kleenex (which we are legally bound to write as a registered trade name).

Still, by publishing detailed technical specifications of the original IBM PC and touting its "open architecture," IBM led buyers to believe that it had taken a big step away from the proprietary systems of the past. When other vendors began to build systems compatible with the PC, XT, and AT, IBM at first appeared ready to meet competitors in the marketplace rather than in court. Most users took "open architecture" to mean that IBM intended to compete by offering better products rather than by locking out competitors.

However, in setting out to build a much more proprietary system with the PS/2 generally and Micro Channel Architecture in particular, IBM effectively reneged on its implicit promise of open architecture, just as AT&T reneged on the explicit promises of UNIX. The primary purpose of the PS/2 and the Micro Channel Architecture was to eliminate competitors rather than to serve customers. IBM began to concentrate as much on finding legal ways to eliminate competition as on delivering real value to its customers.

Still, even though they received no immediate benefits from the PS/2 and the Micro Channel Architecture, many users trusted IBM's explicit promises that both would offer substantial future advantages with IBM's OS/2 Extended Edi-

tion. The PS/2 and the MCA, IBM claimed, were worthwhile investments that would pay off in future benefits through IBM's new operating system software.

The future has become the present. Users are now (or soon will be) able to see for themselves the degree to which IBM's proprietary PS/2 Micro Channel Architecture systems are really capable of providing better performance, function, or value than industry standard systems from other vendors. The cloud of vaporware is lifting to reveal what is real...and what is not. ●

*This is Will Zachmann's last column for PC World.*

### POWER TIP NO. 23

#### Highlight Key Data in 1-2-3

If your spreadsheets contain a multitude of individual line items, it's sometimes difficult for co-workers to spot an important bit of information—such as net income. You can use 1-2-3's Range Unprotect command to highlight individual cells. Place the cell pointer on the desired cell, issue /Range Unprotect, and press <Enter> twice. On a color monitor the cell appears green; a monochrome monitor makes the cell brighter.

Bruno Terkaly  
Corte Madera, California



Compaq introduces  
a revolutionary

new personal computer.

With new display technology.

Breakthrough graphics technology.

Advanced storage technology.

New expansion technology.

Innovative modem technology.

New keyboard technology.

New surface mount technology.

Advanced peripheral technology.





And a battery.





Introducing the new  
COMPAQ SLT/286 Personal Computer.  
The first PC that puts true  
desktop performance in your lap.





# function PC this small, for compromise.

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



*Internal 2400-baud modem optional.*

Flexibility is built in. You can choose a high-speed 40- or 20-MB fixed disk drive to complement the standard 3 1/2" 1.44-MB diskette drive. Plus you can

easily expand the 640K of standard memory to 3.6 megabytes internally.

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

Other creature comforts are also on board. Like an optional internal 2400-baud modem. Room for two internal storage devices. Ports for a printer, external VGA monitor and other periph-



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

erals. You can even add a 12-MHz 80C287 coprocessor as an option to speed number crunching.

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

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

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

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



*Battery included for over three hours of power.*

## COMPAQ



# When you build a full- there's no room

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

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

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

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

First of all, we knew you wanted to wield a lot of power, without throwing around a lot of weight.

The new COMPAQ SLT/286 weighs in at just 14 lb., with a space-saving footprint. That means



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



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

it fits on an airline tray table with plenty of room to spare.

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

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

So you can work longer.

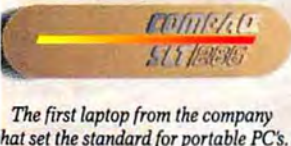
The COMPAQ SLT/286 has VGA graphics with 640x480 resolution with eight

shades of gray. New backlit screen technology produces text and graphics with higher contrast on a 10" diagonal screen. So things are easy to read.

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



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



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

It simply works better.



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



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

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

Today we offer the world's highest-performing portable personal computers. COMPAQ products consistently earn the industry's highest ratings for quality and user

satisfaction. And that's an achievement that stands unchallenged.

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

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

COMPAQ® is a trademark of Compaq Computer Corporation. Microsoft®, MS® and MS-DOS® are trademarks of Microsoft Corporation. MS® OS/2 is a product of Microsoft Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. \*Registered U.S. Patent and Trademark Office. ©1988 Compaq Computer Corporation. All rights reserved. Use of electronic equipment on board commercial aircraft is at the discretion of each airline.

## COMPAQ

It simply works better.



**FRUSTRATED** on stack of manuals and commands?

## YOU CAN DO YOUR WORK IN MINUTES WITH SMART, SIMPLE AND EASY-TO USE POWERFUL SOFTWARES!

Stop wasting your time and money!! Why waste your time on stack of manuals that takes days to read and forever to understand when you can get simple, smart and easy to use powerful software packages that will get the job done in less time. We know the solution is easy and simple when a software package is user-friendly. This is the reason we are glad to introduce our collection of smart and easy-to-use softwares for business and personal applications.

### VENUS - BUSINESS GRAPHICS

- A picture is worth a thousand words. Can you show me your sales earnings for 1988 in 5 minutes?

You probably can do it, but with a lot of sweat and brain racking. The Venus Business Graphics can do that for you just in time.

- Whether you're illustrating your projected sales in pie chart, bar graph or histogram, this simple and easy-to-use, smart but powerful business graphics program will deliver even what Auto CAD or Harvard Graphics won't deliver at such a low price!

**ONLY \$59.95**

**+ \$3.50 shipping and handling**

- You can display your organized data in pie chart, bar graph or histogram for an impressive presentation in just a few minutes!

- Send for your package.

### DOS MANAGER

Every system needs a manager! Even the experts know it. "Technical expertise can be acquired or contracted out, but an administrator that doesn't at least know DOS cannot do the job effectively." - Christine Strehlo, **Personal Computing**

- Now you can put your system under one manager  
- The DOS Manager and run your programs with a more organized operating system. Much easier to use and less costly than similar softwares. Here is what DOS Manager can do for you with a single keystroke!

**ONLY \$39.95**

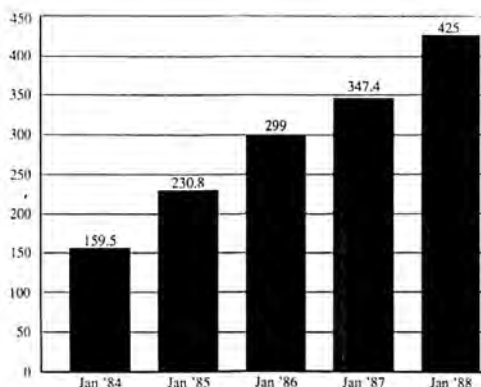
**+ \$3.50 shipping and handling**

- DOS Tutorial instructs users on DOS Commands  
- Excellent for training professionals with no time to waste.

- File Management. DOS shell, format, copy files  
- Print or device set ups and many more  
- Fast results and more productivity with minimum key-strokes! Not Copy Protected. Send for your package

**MINIMUM REQUIREMENTS:** Runs on PC, XT AT, and 100% compatibles. One or two disk drives, 250K memory, PC, DOS and MS DOS 2.0 or higher.

**Circle 281 on reader service card**



### VENUS - MICRO 1-2-3

**VENUS 1-2-3-** is a spreadsheet calculator that is simple to master in a few minutes.

You may be tempted to forget about LOTUS 1-2-3 once you've tried VENUS spreadsheet especially when it comes to simple or complicated applications that eat up lots of your productive time because VENUS Micro 1-2-3 does the job without hassles!

**ONLY \$49.95**

**+ \$3.50 shipping and handling**

- Auto calculation
- Generate Report
- Auto Recalculation
- Print Worksheet
- Note Pad, Save Work
- Produce a Report in Minutes!

### VENUS - MAIL LIST MANAGER

Whether you're sorting names for direct mail or customer information VENUS Mailing List Manager will make the job easier and handy for best results. Print professional looking lists.

- Print Name and Address Labels
- Phone or Directory Listing
- Customer Database
- Sort List by Zip or Area Codes
- Edit/Update Your Mailing List
- Easy to use. Comes in a simple package ready for even computer novices yet powerful and sophisticated.

Send for your package.

**ONLY \$49.95**

**+ \$3.50 shipping and handling**

**30 days money-back guarantee**  
**Dealer Inquiries Invited**

**SOFTWORLD**  
**PUBLISHING**

P.O. Box 1874  
Lowell, MA 01853  
Phone (603) 595-0728

PLEASE SEND ME: ☐ Dos Manager (\$39.95) ☐ Venus Micro 1-2-3 (\$49.95)  
☐ Venus Business Graphics (\$59.95) ☐ Venus Mail List Manager (\$49.95)  
Add \$3.50 shipping and handling per order.

### ORDER FORM

Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_ Phone \_\_\_\_\_

Check \_\_\_\_\_ Money Order \_\_\_\_\_ C.O.D. \_\_\_\_\_



# Share Printers

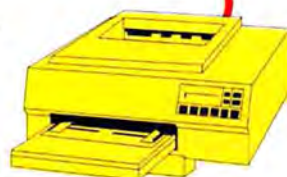


## Transfer files, and a whole lot more with ManyLink.



ManyLink for PCs is the inexpensive software package that lets two PCs (or a PC and a laptop or PS/2) share printers, transfer files and a whole lot more.

Just connect the PCs together with the supplied serial cable, install the software, and you can share any printer connected to either PC. All printing and file transfers are done in the background, so both PC users can continue working even while their files are being printed or transferred.



More than two PCs? ManyLink for Work Groups allows up to eight PCs to share printers and transfer files. There's no better way to make your printers and people work more productively.

With ManyLink for NetWare, any user can print to any printer cabled to any workstation on the network, saving time wasted trekking to file server printers. And users can transfer files from workstation to workstation with a simple "COPY" command.



All ManyLink products allow users to send short messages with a "CHAT" command, and provide security for sensitive files. NetLine's latest product, ManyLink for ISDN, lets you use your ISDN telecommunications system to network your computers, share printers and transfer files. So whether you have two computers, a NetWare network, or an ISDN system, when you think of sharing printers, think of ManyLink.

## NetLine

85 W. Center Street, Provo, UT 84603 (801) 373-6000  
NetWare is a registered trademark of Novell, Inc.

*NetLine products are now available through Micro D.*

**Circle 286 on reader service card**



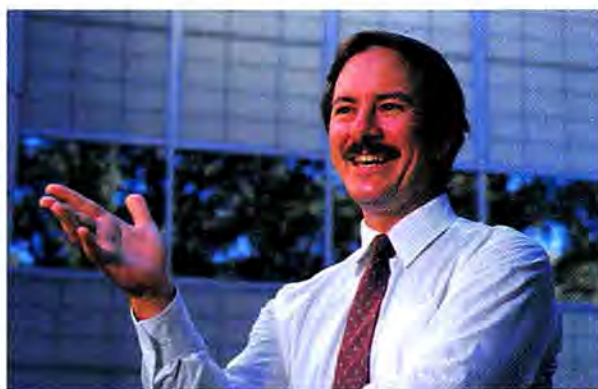
# INDUSTRY **I O** OUTLOOK

Edited by ERIC BENDER

Who's Afraid of IBM?

## Compatible Makers Drive a New Bus Architecture

*AT-Compatible Architecture Challenges the Micro Channel*



The current AT bus will meet almost all needs in the next few years, notes Compaq's Gary Stimac.

It was your classic Manhattan press conference in the requisite \$200-and-up-a-night hotel, the venue that PC vendors inevitably choose to celebrate the really important events. The ballroom was packed with members of the press, Wall Street analysts, and executives from every PC supplier of any note, save IBM. They had all rolled out at an uncivilized 8 a.m. for the announcement, whose details had already leaked to every major newspaper short of the *National Enquirer*.

This was the christening of Extended Industry Standard Architecture (EISA), a new input/output bus specification introduced by Compaq

Computer and eight other major system vendors and backed by virtually every IBM PC-compatibles manufacturer in the industry, save IBM.

EISA-based systems, they claimed, will deliver the same 32-bit data transfers and busmastering capabilities (which offer a foundation for intelligent peripherals) that IBM's highly touted Micro Channel Architecture (MCA) offers. The critical difference is that EISA accepts the current AT-style boards that IBM has snubbed.

But none of the designs will appear until late 1989, and when they do, they'll be ultra high performance workstations or network servers, targeted at that thin upper crust of the PC-buying public with

heavily transaction-oriented applications and open checkbooks.

Given that, what was all the excitement about? The answer has less to do with PC technology than with industry politics, opines International Data Corporation PC analyst Bruce Stephen. "For the first time, a group of manufacturers has banded together to take on IBM as a collective force," he maintains. "From a market dynamics standpoint, it indicates that IBM can no longer control computer buyers and move them toward its products simply because the IBM name is the be-all, end-all, and best-of-all."

Stephen and many others view the Micro Channel as a not-so-well-disguised attempt to steer IBM customers away from the architecture upon which its competitors depend and toward a proprietary solution. However, while IBM has shipped more than 1.5 million MCA-equipped PS/2s to loyalists since the machines were introduced 20 months ago, less brand-conscious buyers are snapping up even larger quantities of so-called Industry Standard Architecture (ISA) machines, leaving Big Blue with a shrinking corner of the marketplace.

The problem is that IBM hasn't delivered the intelligent hard drive controllers, coprocessing boards, and communica-

(continues)

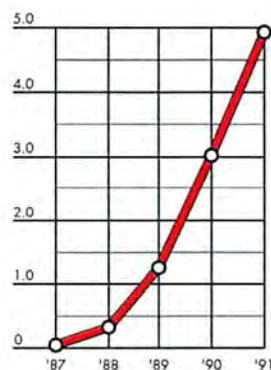
## OS/2 Still Not Ready

*Will Slow Burn Flare Up in 1989?*

No one expected a DOS replacement to be snapped up like a free lottery ticket. Even so, OS/2's proponents have been disappointed in the rate of progress since the next-generation operating system shipped in December 1987.

"IBM has been taken somewhat by surprise (continues on page 84)

## OS/2 Shipments Worldwide: Wait Until Next Year (in millions)



Source: IDC

While OS/2 should begin to spread rapidly next year, the system software will represent only a small fraction of the installed base until well into the 1990s, according to International Data Corporation predictions. Far more than 20 million PCs currently run under DOS.



## Evolutionary Strategy Pays Off for WordPerfect

*Blanket Support Makes Believers*



Dan Lunt emphasizes that WordPerfect has avoided "jumping on the bandwagon of new technologies."

The two top officers were formerly college professors. The marketing director had been hired as a programmer. The execu-

tive vice president got his job by pointing out that no one had filed the legal pa-

pers required to go into business.

But WordPerfect survived that quixotic start-up to build a 1000-employee company. Was it luck, or was the eight-year rise to the top of the word processing heap the result of careful calculation?

"A lot of people feel like WordPerfect came from nonexistence to stardom overnight," says Marketing Vice President Dan Lunt. "Part of what makes it a strong product is that it evolved in a slow way."

The program began life in 1979 as a word processor for Data General mini-computers. Besides the DG version (now accounting for 2 percent of sales), there are versions for DOS machines (85 percent), the Macintosh (about 6 percent), DEC

VAX (3 percent), and other machines (4 percent). A version for IBM mainframes is scheduled for 1989, as are versions for OS/2 1.0 (first quarter) and 1.1 (by year end), despite WordPerfect's initial hesitation.

That early reluctance "is rather typical of the way we look at things," says Lunt. "We haven't been interested in jumping on the bandwagon of new technologies."

Infocorp in Santa Clara, California, estimates WordPerfect's share of the PC word processing market as at least 30 percent—not as dominant a position as 1-2-3 or dBASE enjoys but at least twice the share of its nearest rival.

Bill Higgs, Infocorp's  
(continues on page 86)

## New Bus

(continued)

tions gateways that are a rationale for abandoning AT-style bus architecture in favor of the big, broad Micro Channel highway.

Even when such devices arrive, few buyers will require them—and thus few will need either MCA or EISA, maintains Gary Stimac, Compaq vice president of systems engineering.

Both advanced architectures offer data transfer rates three to four times the 8MB-per-second maximum bandwidth of the current ISA bus. But even heavily I/O-intensive applications today require

only 1.2MB per second at most. In a single-user environment, the current bus easily accommodates data transfers, claims Stimac.

Busmaster capabilities and the extra bandwidth will be mandatory for only the most demanding applications—say, a departmental file server connected to a number of PCs making frequent and complex requests. "I don't see a need for a single-user PC to go to EISA in the next four to five years," concludes Stimac.

"Of course [Compaq] would say that," counters senior IBM engineer Chet Heath, chief architect of the Micro Channel. "Otherwise they would be admitting that existing [ISA] technology is obso-

lete. The question is not what you can put on paper, but what you can put into silicon. What we specify is a reality, and it's been available for 18 months."

Heath ridicules the EISA proposal to mix AT-style cards with 32-bit busmasters, predicting technical problems. He suggests that Micro Channel busmasters will be announced this fall and delivered by spring.

His vision of individual computing also differs radically from Stimac's: "I believe the majority of us will use PCs to do multitasking. And when we do, I/O will operate concurrently because ap-

plications will operate concurrently."

Asked why users need concern themselves with products years before their full utility is realized, both Heath and Stimac insist that early bus introductions provide a necessary blueprint for third-party board makers.

But the real issue, says IDC's Stephen, is who owns the standards. EISA is being licensed for a nominal charge to all who want it, while IBM wants royalty payments of as much as 5 percent from sales of MCA compatibles. "I make it a very public right of passage," he says. "Compatibles vendors aren't afraid of IBM anymore." —Mike Hogan





Dr. Robert Ronstadt, creator of Ronstadt's Financials, is one of the nation's most widely-published authorities on entrepreneurship.

"Preparing financial projections doesn't have to be difficult. It's the software that people use that makes it that way."

"If more businesses had the benefit of comprehensive financial guidance, there would be more successful businesses."

# Financial Projections Fast and Easy

SPECIAL  
INTRODUCTORY OFFER!  
\$199.

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 for \$499. 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.)



## Acer Aims to Become "the IBM of Taiwan"

### *A Dragon by the Tail?*

In Chinese lore, the dragon is a benevolent symbol of power and good fortune. For Taiwanese computer makers, 1988—the Year of the Dragon—lived up to expectations and then some. The Republic of China will sell \$5.7 billion worth of computer hardware—vaulting the tiny island with a population of 20 million into sixth place among world computer suppliers.

The fastest-growing vendor is the Acer Group (formerly Multitech). Founded on a \$25,000 shoestring by five Taiwanese entrepreneurs—in the previous Year of the Dragon, 1976—Acer has more than doubled reve-

nues each year. The company sold \$331 million worth of equipment in 1987, and at midyear it was ahead of its \$550 million sales goal for 1988. The Acer Incorporated computer subsidiary employs around 4500 workers.

Competitors compare Acer to IBM—at least in Taiwan. Its 85 stores represent the largest retail computer chain on the island, it has large distributor and publishing subsidiaries, and it even peddles silicon to other PC makers.

But most of the 450,000  
(continues on page 88)



**Users still await OS/2 packages, says Microsoft's Mark Mackaman.**

processing, data base, graphics, and communications packages—and any front-line applications from Microsoft itself.

Symantec Corporation of Cupertino, California, is among those delivering OS/2 products, but while buyers express great interest, "there's not tremendous demand for OS/2 applications yet," says President Rod Turner.

Most software houses have waited for OS/2 1.1 (the version that includes the Presentation Manager) to ship before starting to get serious. This version was expected in mid-fall from IBM and in early 1989 from other leading vendors. OS/2 1.1 raises drastically higher development hurdles, and its technical contents seemed likely to change up to the last moment. As Lotus chairman Jim Manzi puts it, "We've been building on top of shifting sands for two years."

A handful of Presentation Manager packages may appear by year-end, but don't expect significant offerings in any force before second quarter 1989 at the earliest. Even Aldus, which claims that

PageMaker will be the first major Presentation Manager application, won't deliver until six months after the system software ships.

Despite assurances to the contrary from IBM and Microsoft, when the software does appear it probably won't run quickly without an 80386 machine. But the industry does expect prices to match those for DOS packages, at least until overwhelming new features are offered.

Dealers want to sell just one physical package with both DOS and OS/2 versions, which will help to keep sticker prices from rising. But the single-package demand raises tricky questions for software houses, who want to keep their own costs down by minimizing the amount of disks and documentation in the package.

One tactic crams together DOS and OS/2 software via OS/2's "family application program interface." Developers write one program file that checks to see which operating system is loaded; the program can then adjust itself accordingly. But such software can exploit only a limited subset of OS/2 functions, and its memory demands may be heavy baggage in DOS use. Microsoft and several other vendors are expected to take this route, at least for their word processing applications. Another group, which includes Symantec, has decided against it, at least for the moment. —Eric Bender

## OS/2

(continued)

that OS/2 didn't catch on faster," remarks Judith Hurwitz, senior analyst at Patty Seybold's Office Computing Group in Boston. While a year ago IBM executives were declaring that OS/2 would account for a majority of PC shipments by 1991 at the outside, the industry now expects the shift to come at least a year or two later.

IDC pegs worldwide OS/2 shipments at around a third of a million copies this year, rising to 1.3 million next year. Those figures are "reasonable," says Mark Mackaman, Microsoft's OS/2 product marketing manager, add-

ing that "acceptance of OS/2 is going to be slow." As Mackaman notes, no one shells out hundreds of dollars for the joys of executing directory commands—instead, customers take the plunge once application packages based on the new system platform offer more bang for the buck.

The first OS/2 packages began dribbling out in the first quarter of 1988, and important data base management packages began appearing in the summer. By fall, only about 50 applications had hit the shelves. Absent were the leading spreadsheet, word



# It Takes Guts To Turn A Laptop Into A Desktop.

Most desktop computers are entirely too big and too clumsy to make it off the desk, to



*Two IBM-compatible internal expansion slots let you access mainframe computers and LANs quickly and easily.*

say nothing of making it out of the office.

But with the lightweight portable Toshiba T3200, that's no longer a problem.

We've squeezed everything you'd expect from a powerful desktop computer into a light, slender 19-pound portable — packaged to go.



*A separate numeric keypad speeds numerical input.*

It has two built-in IBM-compatible expansion slots that let you tap into a mainframe computer or LAN. A 12MHz 286 microprocessor for high-speed data handling. A 40MB hard disk for quick, easy access to all your applications. A

720KB, 3 1/2" diskette drive. And a full megabyte of RAM that's expandable to 4MB for

The T3200 is backed by the Exceptional Care Program (no cost enrollment required). See your dealer for details. IBM is a registered trademark of International Business Machines Corporation.

memory that can rival even the most muscular desktops around.

It even comes with a built-in EGA gas plasma display and an EGA monitor



*A 40MB hard disk gives you fast access to all your most important applications.*

port — standard features that some desktops consider optional extras.



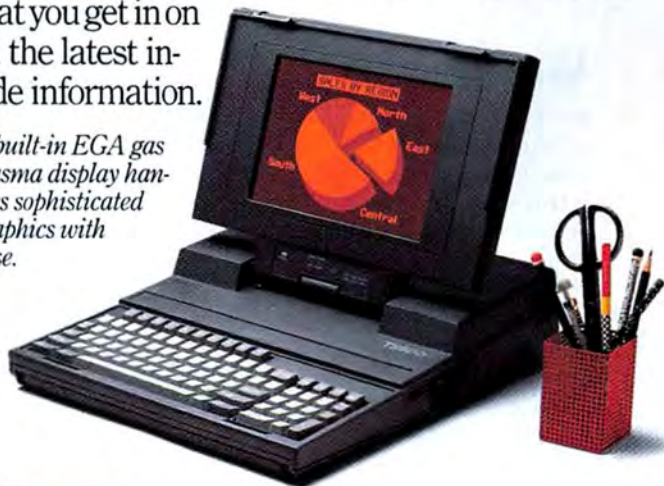
*A 12MHz 80286 microprocessor helps speed data handling.*

Yet, it gives you the freedom to go anywhere your work takes you — from your boardroom to your living room.

So call 1-800-457-7777 for the Toshiba computer and printer dealer nearest you. We'll see to it

that you get in on all the latest inside information.

*A built-in EGA gas plasma display handles sophisticated graphics with ease.*



In Touch with Tomorrow  
**TOSHIBA**

Toshiba America Inc., Information Systems Division

Circle 301 on reader service card



## Vendors Join Hands on Expanded Memory

*Hardware Approaches Vary Widely*



**A**ST Research and Intel slug it out in memory boards, while Lotus and Microsoft do battle in spreadsheets. But all four have joined hands to create an expanded-memory standard that quietly offers increasing benefits to an ever-broader crowd of users.

While expanded-memo-

ry boards once were restricted to power users, "now they're moving toward average users," says Timothy Dowling, Above-Board product manager at Intel Personal Computer Enhancement Operation in Hillsboro, Oregon.

As applications grow in size, word processors like *WordPerfect* and utilities like *SideKick Plus* are tapping expanded memory. And customers who buy environment packages like *Desqview* and *Windows* can run several large applications simultaneously. Even IBM, which bucked the trend for years, bought in last summer, incorporating EMS support in both DOS 4.00 and its own memory boards.

Launched in 1985, expanded memory made a clever end run around DOS's 640K memory limit, essentially by taking an idle chunk of memory above that limit and using it as a window to "page out" to more memory—up to 8MB. Intel and Lotus, the original instigators, wanted to provide a way to store large spreadsheet files. Microsoft soon signed on, and the scheme was codified as the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) 3.0.

AST, the largest board supplier, quickly responded with an even cleverer approach. A superset of

EMS, AST's Enhanced Expanded Memory Specification (EEMS) offered the ability to run code greater than 64K in expanded memory, access to up to 16MB of memory, and multitasking under DOS environments. Unsurprisingly, EEMS boards sold better than EMS.

In August 1987, with input from the vendor community, most notably AST, the original trio released EMS 4.0, a superset of the earlier methods. This latest rendition offers the chance to further boost performance (particularly in multitasking) and tap up to 32MB of memory. Additionally, it gives a single design target for software developers and for Intel, AST, and dozens of other board manufacturers.

Genelle Trader, marketing director for enhancement products at AST in Irvine, California, estimates that roughly 1.25 million expanded memory

*(continues)*

## WordPerfect

*(continued)*

director of software research, attributes most of WordPerfect's success to aggressive marketing, including a policy of unlimited toll-free support. In Higgs's view, "There's a perceived attitude that they care."

Technical support is a crucial marketing function, "as important to us as advertising, if not more so," says Lunt, who has supervised support since

the days when he answered the hot line as a programmer. WordPerfect goes far beyond lip service, with 375 support operators on the payroll and a phone bill for the toll-free lines that exceeds \$300,000 a month.

Providing blanket support does carry risks: When *WordPerfect 5.0* and *WordPerfect for the Mac* were released within days of each other, the ensuing flood of calls

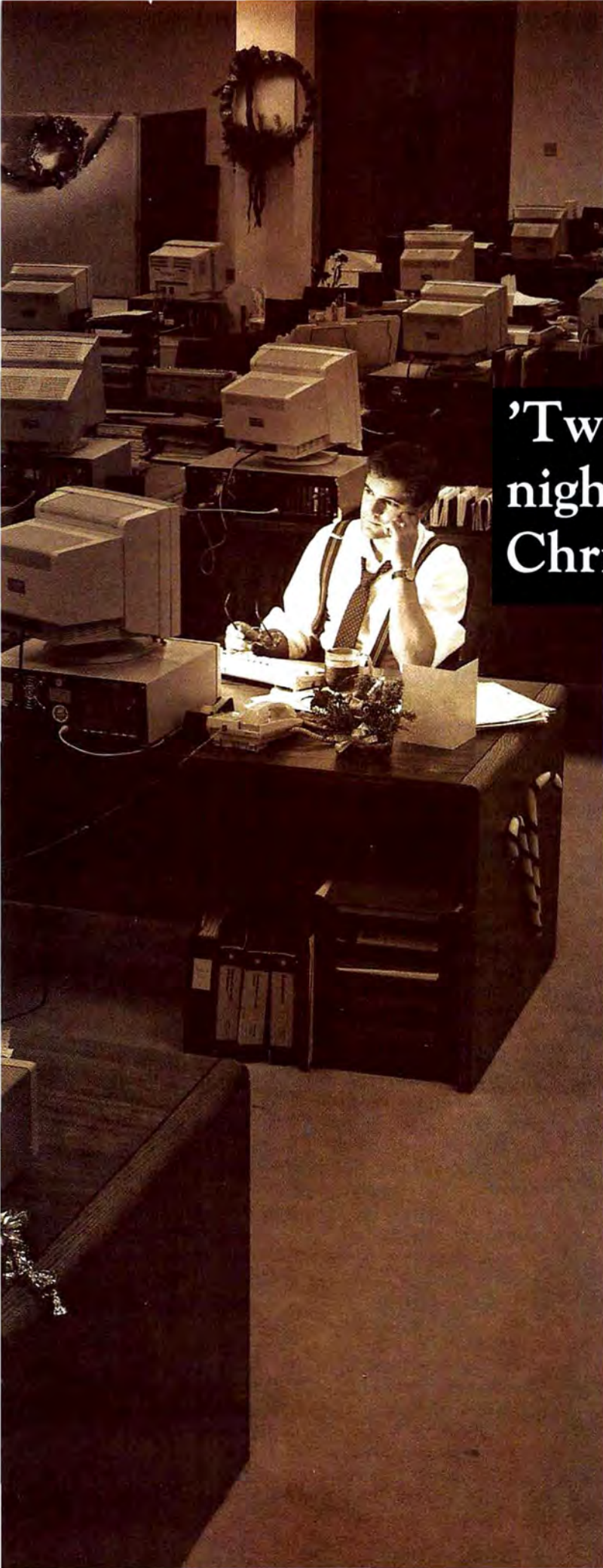
blocked all 800 lines into Utah, knocking out telemarketing centers for American Express, Delta Air Lines, and others.

WordPerfect also publishes *Library*, a group of utility programs; a spreadsheet called *PlanPerfect*; and the *DataPerfect* data base manager. The spreadsheet and data base, though, combine for only about 5 percent of sales. *WordPerfect* accounts for 85 percent, and *Library*, a surprising 10 percent. All of these "are

important product categories to WordPerfect," says Higgs. "A company likes to spread the risk around."

Still private, WordPerfect currently expects a \$160 million year with a very handsome profit. "We've been smart at times, and we've been lucky at times," says Lunt. "It's added up to a good formula." —Daniel J. Rosenbaum





A hard disk crash can happen at any time. What might have been an inconvenience any other night is a disaster tonight.

At Everex, we know that lost data can mean

'Twas the  
night before  
Christmas...

more than just time and money. Which is why we make a

complete line of reliable tape backup systems. We don't compromise on the details, because there's too much to lose.

Everex tape backups. Because you can't always save the day just by working into the night.



**EVEREX**

48431 Millmont Drive • Fremont, California

1-800-821-0806  
1-800-821-0807 in California  
Circle 185 on reader service card



## Acer

(continued)

PCs Acer will build this year are headed to the United States and Europe. And within a year, Acer will have the manufacturing capacity to turn out more than a million PCs annually.

Stan Shih, Acer's self-effacing 44-year-old chairman and chief executive, says Acer Group wants to be "more than just a PC company—we want to be the computer company of Taiwan." By 1990, he predicts, Acer will hit annual sales of \$1 billion.

The company's core business will remain PCs, and fulfilling Shih's dream means associating "Made in Taiwan" with legal, high-quality systems.

On the legal front, Shih and other computer executives lobbied for 1985 legislation granting copyright protection to software. Last summer, Acer and several other Taiwanese suppliers settled a long-running dispute with IBM over royalties for PC and AT clones and license fees for Micro Channel technology. ("There is no past license fee," Shih insists, "just an entry fee" to use IBM's patents.) Acer also hopes to blunt trade-protection risks by opening U.S. research and manufacturing facilities.

Acer's strategy also focuses on development. Alvin Tong, executive vice president for R&D and manufacturing, points out that Acer spends 5 percent of its revenues on R&D, compared to 1 percent for the typical Taiwanese company. In U.S. terms, he argues, "that's equivalent to about 10



percent, because of wage differentials."

The effort has paid off with what K. Y. Lee, vice president of product strategy, calls "superstar products"—like the 80386-based Acer 1100 that followed hot on the heels of Compaq's Deskpro 386 in late 1986. That machine loosened up distribution channels for the U.S. subsidiary, Acer Technologies of San Jose, California. Lee expects the recently launched 25-MHz 386 system to make another big splash.

In the early days, Acer grew its business by building boxes that other computer vendors sold under their own nameplates, and such relabeling deals still account for half of Acer's sales. The strong client list includes Siemens, Unisys, Philips, and many others.

Overall, Shih says, "we have to concentrate on competitiveness; that's how you gain market share. If we—all the Taiwanese companies—can take [another] 1 percent of IBM's business—well, that's a lot of business."

—Ed Bott

## Expanded Memory

(continued)

boards have been installed. All the boards support EMS 3.2 functions, and more than half support EEMS. However, products that take advantage of the 4.0 upgrade only began to appear in mid-1988, and their performance varies wildly.

"EMS is a software specification, and there are a million things in the spec you could implement in hardware to improve performance," Dowling comments.

While most EMS functions can be emulated in software, performance is uninspiring at best. At a minimum, effective EMS calls for memory-paging hardware. "The 80386 chip itself has paging capabilities built into it," Dowling notes. That factor has led Compaq and a few other vendors to offer EMS support for their 80386-based systems. (At press time, however, Compaq had not yet announced support for EMS 4.0.)

Almost at the other extreme in price and performance sit AST's RampagePlus boards, which boost throughput with 64 "mapping registers." (Expanded memory allocations are "mapped" by these hardware registers; adding alternate registers speeds operations. This scheme is particularly helpful when juggling multiple applications—each application needs a set of mapping registers to keep track of memory usage, and if the board has only one set and two applications are running,

they must alternate using it.)

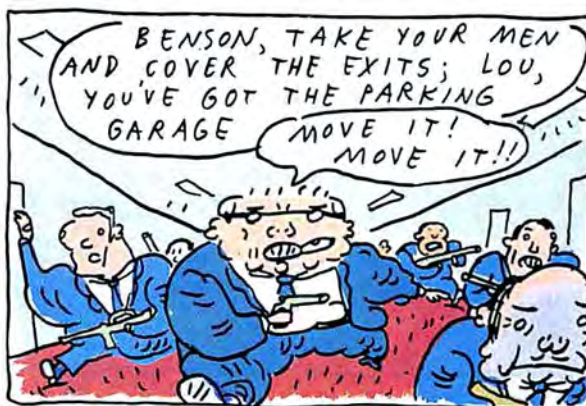
While earlier expanded memory schemes have attracted plenty of enlistees, EMS 4.0 has seen little third-party support so far. *Desqview* and *Windows/286* and *1386* are the first entries; applications installed in those environments don't have to be modified to get the advantages. (The Microsoft offerings also support the otherwise unrelated Extended Memory Specification, XMS, which lets them claim the extra 64K fillip of memory that *Desqview* has enjoyed for years.)

Expanded memory won't end memory crunch on networked PCs; the difficulty lies in persuading net vendors to modify their code. "It's an uphill battle," Dowling says. "They're all focusing on OS/2."

Another key concern is compatibility. "We've been surprised how few 4.0 boards really support *Windows*," reports Mark Zachmann, chairman of Z-Soft in Marietta, Georgia. The bugs lie in the accompanying software, and Dowling doesn't find them surprising: "EMS 4.0 is vastly more complicated than the previous spec or EEMS." —Eric Bender

*Ed Bott is PC World's managing editor, Mike Hogan is news editor, and frequent PC World contributor Daniel J. Rosenbaum has written three books about WordPerfect—the latest being Using WordPerfect for the Macintosh (Osborne/McGraw-Hill, Berkeley, California, 1988). ●*







# COMPUTER DIRECT

Since 1979

**WE WON'T BE UNDERSOLD!\***

Prices Expire 12-31-88

## \* 10 MHz IBM® Turbo XT Compatible System



**\$699<sup>95</sup>**

12" Hi-Res 35 MHz Monochrome Monitor  
Genuine IBM® Printer with Interface  
One Roll of Paper  
Word Processor, Spreadsheet & DataBase  
Complete DOS & System Tutor yours FREE!

## \* 10 MHz IBM® XT Compatible Computer

- 512K Professional XT Turbo Computer
- 360K Floppy Drive and Controller
- MS DOS & GW Basic
- Parallel, Serial, & Game Ports
- TTL Monochrome Monitor Card
- Super Fast 3-in-one card
- "AT Style" Keyboard
- Security Keylock & Clock/Calendar

**Our Low Sale Price**  
**\$599<sup>95</sup>**

List \$1995

## 12" TTL Monochrome Monitor



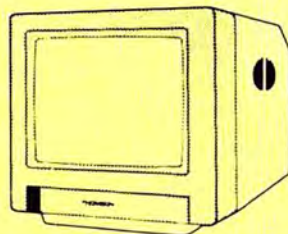
For IBM & Compatibles

- High Resolution
- 80 Column
- Non-glare Screen
- 100 Lines At Center
- Super Low Sale Price

**Our Low Sale Price**  
**\$49<sup>95</sup>**

List \$199

## 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<sup>95</sup>**

List \$399

## \* 16 MHz 286 IBM® AT Compatible Computer



- 80286 16 Bit Microprocessor
- 1.2 MEG Floppy Disk Drive
- 16MHz (Landmark CPU Rating)
- 101 Key "AT Style" Keyboard • 0 Wait State
- BIOS w/Built-in Support for 3 1/2" Drives
- Clock/Calendar & Security Keylock

**\$899<sup>95</sup>**

With Floppy/Hard Drive Controller Card, 512K RAM Memory Installed And Parallel & Serial Printer Ports

**Our Low Sale Price**  
**\$599<sup>95</sup>**

List \$2295

## 5 1/4" Floppy Disks

Double Sided  
Double Density

Minimum Quantity 50  
Maximum Quantity 250

**19¢ each**

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

## 3 1/2" DS-DD Micro Disks



**99¢ each**

Quantity of 10 .. \$11.90 (\$1.19 each)  
Quantity of 50 .. \$54.50 (\$1.09 each)  
Quantity of 100 ... \$99.00 (99¢ each)

## 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<sup>95</sup>**

List \$149

## 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** **\$99<sup>95</sup>**



Call

**IMMEDIATE ANSWER**  
**800 - BUY - WISE**

**800 - 289 - 9473**



Mail

**We Love Our Customers!**  
**COMPUTER DIRECT**  
22292 N. Pepper Rd.  
Barrington, IL 60010



# BEST SERVICE IN THE USA (Price is Not Enough!)

- Fast, Low Cost Delivery
- 15 Day Home Trial
- Free Technical Assistance
- No Credit Card Fees
- 90 Day Immediate Replacement
- Free Catalogs

## Seagate

### 20 MEG Harddrive

- Supports MS DOS
- 20 Mega Byte Storage
- Auto Boots When Powered Up
- Dual Hard Disk Controller Included
- Fits IBM PC, XT & Compatibles
- 1/2 Height - Takes 1/2 the Room of Full Size Drives

Sale Price **\$249<sup>95</sup>** List \$499

## Seagate

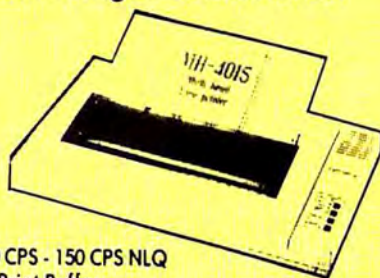
### Super Fast ST 251 40 MEG Harddrive

- 38 ms Access
- Supports MS DOS
- 40 Mega Byte Storage
- Auto Boots When Powered Up
- 1/2 Height - Takes 1/2 the Room of Full Size Drives

Sale **\$359<sup>95</sup>** List \$699

## 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<sup>95</sup>** List \$1995

## NEW Hi-Speed NLQ 180-II

• 180 CPS • Lifetime Warranty



- 2 yr. Immediate Replacement
- Dot Addressable Graphics
- High Speed Dot Matrix
- Italics - Elite - Condensed - Pica
- Tractor/Friction Feed
- Centronics Parallel Port
- \* Lifetime Warranty on Print Head
- 8K Print Buffer
- Near Letter Quality from Front Panel
- Low Cost Adapters available

Our Low Sale Price  
**\$149<sup>95</sup>** List \$499

## PC, XT & AT Compatible Internal Disk Drives

### TEAC 360K - 5 1/4" Drive

- Double Sided/Double Density
- Fits IBM PC, XT & Compatibles
- Half Height
- List Price \$199

**\$79<sup>95</sup>**

### TEAC 1.2 M - 5 1/4" Drive

- 1.2 Mega Byte Memory
- Fits IBM AT & Compatibles
- Double Sided/Double Density
- List Price \$199

**\$99<sup>95</sup>**

### TEAC 720K - 3 1/2" Drive

- Double Sided/Double Density
- Fits IBM PC, XT & Compatibles
- Half Height
- List Price \$199

**\$99<sup>95</sup>**

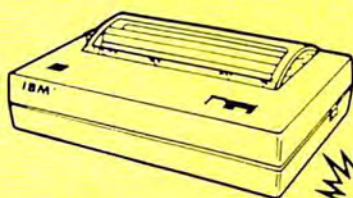
### TEAC 1.44 M - 3 1/2" Drive

- 1.44 Mega Byte Memory
- Fits IBM AT & Compatibles
- Double Sided/Double Density
- List Price \$299

**\$125<sup>95</sup>**

## Genuine IBM® Printer

8 1/2" Letter Size • 80 Column  
Limited Quantities



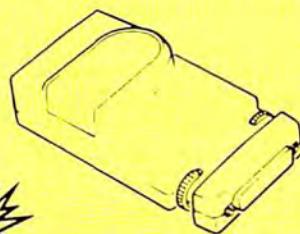
- Upper & Lower Case (with true lower descenders)
- Advanced Dot Matrix - Heat Transfer
- Graphics With Commodore, & Apple Interfaces
- Ready to Hook Up To Serial Port Of IBM® PCjr.
- Low Cost Adapters For IBM®, Apple, Commodore, & Laser Computers
- Underline & Enlarged

Our Low Sale Price  
**\$49<sup>95</sup>** List \$199

Thousands of the most popular Software titles in stock!

## 300/1200 BPS Migent Pocket Modem

Free Terminal Software



- Hayes compatible
- Runs on AC or battery
- Turns on/off automatically
- Small enough to put in your pocket
- Plugs directly into your serial port on many computers
- Easy to use; no switches to set
- On-screen status lights show call progress

Our Low Sale Price  
**\$99<sup>95</sup>** List \$413

VISA  
MASTER CARD  
COD

Prices do not include Shipping Charges. Call to get Your Lowest Delivered Cost. We insure all shipments at no extra cost to you! All packages are normally shipped UPS Ground, 2nd Day or Overnight delivery available. Minimum shipping charge per order is \$3.75. Illinois residents add 6 1/2 % sales tax. We ship to all points in the U.S.; Canada, Puerto Rico, Alaska, Hawaii, Virgin Islands and APO-FPO. (Monitors only shipped in Continental USA) Prices and availability subject to change without notice. Computer Direct will match any valid nationally advertised delivered price on the exact same product & payment method (excluding sales taxes)



# Amí by Example

Samna's Amí, a modest Windows-based word processor

with easy-to-grasp desktop publishing features,

includes prefab style sheets and instant examples of formatting selections.

Eric Brown

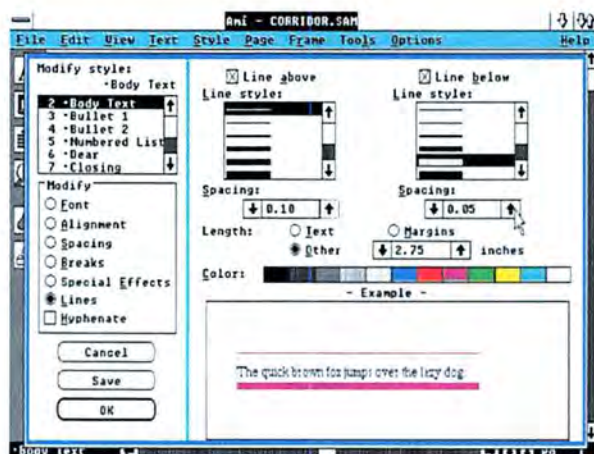
An early version of this Windows-based word processor/desktop publisher was called *Elroy*, but the final is named *Amí*—the French word for *friend*, but with an accent added. Perhaps Samna Corporation felt it had to stress the product's user-friendliness. After all, the firm has long been known for its competent word processing powerhouses, but nobody has ever accused Samna of underestimating the technical sophistication of the buying public.

In any case, the new title is as straightforward as *Amí*'s easy-to-learn interface and \$199 price

**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.**

tag (\$149 for the first four months). Lacking such features as footnotes, indexing, mail merge, an outliner, or even a thesaurus, *Amí* may not compete with the upcoming Windows version of *Microsoft Word*. However, thanks to its extensive yet easily mastered desktop publishing features, *Amí* is perfect for creating small-scale documents such as newsletters.

*Amí* marches to the beat of IMSI's *PagePerfect*—the combination word processor and desktop publishing program. As such, it compares favorably with NBI's recently released \$695 *Legend*, which suffers severe performance degradation because it stuffs too many features into the already slow Windows environment. *Amí* succeeds by attempting less—though hardly a speed demon, it puffs along admirably, considering its Windows overhead. (An upcoming *PC World* review will



When modifying styles, Amí displays graphic examples of your settings in the lower right corner of the dialog box.

evaluate the performance of the shrink-wrapped version.) Like *Windows*, the program demands an 80286- or 80386-based machine with 640K, EGA, and hard disk.

## Simple Strengths

At first glance, there's nothing revolutionary about *Amí*, and that's all to the good. It dutifully follows *Windows* and desktop publishing conventions, with pulldown menus across the top,

icons along the left, scroll bars around the perimeter, and a context-sensitive help system tucked away in a corner. Rather than clog the screen with menu selections, the program assigns more arcane tasks to buttons that you click on from within numerous, well-designed dialog boxes.

One icon lets you switch to a speedier draft mode devoid of enhancements, a blessing that



saves *Ami*'s modest editing talents from being wasted in endless screen refresh. Basic editing tools are well represented, with cut-and-paste and search-and-replace functions easily accessible by mouse or keyboard. *Ami* even offers such niceties as an undo function and variables for date and page number.

Advanced editing functions, however, are limited to a 130,000-word spelling checker. If you need more editing capability, you can convert files to and from *Samna Word*, *WordPerfect*, *WordStar*, and ASCII and use *Ami*'s editor solely for last-minute editing changes.

You'll likely spend most of your time in layout mode, where everything from print attributes to fonts and graphics are colorfully and realistically displayed. *Ami*'s approximation of printed output is exceptional. The program offers a thorough range of views, from full-page text to magnified zoom, but it lacks a dual-page mode.

#### Working in Style

*Ami*'s implementation of style sheets may be the best on the market, far easier than the convolutions required by *PagePerfect*. More good news for casual word processors and novice desktop publishing designers: The program comes with 20 preformatted styles. Tagging paragraphs with styles is easy, and if you

don't want to select styles from a pop-up menu, you can assign them to function keys.

Modifying or creating styles is also straightforward, thanks to graphic examples that adorn nearly every dialog box. To change such variables as leading or point size, you can select choices from a menu, click on up or down arrows, or enter precise figures—and when you do, the sample text in the example window adjusts accordingly.

*Ami*'s examples save a lot of time you would otherwise spend switching back and forth between dialog boxes and page displays that refresh slowly. Usually the example displays are precise enough to let you choose the right setting the first time. *PagePerfect* also provides this capability, but only for a few settings; *Ami*'s extends to almost every applicable formatting decision.

While not in *PageMaker*'s league, *Ami* offers a respectable number of formatting controls for such an inexpensive program. Style formatting handles such decisions as kerning, paragraph leading, bullets, and borders. Page formatting options include up to eight snaking columns, column balancing, and style-sensitive page-break controls, as well as the basics of hyphenation and headers and footers.

#### Graphic Results

*Ami*'s *Ventura*-like framing controls and graphic import skills round out the program as a competent publishing vehicle. Framing text or graphics requires that you enter a separate mode, but the controls are clear and logical. Illustrated examples let you choose between wrapping the text around the frame, behind the frame, or not wrapping at all. *Ami* can import .PCX and TIFF files and lets you scale and crop imported graphics. Printer support matches *Windows*'—more than 130 output devices can finish the job.

Desktop publishers who use *Windows* will still choose *PageMaker*, and high-end wordsmiths should wait for *Ami Professional*—Samna's full-powered word processor/desktop publisher due in mid-1989. Still, with its short learning curve and thoughtful balance of editing and publishing features, *Ami* is a cinch to carve out a niche at the low end. And its run-time version may even steal some thunder from other entry-level publishing programs such as *PagePerfect* and *Byline*.

It's refreshing to see an old dog like Samna learn some new tricks. Unlike *Legend* and a few other newcomers, *Ami* seems right at home in the *Windows* world. ●

*Eric Brown is an associate editor for PC World.*

## SNAPSHOT

### Ami

Samna stresses *Ami*'s word processing skills, but its real strength lies in easy-to-use desktop publishing features. Melding easily into the *Windows* environment, *Ami* excels at short to medium-size documents and publications.

#### KEY FEATURES

- Example windows in dialog boxes that reflect style formatting changes as you alter settings
- Easy-to-use tagged styles with 20 preformatted style sheets
- Draft mode for fast text editing
- Framing command with .PCX and TIFF graphics import and manipulation

#### AVAILABILITY

*Ami* was scheduled for release in November 1988. *Ami Professional* is due in mid-1989.

#### PRICING

\$199 (\$149 for first 120 days after shipment)

#### Samna Corp.

5600 Glenridge Dr.  
Atlanta, GA 30342  
404/851-0007

For more information,  
circle 801 on reader  
service card.



# Word's Glitter and Grace

Microsoft Word 5.0 adds graphics importing, page

preview, and snazzy document management features.

Eric Knorr

Once word processors were for writing and editing text. But today's world-class word crunchers need splashy graphics and enough document handling features to please a hyper-text programmer.

Like archrival *WordPerfect 5.0*, *Microsoft Word 5.0* provides a page preview mode and the ability to import and manipulate graphics files. Moreover, new bookmark and annotation features will enable users to create dynamic links between documents and to comment on each other's work. *Word 5.0* also brings many small commonsense touches, vastly improved tabs, and a spelling checker that finally works in real time.

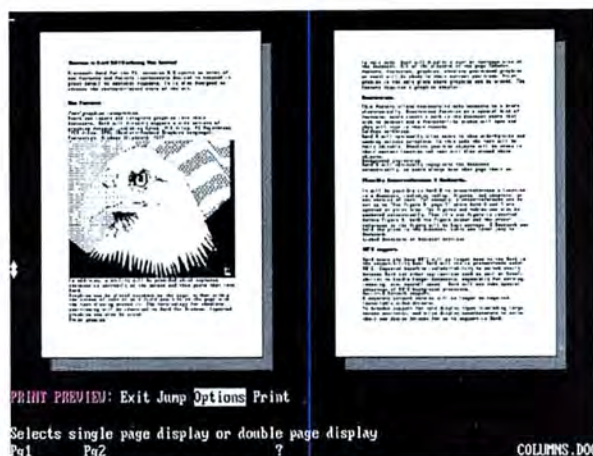
## Getting Graphics

*Word 5.0* incorporates all the graphics and page preview functions of Microsoft's *Word* add-on, *PageView*. .PIC, .TIFF, .PCX, Encapsulated Post-

Script, and HPGL graphics files can be imported, sized, and viewed—and you can view one or two pages in their entirety. As with *WordPerfect 5.0*, the preview mode is not interactive; you edit text and manipulate graphics in the main editing window, then switch back to the preview mode to see how it looks.

At least in beta version, the latest *Word's* graphics and page preview functions haven't caught up to those of the latest *WordPerfect*. With *Word 5.0*, you can't rotate or invert a graphic, and color graphics appear in black and white on screen (neither program supports color hard copy). In addition, the preview display is always full page with greeked text, whereas *WordPerfect 5.0* enables you to zoom in to 200 percent of actual page size and view several fonts on screen.

Other *Word 5.0* graphics features are more similar to those of its rival. Text automatically wraps



**Word 5.0 helps you lay out documents by providing a text-plus-graphics preview mode.**

around rectangular graphic elements, and you can anchor a graphic to a paragraph or a position on the page. Lines and boxes sport a wider variety of styles, and you can shade and apply graphics-positioning commands to tables.

Layout enhancements will elicit sighs of relief. *Word 5.0* enables you to edit multiple columns interactively and—at last—offers automatic pagination as an option, although

both these features drastically reduce the program's speed. Furthermore, while the new 'show line breaks' choice on the Options menu can't replace an on-screen font preview, it does display the actual number of characters that will print on a line when you choose a proportionally spaced font, reducing the number of unhappy surprises rolling out of your laser printer.



## Placing Bookmarks

One of the biggest advantages *Word 5.0* enjoys over its *WordPerfect* counterpart is the bookmark—a block of text of any length that you can jump to, link to, or cross-reference.

Bookmarks are ideal if you need to maintain several documents that are updated often. For example, if an essential price list is located in a large, frequently revised marketing document, you can highlight the list, give it a bookmark name, and import only the list into another document. The magic of bookmarks is that when the list is updated, it's updated simultaneously in both documents.

Cross-referenced bookmarks work like dynamic footnotes. To refer to a passage of text, you type 'See page:bookmark name' and press <F3>. When the document is printed, *Word 5.0* substitutes the page number for the bookmark name—or, if it's a long passage, the page range.

*Word 5.0's* annotation feature, designed for group documents, bears even greater similarity to footnoting. Annotation will enable you to mark points in text with a numeral plus your initials in superscript; you'll then be shuttled to the end of the document (where your initials again appear and the time and date are automatically stamped) and prompted for a comment. Executing the Annotation

option from the Jump menu and entering the same numeral and initials returns you to your starting point.

With the Windows Split Footnote command, *Word 5.0* can scroll annotations and text in tandem. In addition, Microsoft promises to add a macro to *Word 5.0* that will collect annotations from several files and compile them into one file, organized by page number and position in the document.

Though not as razzle-dazzle as other document management improvements, *Word 5.0's* bolstered subdirectory support may prove more appealing. You can browse through your directory tree before you load a file or conduct a query, and add multiple directories to your query path. (The Query function, added along with the Summary in version 4.0, uses such Summary fields as date, author, and keyword to sort and create views of documents.) Another commonsense feature follows a long-standing *WordPerfect* custom: automatic document saving.

Bookmarks, annotation, and other document management features are most productive in a LAN environment. Rather than offering a separate LAN version, Microsoft has built LAN support into the standard version of *Word 5.0*. The unchanged \$450 *Word* price covers

program use on a server and one workstation; additional workstation versions are available at \$195 per user.

## Oh, Those Little Things

Ask people what they dislike most about *Word*, and setting tabs ranks high. Previously, you had to move from field to field within the Tab menu each time you set a tab. Now you simply move the cursor along the ruler and type the first letter of the tab you want—Left, Right, or Decimal. Boom! The tab is set.

Lack of a real-time spelling checker has been another annoyance, exacerbated by *Word's* incompatibility with memory-resident spelling checkers like *Turbo Lightning*. Now you can look up spellings and replace words from within a document. And the process is fast.

While Microsoft's own research shows little user demand for outlining, another enhancement is a kind of *reverse* outlining. You can take any document, assign its subheads the style sheet designation 'Heading level 1', and collapse the document into an outline-like subhead list. Then you can shuffle entire sections just by moving the subheads.

Microsoft has made scads of small improvements—too numerous to mention here—to the user interface and screen display. *Word 5.0* is clearly a formidable upgrade, even though it seems doubtful

## SNAPSHOT

### Microsoft Word 5.0

Microsoft's word processing powerhouse integrates low-end desktop publishing capabilities and shows higher polish throughout, but it really shines in document management assistance.

#### KEY FEATURES

- Support for "bookmarks"—blocks of text that you can jump to, link to, or cross-reference
- Annotation capabilities that aid group editing
- Integrated graphics importing and page previewing
- Real-time spelling checker

#### AVAILABILITY

Release is scheduled for November 1988.

#### PRICING

\$450; network end-user packs \$195 each

#### Microsoft

16011 N.E. 36th Way  
Box 97017  
Redmond, WA 98073-9717  
206/882-8080

For more information,  
circle 802 on reader  
service card.

that the program can beat *WordPerfect* at the pseudo-desktop publishing game. *Word 5.0's* strengths are in document handling and the long-awaited cleanup of some annoying flaws. ●

Eric Knorr is a senior editor for PC World.



# This is for ev too busy to get

If you're the type of person who's too busy to read an ad, read this ad.

Because you'll learn about a new tool that will help you manage people, ideas,



*Dump any random, unrelated thoughts or ideas into Agenda, and it'll help you turn that information into a stream of structured, actionable knowledge.*

projects, and information with incredible efficiency. A tool that will help you avoid slumping into your chair, shaking your head, and asking, "How on earth will I ever get this done?"

We call it Lotus® Agenda®, the personal information manager.

Agenda allows you to dump random facts, thoughts, and ideas into your PC without having to structure the information in advance.

*Agenda's filing system is a more sophisticated version of this filing system. You can put items anywhere you want. View them any way you want. And have access to them anytime you want.*

You can record the thousands of tasks you need to address to put together a

new product line. Or the thousands of factors you need to put together a new bottom line.

Agenda will not only file these random items of information for you, it'll help you arrange them any way you want.

So you can understand them better, formulate new ideas better and extract all the answers you need better.

Which means, now you can concentrate

File	View	Item	Category	Print	Utility	System	Quit
New	Remove	Position	Assign	Discard	Undiscard		
Scratchpad				Who	Issues		
• Forward product comparison articles to Joan.				• Joan	• Competitive Tracking		
• Can we get the cost of goods sold under \$12?				• Tom	• Materials		
• Bob will present ten-point incentives program at sales conference.				• Bob	• Bonus Dollars		
• Tom will have his report in by a week from Friday; make sure it covers pricing strategy, distribution, and implications of using outside vendor for typesetting and printing.				• Tom	• Distribution Vendors Pricing		
• Decision needed on research budget by end of this week—discuss options with Jim and Joan.				• Jim	• Research		
				• Joan			

*Items. Dump information in manually, import it or use our pop-up capability while in another program.*





# everyone who's any work done.

File View Item Category Print Utility System Quit  
Column: Section, Management, Info

Issues	Product Issues	Who	Department
• Packaging	• Accept packaging bids until the end of October.	• Liz	• Operations
• Materials	• Make sure synthetic materials are reliable.	• Sue	• Operations
• Research	• Have Tom break down market research results into best case/worst case scenarios.	• Tom	• Marketing
• Distribution Vendors Pricing	• Tom will have his report in by a week from Friday; make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing.	• Tom	• Marketing
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• Tom • Bob	• Marketing • Sales

*Categories. Agenda files items in all relevant categories so you can always find the information you need.*

File: C:\AGENDA\FILES\ISSUES 06/21/88 11:00  
View: Issues by Person

Issues	Joan	Priority	When
• Research	• Decision needed on research budget by end of this week-- discuss options with Jim and Joan.	• High	• 06/25/88
• Competitive Tracking	• Forward product comparison articles to Joan.	• Low	• 07/07/88

Issues	Bob	Priority	When
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• High	• 06/22/88
• Bonus Dollars	• Bob will present ten-point incentives program at sales conference.	• Medium	• 06/29/88

*Views. Looking at the same information through different views gives you a more informed perspective.*

different ways so you can pinpoint information that's important to you. Or discover new relationships you hadn't considered before. And anytime you change an item in a view, Agenda will

more on using and acting on your information. And less on processing it.

How does Agenda work?

First, enter your items of information



*The whole idea behind Agenda is to get them all in a row.*

into your PC and assign them to categories that you create.

Then Agenda will do all of your filing automatically. And thanks to Agenda's *multiple filing capabilities*, if the information is relevant in more than one place, Agenda will take it and put it in several categories at once.

This makes it easy to view your data in

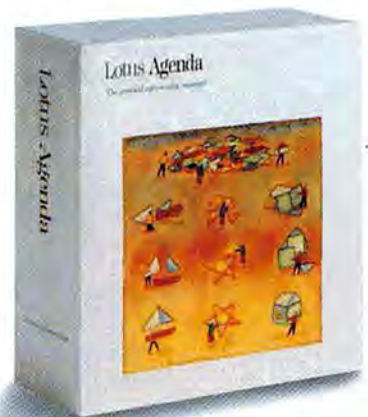
automatically update all other categories where the item has been assigned.

In fact, you could say that Agenda recalculates your text the way a spreadsheet program recalculates numbers.

All of which means, from now on you'll be able to come in every morning, check your Agenda, and get right to work.

Because you'll immediately know what work needs getting to.

For \$15, we'll send you an Agenda demo kit or videotape. Call 1-800-345-1043 and ask for demo kit AGN-3058 for the 3.5" version or AGN-3053 for the 5.25" version. Or ask for videotape AGN-3063.



## Introducing Lotus Agenda



## 98 PRODUCT OUTLOOK

### LaserJet IID

HP gives its office workhorse a new Canon engine and comes up with duplex printing and other throughput enhancements.

### ALPS Allegro 24

Out with the cylindrical platen, in with flat-surface paper feed; and gone are the paper jams, misprinted carbons, and mangled envelopes that had you tied in knots.

### Ronstadt's Financials

Wit and wisdom are thrown in gratis with this spreadsheet-like business planner. Enter data just once, and Dr. Ronstadt will help you model, forecast, and analyze your enterprise.

### LAN 60-2000, LAN 150-2000

Time to do some housekeeping on your hard drive? Sweep backup files onto Emerald's 60MB tape drives.

### Who Works When

*Who Works When* deftly juggles all the variables that can turn staff scheduling into a three-ring circus.

### LINK

Not quite a LAN (but an inexpensive interim step), LINK uses ordinary building wiring to let co-workers share files and peripherals.

### SoftCode

Generate programs in many popular programming languages, using templates that you can customize.

## 106 BRIEFLY NOTED

### Epson FX-850, FX-1050

Two new dot matrix printers offer greater speed and paper-handling talent at the same low prices of the printers they're replacing.

### PubTech File Organizer

*Microsoft Windows* users: Get a handle on your DOS file management chores, from searching across directories to loading programs, using this easy system of pulldown menus and icons.

### OnTrak

Whip your lists of customers, sales prospects, and business contacts into order with this flat-file manager in Rolodex form that runs under *Windows*.

### Windows Manager

Customize your *Windows* desktop for maximum efficiency, from moving and resizing windows to predetermining combinations of programs to be loaded.

### EFAX-88

A portable fax machine that transmits hard-copy information at a decent rate.

### Generic Estimator

CAD pros and hackers can prepare more effective construction bids using a combination of *Generic CADD* and *Estimator*.

### CrystalPrint WP

Bargain hunters take notice: a laser page printer that beats the price of an Epson by one-third.

## 110 UPDATE

### AboveBoard Plus, AboveBoard Plus I/O, AboveBoard 2 Plus

The AboveBoard line of expanded memory boards trades up, adding multitasking, more addressable memory, and serial and parallel ports—not to mention some bucks.

### PC-Write 3.0

Point-and-shoot menus and the ability to handle larger files and create multiple columns update this well-known shareware word processor.

### DeskMate 3.0, DeskMate Workgroup Companion

Tandy combines all previous versions of its integrated package and then divides them in two: version 3.0 and its network companion.

### LetterMaster 4.0

Keep thorough records of client contacts with this mail management/data base combo, which includes mail-merge, note-taking, and keyword-search capabilities. Comes in regular and network versions.

### Publisher's Type 1.1

Create WYSIWYG fonts, logos, and special symbols using this *Windows*-compatible package.

### pcANYWHERE III

Automatic call-back guarantees security when you're communicating from a remote PC.

### Pro3D/PC

Pro3D/PC adds four new rendering options, printing enhancements, and lots of speed to its presentation graphics capabilities.

### Draw Plus

You can refine your drawings with a new bag of drawing tricks, select and manipulate nonadjacent objects, and rotate objects in 1-degree increments.



## LaserJet IID

### Handling It

Four years ago, when the word *laser* had just entered PC parlance, Hewlett-Packard decided to sidestep the glamour of desktop publishing and deliver a general office printer instead. The first HP LaserJet wasn't equipped with the PostScript language of Apple's sexy LaserWriter or even with enough memory for a full page of graphics. But it was only half the price of the LaserWriter and did one thing very well: It printed letter-quality text very fast.

Four years, several upgrades, and 1 million units later, it's clear that HP guessed right about users' needs. Now its latest model, the LaserJet IID, suggests that paper handling will be the principal focus of laser printing improvements over the near term.

The LaserJet IID is the same office workhorse against which other lasers are now measured, but its slightly improved Canon

SXD engine sets a faster pace for the rest of the pack. It provides 8-ppm printing as before, but HP has added three much sought after paper-handling capabilities.

The *D* in IID stands for *duplex*. The LaserJet IID can print on both sides of a piece of paper and take that page from either of two 200-sheet feeding bins, rather than one. You can use one bin for letterhead and the other for following pages, or tap both reserves for larger jobs. The IID also offers a separate 50-unit envelope feeding option, more than triple its predecessor's 15-envelope capacity.

The LaserJet IID uses the same paper trays, memory boards, font cartridges, and soft fonts as the LaserJet Series II.

The IID comes with 640K of memory, expandable up to 4.6MB, and more fonts than earlier models—14 internal and 10 on a font cartridge. But while font and memory capacity has expanded over the years, giving the



The flatter the better is the motto of the ALPS Allegro 24, a 24-pin dot matrix printer that reduces jamming by feeding paper directly over a flat, stationary platen and under a downward-striking printhead. It prints 180 cps in draft mode and 60 cps in letter quality mode.

printer desktop publishing capability, the IID is still clearly positioned as a mainstream office printer.

HP also plans to be as aggressive in pricing as it was with the original \$3495 LaserJet: The IID sells for \$4295 equipped with 640K of memory (the envelope feeder is another \$350). Hewlett-Packard, Boise Division, 11311 Chinden Blvd., Boise, ID 83714; 208/323-6000. —M. H.

Reader service no. 750

## ALPS Allegro 24

### Paper Tiger

There's no need to get your correspondence or your stomach in a knot just because paper jams have your printer looking like a dot matrix dumpster. New flatbed printers from ALPS can straighten out your work flow and reduce jamming by feeding paper directly from tractor to printhead without the usual over, under,

around, and through. Declaring cylindrical platens as archaic as manual typewriters, the ALPS folks give you the front-loading Allegro 24, which routes paper in a beeline over a flat, stationary platen, under a downward-striking printhead, and out the back.

Most printers seem to bear a special hostility toward envelopes, forms, transparencies—anything departing from 8½-by-11-inch paper. The Allegro 24 handles those materials as easily as fanfold or sheet paper, so there's one less reason to keep that typewriter hanging around. And since the Allegro doesn't bend multipart forms, you're more likely to find your words printed on the correct line on every carbon copy.

If, like most of us, you switch between fanfold paper (for drafts) and single sheets (for correspondence), you'll appreciate the Allegro's paper-parking button. It automatically backs the continuous sheet out far enough



Hewlett-Packard's LaserJet IID features advanced paper handling with two-sided printing, dual 200-sheet paper bins, and a special 50-envelope feeding option.



to drop a single sheet in place. Press the friction-feed switch, and you're in business. An 87-column carriage lets you print 8½-by-11 sheets horizontally. The paper-saving tear bar lets you roll out half-printed sheets far enough to rip them off, then backs the printhead up to the top of the form again. You can quickly customize alignment for printed forms via front-panel controls. A single-sheet feed bin is in the works.

ALPS saved money by eliminating the rolling platen and by using a power-saving printhead that requires a smaller, less expensive motor. It gives you 24-pin printing for only \$499. Of course, you can't expect everything for such a modestly priced printer, and ALPS emphasizes paper handling over speed. But drafts still print out at a respectable 180 characters per second, and 24-pin letter-quality copies at 60 cps. Graphics roll out at 180-by-360-dots-per-inch resolution.

The Allegro comes with a standard Centronics parallel port and an RS-232C option. It emulates the Epson LQ-2500 series command and character sets. Four resident fonts—Gothic, Tiempo, and Courier letter-quality type and a draft Gothic—can be bolstered with a cartridge containing three more letter-quality typefaces. The 7K standard buffer sounds skimpy, but that's what's left after the software is loaded. A 32K option is available. ALPS America Inc., 3553 N. First St., San Jose, CA 95134; 408/432-8000.

—Mark Henricks

Reader service no. 751

#### Ronstadt's Financials

### Comprehending the Situation

Confidence is what you feel before you comprehend the situation." That's one of the first messages to greet you when you load *Ronstadt's Financials*, a "statement driven" financial-budgeting/projection program from

Lord Publishing. Another 300 or so business quotations and jokes pop up occasionally, but the program is quite serious about helping the small business owner get a grip on financial decision making.

Robert Ronstadt, who established an entrepreneurial studies curriculum at Babson College in Wellesley, Massachusetts, created *Ronstadt's Financials* to help you be more specific about your business plans and assumptions. Similar in format to a spreadsheet but without an empty matrix of rows and columns, *Financials* is actually built upon a data base supported by 1-2-3-like menus.

The program leads you through data entry with prompts for information such as typical business operating expenses, cost of sales, gross profit, and cash surplus. These are entered only once for the period specified. User-defined variables—say, regularly recurring costs specific to your enterprise—can be added. After all the figures are input, *Financials* generates a detailed income statement, balance sheet, and various budgets, as well as break-even points, profitability measures, projected cash flow, and other financial ratios.

*Financials* also helps you build worst- and best-case business scenarios typical of spreadsheet financial modeling. You can tie budgets and schedules to these financial projections, and the program will support up to 64

statements and schedules in a scenario of up to 32,000 line items (which can be footnoted).

You can enter alternative data and see how your financial statement would change. These different business scenarios can be viewed on screen or printed side by side. Likewise, you can enhance your understanding of trends in your business using color charts to compare these statements over time.

*Financials* comes with built-in business models for general contracting, professional services, manufacturing, retail, wholesale, and real estate. But the program also is equipped with a general purpose model for quick projections and feasibility studies. An on-line glossary explains business and financial terms in context.

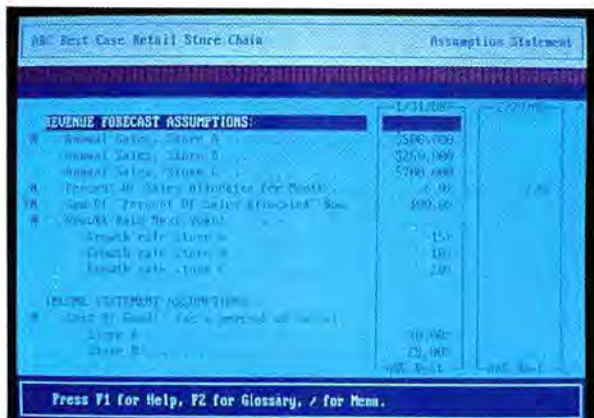
The package requires DOS 2.00 or later and 640K of memory, and a hard disk is recommended. You'll also need Hercules or compatible monochrome graphics or CGA or EGA color graphics. The \$499 *Financials* can use an 8087 or 80827 math coprocessor. Lord Publishing Inc., One Apple Hill, Natick, MA 01760; 508/651-9955. —Glenn Grant

Reader service no. 752

#### LAN 60-2000, LAN 150-2000

### Half an Answer

Need a tape backup that's easy on power and real estate? Emerald Systems has half an answer. The company's new 5¼-inch tape cartridge drives—the LAN 60-2000 and



Ronstadt's Financials helps you develop more precise business plans via spreadsheet-like financial modeling built atop a data base of your company's key financial indicators.



# 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.

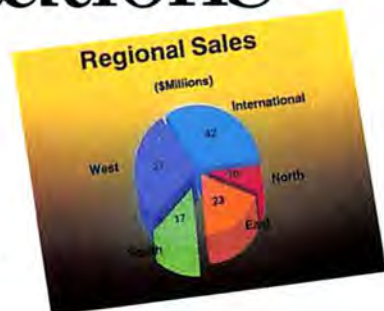
On-screen prompts, obvious menus, and context sensitive on-line help make it easy to learn Pinstripe Presenter in record time. The quick start guide will take you through your first presentation in under 1 hour.

## 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

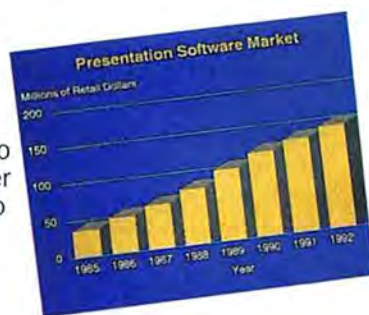
For Dealer, VAR and OEM inquiries call 1-800-323-8088.



## Driving Factors

Behind the Graphics Explosion

- More presentations
- Laser Printers
- Graphic capabilities
- Slide making systems
- On-line to slide services



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**

**SPINNAKER**

© 1988, Spinnaker Software Corporation  
One Kendall Square, Cambridge, MA 02139  
All rights reserved. Spinnaker is a registered trademark of the Spinnaker Corporation

Circle 69 on reader service card





Protect yourself from catastrophic hard disk crashes with Emerald's new 5 1/4-inch tape cartridge drives—the LAN 60-2000 and LAN 150-2000—that require only half the space of most tape drives.

LAN 150-2000—can help safeguard your work and provide low-cost storage. And they do it in half the space and with lower power consumption than traditional 5 1/4-inch devices.

The new drives come in 60MB and 150MB capacities, as their names suggest. Both models can be configured to run under DOS, Xenix, or Novell and other DOS-based networks. Emerald's ASP software offers nifty features for DOS and network users like unattended backups at night. (Just shift ASP into learn mode and it saves all of your ensuing commands in a batch file, which you can set to start executing by using ASP's clock-interrupt command.)

Emerald has packed the same capacity in half the space its existing full-height tape backup systems require, and the new half-heights consume only about 70 percent of the power. That may not be a big deal for owners of 200-watt systems, but it could be a plus if your system is fully loaded with floppies or more power-hungry

hard disks.

Emerald will keep supplying its full-size models in 60MB, 150MB, and twin-drive 150MB versions for those who prefer them; but at \$14 to \$21.50 per megabyte, the new half-heights cost 8 to 14 percent less than their full-size cousins. The 60MB internal half-height drive goes for \$1295, while the 150MB version lists at \$2095. Emerald Systems Corp., 4757 Morena Blvd., San Diego, CA 92117; 800/553-4030.

—Mark Henricks

Reader service no. 753

## Who Works When

### Labor Organizer

Anyone who's faced the nightmare of manually scheduling and rescheduling employee shifts knows the meaning of frustration. A small change in one variable can ripple through them all and pull your entire schedule down around your ears. It's for chores like this that computers were invented, and Newport Systems has just the electronic manager for the job.

For only \$895, *Who Works When* gives you scheduling capabilities typically found with \$30,000 systems. There is one caveat: *Who Works When* differs from those more expensive counterparts in its 200-employee-per-file limit. You can schedule more employees by creating a separate file for the overflow, but the schedules of the two groups can't be merged electronically.

On the plus side, *Who Works When* can schedule

up to 26 shifts in increments from 6 minutes to 24 hours for up to 20 departments with five substations in each. For example, if you were responsible for a hospital's radiology department, you could create separate but coordinated schedules for both front-desk staff and X-ray technicians.

*Who Works When* works through four basic modules: facility, department, employee, and schedule. Department names and shift descriptions are entered into the facility module. In the department module, you set up the period of time your schedule covers—from one day to six weeks—and enter job codes, stations, employee teams, and up to ten holidays. The department module is also where you establish the number of employees each shift requires.

The employee module lets you factor in hiring dates (for assignments that depend on seniority), the number of consecutive days an employee can work, an employee's first and second scheduling choices, and even a cap on hours for part-timers. When you're ready to compile schedules, the department module pulls the data in from the employee module and finds the most appropriate people for a given shift.

The result appears in the schedule module. If you're not satisfied, you can enter that module with a touch of the <Space> bar and edit the entries. Moving between modules is a matter of two keystrokes—the <Esc> and an identifier: F for fa-

cility, E for employee, and so on. Newport Systems offers 30 days of free telephone support. Thereafter you can purchase 90 days of telephone support for \$160.

*Who Works When* will print out separate schedules for your department and for each employee, and its files can be exported in ASCII format to in-house payroll systems. It runs on either classic PCs or PS/2s, and requires 640K of memory and a hard drive. The program supports CGA, EGA, and VGA. Newport Systems, 636 120th Ave. NE, Bellevue, WA 98009-3705; 206/451-0537.

—Ronnie Gunnerson

Reader service no. 754

## LINK

### Stepping Stone for the LAN-Locked

Connectivity sounds great in principle, but installing a local area network can be scary. Some small businesses have hooked PCs and peripherals together with simple serial networks, but serial cable isn't free, and it's useful primarily for connecting nearby devices. Reconfiguring a network and moving cable around represent such prohibitive costs in time, money, and hassle that many budget-conscious work groups find themselves LAN-locked.

NetLine has solved the serial-cable jumble by taking advantage of a resource that's as close as your nearest wall socket.



# 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."

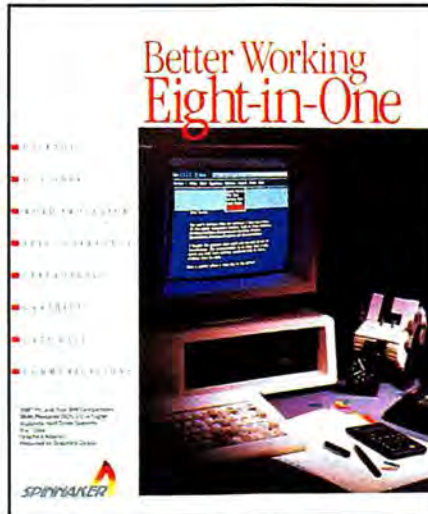
— **PC Week**

"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**

Available at fine software dealers,  
Or: For orders only call 1-800-826-0706

- IBM® PC and True IBM Compatibles
- Requires: 384K/DOS 2.1 or higher
- Supports hard drive systems
- Graphics adaptor required for graphics output



©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





NetLine's LINK solves the LAN cable jumble by using the electrical wiring already in your walls as a transmission medium. The token-passing bus network has a 2000-foot range and moves data at 19,200 bits per second.

NetLine's LINK is a low-priced connectivity solution that saves time and money by relying on the electrical wiring already in your walls. It won't knock Novell's *Netware* off its throne, but it's an ideal first step toward full-blown networking for the accounting work group, office members who want to share a laser printer, or co-workers who occasionally need to pass around files and electronic messages.

LINK comes in two forms. One's a box about 9½ inches square and 3 inches high that can sit under your monitor; it's equipped with its own power supply and connects to the PC via an internal serial card. The other comes as an internal card with serial connector and power line interface but without its own power supply. Either way, LINK translates data from a computer or printer into electronic signals that can travel through building wiring, and then sends them out along its own power cord to other LINKs. The system has a

2000-foot range, depending on the power of your office transformer.

The LINKs form a proprietary token-passing bus network that moves data at 19,200 bits per second between LINK-equipped devices, including PCs, minicomputer terminals and hosts, file servers, printers, and other peripherals.

The external unit retails for \$595, the internal version for \$495. Each PC also needs a \$165 copy of *ManyLink for PC*, which allows two LINKed computers to share data files, printers, and other peripherals in the background and to conduct one-line chat sessions. This software also lets you lock any disk or sub-directory on any node and is available as *ManyLink for Work Groups* (\$495) for up to eight users. NetLine, Inc., 85 W. Center St., Provo, UT; 801/373-6000. —Jennifer Beaver

Reader service no. 755

## SoftCode

### Have It Your Way

Programming is as personal as writing. If you've developed many applications for yourself or your work group, you've probably also developed a personal approach to the way those applications execute. Some programmers feel so strongly about the way a list is checked, for instance, they won't touch a program generator that takes a different approach to the routine. Or they'll go in and make changes every time the application runs.

The Software Bottling Company has a program generator for people who hate program generators. *SoftCode* employs customizable templates for the most popular programming languages; once the template is customized, the program will execute the way you like it every time. *SoftCode*'s fully documented program-template language lets you preserve all the tips and good programming habits you've developed over the years, so you can maintain your own programming approach even when you switch to another language.

Aimed primarily at corporate programmers who create accounting or data base applications, *SoftCode* comes with a screen editor you can use to specify fields, draw boxes, change colors, and set special parameters—such as validating data entry by checking against

a list or by defining an acceptable range of values.

*SoftCode* is ideal for those who develop programs in more than one language; if you've found the best way to set up a screen for data entry, but the language you're working in does it differently, *SoftCode* will arbitrate. It generates code for Borland's Turbo Basic, Turbo Pascal, and Turbo C; Microsoft's C, BASIC 5.0, QuickBASIC, and Pascal; and *dBASE III Plus*, *Foxbase +*, *Quicksilver*, and *Clipper*. Other templates are under development.

The program comes with the template of your choice for \$195. Additional templates are \$49 each. The code allows data entry using the full PC keyboard as well as calculated fields, data validation with file checking, list checking, and range checking.

*SoftCode* requires DOS 2.00 or a later version and 512K of memory. No royalties or run-time fees are required. Code generated can be integrated with Software Bottling's other products—*Speed Screen*, *Flash-Up*, and *Flash-Up Developer's Toolbox*. A \$19.95 upgrade is offered to owners of the firm's *Screen Sculptor* and *Flash Code* program generators. The Software Bottling Co., 6600 Long Island Expwy., Maspeth, NY 11378; 800/872-8787 (operator 311), 718/458-3700. —M. H.

Reader service no. 757



# TO MAKE YOUR WRITING MORE RIVETING, STOP USING DULL CHARACTERS.

24-wire print quality. 9-wire price.

Ho. Hum.  
Yawn. That's how people react when your writing fails to keep them glued to the page. But you'll get readers' attention and keep it, when you write with appealing, fully-developed characters. Like the ones created by our Pinwriter® P2200 printer.

The P2200's 24-wire print head produces crisp, fully-formed characters for a 9-wire price. Which means you get print quality that people will stop and read. At a price that won't stop you.

Of course, stand-out print quality is just one reason the P2200 is so outstanding.

It sprints through 55 letter quality CPS

or 170 in draft mode. Dresses up memos, letters,

etc., with up to 128 type variations. And, like all our Pinwriters, it works with more software packages than any other 24-wire printer.

For more information about the entire Pinwriter Family, call 1-800-343-4418. And discover what a little character development can do for your writing.



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

## NEC





Epson's new 80-column FX-850 and 136-column FX-1050 9-pin printers are 10 percent faster than previous models and feature expanded paper-handling capabilities.

## BRIEFLY NOTED

### Epson FX-850, FX-1050

Epson America, the leader in dot matrix printing, is phasing out its well-entrenched 9-pin FX-86 and 286E models in favor of the new 80-column FX-850 and 136-column FX-1050. Ten percent faster than their predecessors, the latest FX printers also feature expanded paper-handling capabilities that take the inconvenience out of switching between tractor-fed and single-sheet paper by enabling you to park both types in the printer at the same time.

The SmartPark feature reduces the waste of time and printing stock that results from tearing off multiple-copy forms or searching for the top-of-form. After you tear off a fanfold sheet, the printer automatically backs up to the top of the next sheet to begin the print job. Additionally, the FX-850 and

-1050 are quieter, each sporting a dual-walled, insulated chassis.

Both the FX-850 and -1050 offer print speeds of 264 characters per second (cps) in elite draft mode and 54 cps in elite near letter quality (NLQ) mode. Each comes with Roman and Sans Serif NLQ fonts, a built-in parallel port, and an 8K buffer. Despite the improved features, the new printers cost the same as the ones they replace—\$549 for the FX-850 and \$799 for the FX-1050. Epson America, 23530 Hawthorne Blvd., Torrance, CA, 90505; 213/549-9140. Reader service no. 758

### PubTech File Organizer

The *PubTech File Organizer* provides pulldown menus, icons, and a variety of utilities for managing files in the *Microsoft Windows* environment. You can speed computing by clicking on icons that represent files and programs and then moving them to other icons that represent actions. *Pub-*

*Tech File Organizer* performs all the usual DOS file management functions—such as RENAME, MOVE, COPY, and DELETE—and offers unique ways to search for files across subdirectories and even to undelete them.

You can load groups of programs simultaneously, remap the keyboard to emulate your favorite software packages, or choose unique hot-key combinations to execute operations. The *PubTech File Organizer* includes an ASCII editor, the ability to replace or append text in the *Windows* clipboard, and extensive printer settings. It requires DOS 3.00 or a later version, *Windows 2.03* or later, 512K of memory, and a hard disk. It retails for \$145. Publishing Technologies, 7719 Wood Hollow Dr. #260, Austin, TX 78731; 800/782-8324, 512/346-2835.

Reader service no. 760

### OnTrak

*OnTrak* is a flat-file manager with a Rolodex-like interface that runs under the *Microsoft Windows* environment. Designed to manage customer lists, sales prospects, and personal/business contacts, *OnTrak* lets you specify up to 20 fixed-length fields per Rolodex card and create 5000 cards per card file. You sort by only one field at a time, but you can append up to eight pages of notes to each card. You can exchange data between *OnTrak* and other applications via the *Windows* clipboard and print your data in a variety of formats, including mailing labels and file cards. *OnTrak*, which requires DOS 3.10 or a later version, *Windows 2.03* or later, 640K of memory, and a hard disk, sells for \$195. Active Software Corp., 1208 Apollo Way #507, Sunnyvale, CA 94086; 408/732-1740. Reader service no. 763



Manage your hard disk with icons, load groups of programs simultaneously, and perform all the usual DOS file management functions in the *Windows* environment more quickly and easily with *PubTech File Organizer*.





## Great Performers, Superb Performance

### The QIC Research 80286 and 80386 machines.

These represent the latest in PC speed and compatibility for your Desktop Personal Computer. Made in the USA, burned in for 48 hours and available with NCS on site service contract, the QIC systems boast tenacious reliability. And the systems expandable memory, DOS and OS/2 capabilities

will allow your business to run virtually any word-processing, spreadsheet, graphic or networking package available. From the reliable 80286/8MHz system to the very fast 80386/20MHz, QIC Research can provide the solution to all your business computing needs.

MODEL	CPU	WAIT STATE	16-bit	8-bit	32-bit	STANDARD MEMORY	MAX ON BOARD	POWER SUPPLY	VGA	EGA	MONO
QIC 386-20	386-20	0	5	2	1	1MB	16MB	200W	\$3,370	\$3,115	\$2,745
QIC 386-16	386-16	0	6	2	0	1MB	1MB	192W	\$2,899	\$2,515	\$2,145
QIC 286-12	286-12	0	4	4	0	1MB	1MB	192W	\$2,299	\$1,895	\$1,525
QIC 286-10	286-10	0	6	2	0	512K	1MB	192W	\$2,099	\$1,760	\$1,390
QIC 286-10	286-10	1	6	2	0	512K	1MB	192W	\$1,995	\$1,609	\$1,239
QIC 286-8	286-8	1	6	2	0	512K	1MB	192W	\$1,795	\$1,365	\$999

\*All Systems come with 1.2MB HardDisk/Floppy Controller, 101 key enhanced keyboard and complete documentation.

**To Order a QIC computer,**  
**(SALES) ..... (408) 432-8880**

(Technical Support) ..... (408) 432-7520

(FAX Number) ..... (408) 432-1250

All prices and models are subject to change without notice.

**QIC**  
 RESEARCH INC.

1961 Concourse Drive Suite C  
 North San Jose, California 95131  
 QIC is not affiliated with MDS Quanel, Inc.  
 QIC-09B 08/29/88



## Windows Manager

*Windows Manager* helps you organize the *Windows* desktop to get the full benefit of the environment. Accessible from any window via the *Windows* control menu, this utility lets you predetermine combinations of programs to be loaded concurrently—a spreadsheet and its add-ins, for example—and define the sizes, locations, and configurations of their windows.

Using *Windows Manager*, you can end your computing session from any window without returning to the DOS Executive. Work is automatically saved at regular user-defined intervals, and you can close all windows and save their contents simultaneously. *Windows Manager* lets you replace the DOS Executive with your own opening screen and customize both it and the background screen with a preferred design, color, and special effects.

*Windows Manager* includes a screen saver, an alarm clock with three alarms, and different viewers to show the fonts and memory available. *Windows Manager* requires DOS 3.00 or a later version and *Windows/286* or *Windows/386*, and retails for \$79.95. HDC Computer Corp., 15379 N.E. 90th St., Redmond, WA 98052; 206/885-5550. **Reader service no. 765**

## EFAX-88

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

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

The EFAX-88's fallback feature guarantees error-free transmissions by automatically adjusting its rate from 9600 bps to 7200, 4800, 2400, and below if line problems crop up. Weighing less than 10 pounds, the EFAX-88 can perform as a personal copier. A 110/220 voltage selector and an optional acoustic coupler also make the EFAX-88 a practical unit on the road. Elec & Eltak (U.S.A.) Corp., 1230 Oakmead Pkwy. #310, Sunnyvale, CA 94086; 408/732-1181.

**Reader service no. 766**

## Generic Estimator

Used in tandem with *Generic CADD*, Generic Software's *Generic Esti-*

*mator* reduces the time and effort you spend determining costs or creating bids for construction projects by enabling you to itemize those costs. *Generic Estimator* is ideal for builders, landscape designers, interior decorators, and other CAD professionals. But now that low-cost CAD is being put to a variety of nontraditional uses, you don't have to be a professional to benefit from it.

Simply highlight an item such as carpeting on a *Generic CADD* drawing, and *Generic Estimator* will automatically calculate the quantity needed and the cost for materials, labor, and equipment based on the dimensions of the highlighted object. *Generic Estimator* draws prices from a data base of materials that you maintain, which can include up to 16,000 different items. If you change the price of an item, the program automatically recalculates all items related to it, so you can quickly prepare several estimates for the same job using alternative materials and prices. Generic Software is talking with major materials suppliers to obtain add-on data bases of their inventories for sale at a later date.

*Generic Estimator* costs \$295 as a standalone product and \$495 when bundled with *Generic CADD Level 3*. Both require DOS 2.00 or a later version, 512K of memory, and a graphics card. Generic Software, Inc., 8763 148th Ave. NE, Redmond, WA 98052; 206/885-5307.

**Reader service no. 767**

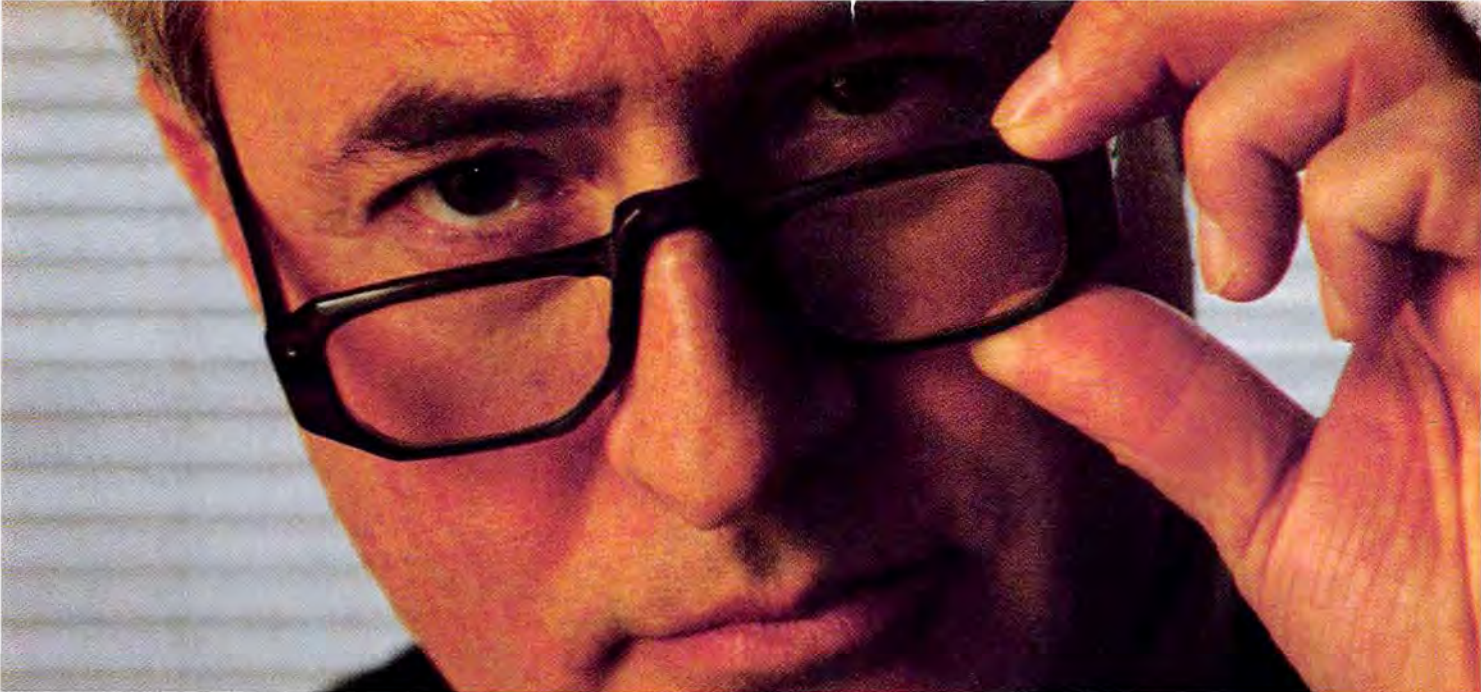
## CrystalPrint WP

Hoping to lead the laser printer market in the same way Epson dominates in dot matrix devices, Qume has introduced an upgradable laser page printer at a rock-bottom price. At \$1299, the stripped-down CrystalPrint WP costs about one-third less than competitors like the Okidata Laserline Plus (\$2000) and Epson GQ 2500 (\$2199), claims Qume. It should be noted, however, that those competitors all come with graphics capabilities built in. Graphics options that allow the Qume printer to emulate the HP LaserJet Plus or the Epson FX-85 dot matrix printer are priced at \$79 each. To take advantage of graphics upgrades, you also need to add a 128K memory module (for \$169), bringing the CrystalPrint's memory to 256K.

Designed primarily for text-based applications, CrystalPrint WP prints six pages per minute and emulates the Diablo 630, the de facto standard for daisy wheel printers. The Qume printer works with most word processing software but doesn't yet support a page description language (PDL) like PostScript. Bitstream soft fonts can be added via snap-in cartridges, but without a PDL they can't be altered using software commands.

Qume boasts that because it has fewer moving parts, the liquid crystal shutter design of its 300-dpi printer provides greater reliability than do





## “Give me one good reason why we should buy Macola Accounting Software.”

### “How about five great ones?”

Choosing the right accounting software can be a complicated process. And due to the time and money invested, this decision should be made only once—regardless of how much your business grows.

There's plenty of excellent reasons to buy Macola Accounting Software. Here's five great ones.



**Reason 1: Flexible and Powerful.** 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.”

**Reason 2: Thirteen Integrated Modules.** It's modular, so you can add more computing power as your needs grow, from simple accounting to full scale accountability.

**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

That's not all. There's a Report Writer that allows customized reporting and can easily transport data files to popular spread sheet, word processing and database programs.

**Reason 3: The best multi-user LAN compatibility.** No other software can match Macola's 15 years of maturity in mini and micro Local Area Network (LAN) environments. Today, Macola is the most advanced accounting software for LANs. No limitations, no compromises.

**Reason 4: Unparalleled Speed and Data Integrity.** Macola Software is the only high-end accounting software written in Micro Focus COBOL... for maximum speed and data integrity. Source code is available. IBM has licensed Micro Focus COBOL

as its SAA standard for the new PS/2 and OS/2.

**Reason 5: Comprehensive Support.** Toll-free 800-line support is available from Macola. Or, utilize Macola's nationwide network of authorized resellers for local training, customization and hands-on support.

These are just five of the many great reasons why Macola Accounting Software is the right choice for your business. For more 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®**  
S O F T W A R E

P.O. Box 485  
Marion, Ohio 43302-0485  
614/382-5999

*Accounting Software  
You'll Never Outgrow.*



most laser printers. Similarly, the CrystalPrint WP functions without the rotating mirrors standard on laser printers. Qume claims this reduces scanning distortion and makes for a sharper on-page im-

age. The CrystalPrint WP also is up to 50 percent smaller than many other laser printers, measuring 15.7 by 13.4 by 9.1 inches. Qume Corp., 500 Yosemite Ave., Milpitas, CA 95035; 408/942-4000.

Reader service no. 768

## UPDATE

### AboveBoard Plus, AboveBoard Plus I/O, AboveBoard 2 Plus

Intel Personal Computer Enhancement Operation (PCEO) has added the ability to multitask and address more memory to new versions of its AboveBoard expanded memory board. The company also has raised its prices. The AboveBoard Plus, which now retails for \$795 before adding memory, supports the multitasking feature of EMS 4.0. If you use Quarterdeck's *Desqview 2.01* environment, the board lets you load and simultaneously execute multiple DOS applications. *Microsoft Windows* also multitasks programs written specifically for it. You can add up to 8MB of expanded memory to the AboveBoard Plus in classic PCs using piggyback cards. A companion product, the

\$945 AboveBoard Plus I/O, gives you serial and parallel ports as well.

AboveBoard 2 Plus lets owners of IBM PS/2 Models 50, 50 Z, and 60 multitask and add up to 8MB of expanded memory on a single card. It supports IBM's guidelines for going beyond 2MB of memory in those machines, and sells for \$495 unpopulated. All AboveBoards come with software to create RAM disks, buffer printers, and diagnose memory-chip failures. Intel Personal Computer Enhancement Operation, 5200 N.E. Elam Young Pkwy., Hillsboro, OR 97124-6497; 800/538-3373.

Reader service no. 769

### PC-Write Version 3.0

Menu changes, the ability to handle larger files, and support for multiple columns are among the improvements in version 3.0 of *PC-Write*. The popular shareware word processor

now has a three-line, context-sensitive menu at the top of its screen and gives you a full-screen opening menu if you invoke the editor without specifying a file. New point-and-shoot menus simplify font and page layout selection, and margin-setting capabilities let you create tables, scripts, and numbered or bulleted paragraphs. *PC-Write* version 3.0 uses all available memory for editing, breaking its former 60K file limit. It has an improved spelling checker, supports file locking and read-only files for network users, and still responds to *WordStar* commands. *PC-Write 3.0* requires DOS 2.00 or a later version, and 384K. *PC-Write* has a registration price of \$89; the upgrade is free to registered users. Quicksoft, 219 First Ave. N #224, Seattle, WA 98109; 800/888-8088, 206/282-0452.

Reader service no. 770

### DeskMate 3.0, DeskMate Workgroup Companion

Tandy Corporation has consolidated all previous versions of its *DeskMate* environment/desktop utility into *DeskMate 3.0* and its network extension, *DeskMate Workgroup Companion*. *DeskMate 3.0* works on all IBM compatible machines and is ROM resident on the Tandy 1000 TL and 1000 SL. In addition to its graphic user interface, *DeskMate 3.0* includes a text editor with a 90,000-word spelling checker, a spreadsheet, a communications module, a draw program, a card file, an auto-dialer, a calendar, and a to-do list. On a local area network, *DeskMate Workgroup Companion* adds a shared address book, the ability to direct output to different printers, remote access to your office com-

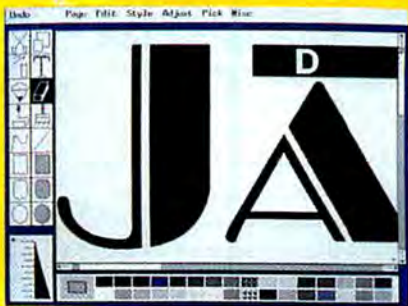


In version 3.0, the popular shareware word processor *PC-Write* gets a new point-and-shoot menu system and the ability to handle larger files. Now it's easier to lay out pages, and you can even create tables in columnar format.



# 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.

## Z·SOFT

450 Franklin Road / Suite 100  
Marietta, Georgia 30067  
(404) 428-0008  
FAX: (404) 427-1150  
Telex: 6502859318

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.

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



Big instant payouts – up to \$50,000 in some cases – are now commonly featured in 23 state lotteries, according to our survey of lotteries in 23 states.

"This is the NOW generation," says one state official who requested anonymity. "Some people just won't wait for a weekly or even a daily drawing. But give them an immediate chance to walk out of the store with \$10,000, and they jump at it. Frankly, it lets the same spontaneous race track much."





Tandy's DeskMate Workgroup Companion environment/desktop utility gains a shared address book for LAN members, central phone messaging, and a capability that lets multiple work group members comment on a topic in a single file.

puter by modem, and a central phone messaging capability. Also incorporated is an "action item" capability, which allows several work-group members to comment within a single file. *DeskMate 3.0* retails for \$99.95; *DeskMate Workgroup Companion* is \$149.95. Owners of previous versions can get a \$50 credit toward the purchase of *DeskMate 3.0* by taking the cover of the manual to a Radio Shack store. *DeskMate 3.0* requires DOS version 2.00 or a later version and 384K of memory; *DeskMate Workgroup Companion* needs DOS 3.00 or a later version and 512K of memory. Both require a CGA or better graphics adapter. Tandy Corp., 1700 One Tandy Center, Fort Worth, TX 76102; 817/390-3700.

Reader service no. 771

## LetterMaster 4.0

An ability to organize a list of business contacts enhances version 4.0 of the *LetterMaster* mail management/data base program. The contact management feature lets salespeople and others include the first, previous, and next dates of contact with their clients. Combined with *LetterMaster 4.0's* extensive note-making and keyword-search capabilities, contact management lets you keep complete records of client contacts and quickly retrieve them by name, subject, date, and other parameters. *LetterMaster 4.0* has a full mail-merge capability for letters, forms, and labels. It makes summaries of calls, notes, and clients; a follow-up log; a phone directory; an address book; and Rolodex cards. *LetterMaster 4.0* follows the guidelines for IBM's Systems Application Architecture screen design and can export files directly to *dBASE III Plus*, *Word-*

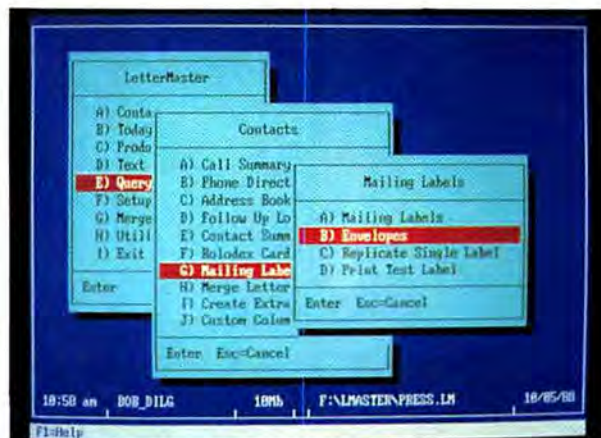
*Star*, *Microsoft Word*, and other formats as well as ASCII text. The package also directly imports *dBASE .dbf* files. It is compatible with DOS-based networks including Novell, 3Com, and IBM products. The \$149 single-user version requires DOS version 2.0 and 512K of memory. The network version requires DOS 3.10 and costs \$349 for an unlimited network license. Research Development Systems, P.O. Box 110216, Arlington, TX 76007; 800/338-9181, 817/860-0155.

Reader service no. 772

## Publisher's Type Foundry Version 1.1

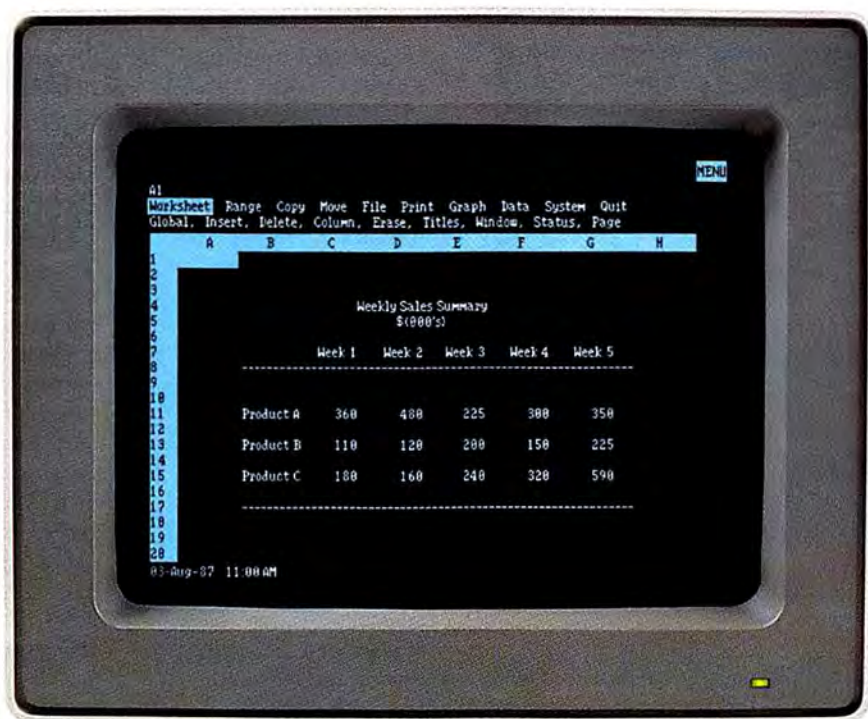
Z-Soft, manufacturer of *PC Paintbrush* for Windows, has strengthened its *Publisher's Type Foundry* version 1.1 with a Windows screen-font translator that lets you

have on screen the same fonts that you create for your printer with the program's bit-map editor. Version 1.1 lets you create or capture fonts, logos, and special symbols from the company's eight different typeface outlines and modify them pixel by pixel before downloading them to your laser printer. The program compresses your data between 10 percent and 90 percent, conserving disk space and speeding the loading and saving of bit maps by as much as 400 percent. Version 1.1 also offers a virtual memory manager disk cache to handle large, complex images and fonts. For example, you now can hold in memory a full 300-dpi image created with Z-Soft's paint program or a 90-point bit-mapped font. The outline editor can hold in RAM up to 1200 line segments of a specific font. Both the bit-map and outline editors let you preselect character height and width for more uniform fonts and preview



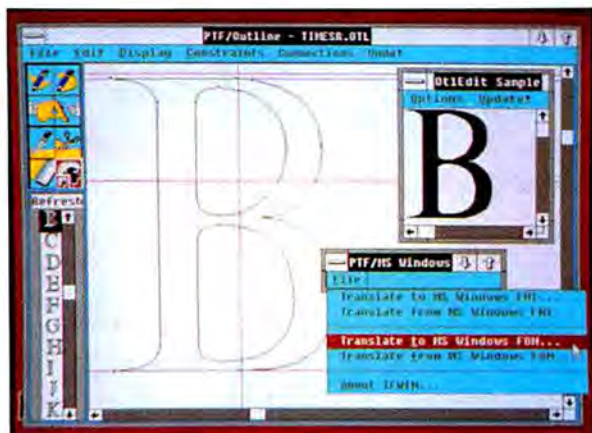
With version 4.0 of *LetterMaster*, you can track the first, last, and next dates of contact for your clients; keep complete records of those contacts; and quickly retrieve one or more client records by name, subject, date, and other parameters.





Quick—turn the page.





What you get from the printer will be in the same font you see on screen, thanks to the Windows screen font translator that Z-Soft has added to Publisher's Type Foundry 1.1.

your creations before printing them. Version 1.1 of *Publisher's Type Foundry* sells for \$495, and upgrades are free to registered users. The program requires DOS 2.00 or a later version, *Windows 2.0* or later, 640K of memory, and a hard disk. Z-Soft Corp., 450 Franklin Rd. #100, Marietta, GA 30067; 404/428-0008. **Reader service no. 773**

## pcANYWHERE III

Dynamic Microprocessor Associates has upgraded its *pcANYWHERE III* remote computing package with an automatic call-back feature. It lets a remote computer control another PC connected to it via modem or serial port and ensures security by having the host call back the remote PC to set up the link. The software also enables the user to control which party absorbs the phone charges. *pcANYWHERE III* has a

built-in dial directory for making phone connections with a single keystroke and logs the length of a call on both sides of the connection. The same line handles data and voice. An automatic record and playback feature lets you trace a communications session back through every keystroke for diagnostics or training. The program works at speeds of up to 19,200 bps. *pcANYWHERE III* retails for \$145 and requires DOS 2.00 or a later version. Dynamic Microprocessor Associates, 60 E. 42nd St. #1100, New York, NY 10165; 212/687-7115. **Reader service no. 774**

## Pro3D/PC version 1.1

*Pro3D/PC*, the 3-D presentation graphics program that gives you several different views of a single design, now lets you create transparent "wire frame" views of your graphics for faster renderings. Enabling

Technologies claims that with this feature, version 1.1 of *Pro3D/PC* lets you build complex and detailed graphs three times faster than you could with version 1.0. The new version of the competent modeling program provides three other rendering options and printing enhancements that gain still more speed. Additionally, *Pro3D/PC* takes full advantage of the faster graphics interface, overlapped windows, and extended memory support in *Windows/286* and *Windows/386*. You can create shaded graphics such as logos or product prototypes and rotate, resize, and light the images for presentation or analysis well beyond the capabilities of most draw or paint programs. *Pro3D/PC* images can be exported in 13 common file types; and, using popular data bases, 3-D images can be tagged with up to five fields of information for easier record keeping. Version 1.1, which ships with a run-time version of *Windows/286*, retails for \$495 and is free to registered users of version 1.0. It requires DOS 2.00, 640K of memory, and a hard disk. Enabling Technologies, Inc., 600 S. Dearborn St. #1304, Chicago, IL 60605; 312/427-0386. **Reader service no. 776**

## Draw Plus

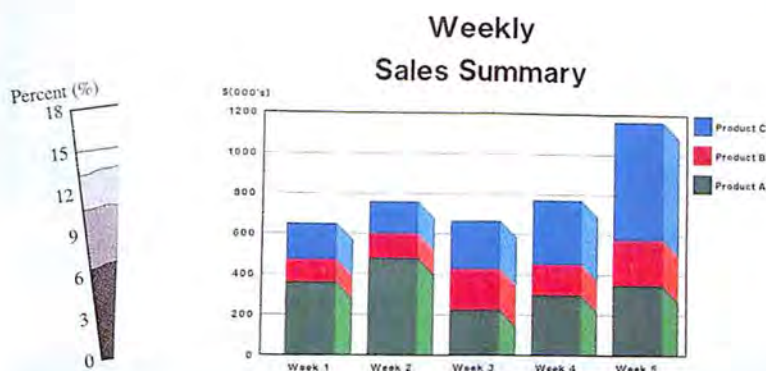
*Draw Plus*, Micrografx's new version of *Draw*, features a tool-kit menu appearing at the left side of

the screen from which you can select from a baker's dozen of drawing primitives such as curves and other shapes. Other drawing aids include the ability to smooth a polyline or unsmooth a spline curve in your sketches. You now can rotate objects in increments as small as 1 degree, and select non-adjacent objects for manipulation. *Draw Plus* includes a cross-hair cursor (in addition to its pointer), various end-of-line styles such as arrowheads, and the ability to specify a wider-than-before range of page sizes and rulers. You also gain greater capability to manipulate graphics from other applications placed in the *Windows* clipboard as metafiles. You can choose from eight different predefined color palettes. *Draw Plus* ships with a run-time version of *Windows/286* and requires DOS 3.00 or a later version, 640K of memory, and a hard disk. It retails for \$395; upgrades are available to registered users for \$99. Micrografx, 1820 N. Greenville Ave., Richardson, TX 75081; 800/272-3729, 214/234-1769. **Reader service no. 777**

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

Jennifer Beaver is a Los Angeles writer; Glenn Grant is a freelancer based in San Diego; Ronnie Gunnerson is a Los Angeles writer; and Mark Henricks is a PC World contributing editor.





# That's how much effort it takes to turn data into graphs with Graphwriter II.

Actually, it may take even less effort than that. You see, Lotus® Graphwriter® II is the only graphics software that lets you automatically generate large quantities of quality graphs based on current spreadsheet and database information. All with a single command.

Do you regularly need to create a variety of graphs from continually changing data such as daily inventory, monthly P&L or quarterly head count? With Graphwriter II you can create a direct link to data in your 1-2-3®, Symphony®, dBase® or ASCII files. So whenever you update your data, you can automatically update your graphs with a single command. What's more, with one keystroke you can toggle back and forth between your data source and Graphwriter II to view and select the data to be graphed. No more printing out files and time-consuming rekeying.

Graphwriter II is a full-fledged production system. You can automatically output up to one hundred charts at a time with a single command. You can even print multiple charts on a page.

And Graphwriter II offers you 24 different graph types—more than any other PC graphics package. So you can choose the chart type that best represents your data.

What's more, you have control over hundreds of style settings such as type font, heading location, bar width and color.

So if you need to create and frequently update graphs from ever-changing data, you need Lotus Graphwriter II.

To get a free self-running Graphwriter II demonstration kit, call 1-800-345-1043 and ask for demo kit AEQ-2524, for 5.25" format, or demo kit AEQ-2664 for 3.5" format.\*

Then you can turn *this* page too.

## Lotus Graphwriter II

Lotus Graphwriter II







August 26, 1988

Mr. William Ryan  
Ryan Manufacturing Corp.  
1941 Broadway  
New York, New York 10023

Dear Mr. Ryan:

Enclosed is your copy of our new price list for the upcoming year. As you will see, we have held our prices fairly steady.

As one of our valued customers, you will be able to continue to receive volume discounts on all of our materials for heating, ventilation and air conditioning. On orders ranging from \$10,000 to \$24,999, you will receive a 3% discount. On orders \$25,000 and over, you will receive a 5% discount. Based on your figures from last year, you will most likely receive the larger discount.

As always, all of our materials are guaranteed for one year. Any material that does not meet your standards must be returned to us within a year of the date you receive the shipment.

Our new price list also features a full line of tools which can be of assistance to your employees. Orders of our tools are also eligible for our discount policy. Simply add any order for tools onto your next materials order and we will apply the appropriate discount.

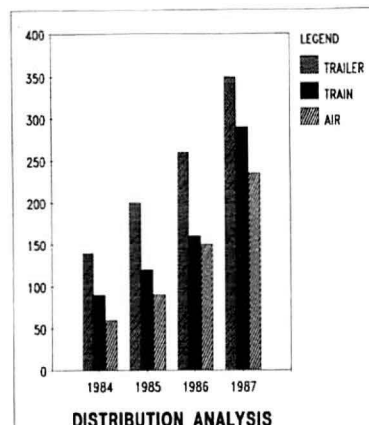
I will call you in the near future to discuss your plans for the coming year. We will need to coordinate delivery schedules to coincide with your busy season.

Once again, I am looking forward to doing business with you and your company.

Thank you very much.

Sincerely yours,

*H. Stone*  
H. Stone  
Vice President, Sales



# Looking good on this paper



# doesn't take a lot of this paper.

Star's new NX-2400 Multi-Font printer gives you the high resolution of 24-pin printing, so you can create compelling reports and letters. Attention-grabbing charts and graphs. And all kinds of distinctive print-outs. Without having a lot to pay out.

The NX-2400 is the latest member of the Star Signature Series. Its four built-in fonts and over 20 typestyles give you all the ImagePower you need to look your best.

The NX-2400 produces draft quality text at 170 characters per second. Letter quality at

57 cps. And it offers superb 360 x 360 dots per inch graphics resolution that surpasses most laser printers.

Among the many other built-in features are friction and tractor feeds. A push button control panel that puts a wide range of functions at your fingertips. And a paper parking mechanism that lets you feed single sheets while keeping sprocket paper in place.

So for high-resolution printing without the high price, take a look at Star's NX-2400 Multi-Font. For your nearest dealer, call 1-800-447-4700.



*Star Signature Series™* by **star**   
MICRONICS

THE IMAGEPOWER PRINTERS

Circle 43 on reader service card



# You've heard that "The Pride is Back"? Well, at STAR "The Pride Never Left"!

If a picture is worth a thousand words then seeing is unbelievable. After nearly a year of new design and research technology, STAR Industries introduces its American made 286 & 386 based personal computers which feature the new STAR FSM-Case and FCF



Digital Display. Both features are exclusive on STAR Computers and are 100% American engineered and produced. These innovations are available on the new STAR 12 MHz to 24 MHz 286 systems and all 386 systems.

Is desk space a concern? The STAR PT-286 & PT-386 are designed to fill your needs and provide the extra power available in a "stand-up" type case, which will maximize your workspace more effectively.

With a proven track record of quality and performance you can rest assured that your STAR will perform as expected. After 2 1/2

years the STAR BAT 286 for example, has a failure rate below 1/2 of 1%. American quality you can depend on with prices starting at only \$999.

And now with every system you purchase STAR will include the STAR "Mouse", built especially for STAR by technology leaders in the industry. The STAR Mouse is also available separately at a great low price.

No matter how you look at it, STAR has the personal computer that will do the job you need done. If quality, performance,

and price will help you decide which is the best personal computer for you, then take a good look at STAR. **After all, it's not every day you find what you're looking for.**



Information (602) 483-2854  
Orders Only 1-800-STAR-286  
FAX (602) 483-7138  
**Dealer Inquiries Welcome**



# Surprise Values at 20 MHz

When it comes to balancing price and performance, PCs from the best-known companies don't always come out on top.

We play "run the gauntlet" with six 20-MHz 80386 PCs and discover some unexpected winners.

*Eric Knorr*



STAN MUSEK



**W**ho needs the power of a 20-MHz 80386 PC? Desktop publishers, developers, CAD users, and those looking for network servers demand high performance—but so do many business users. To get performance you can live with using multitasking environments like OS/2 and *Windows/386*, it's quite possible you won't be satisfied with anything less than 20-MHz speed.

The problem with any kind of multitasking, however, is that it requires a lot of RAM. And for the past year, RAM has ranged from expensive to unavailable.

This roundup of six 20-MHz 80386 systems pays special attention to memory issues. We can't tell you how much RAM will cost when you read this, but we *can* give you an idea of which memory upgrade schemes are best for you.

As usual, *PC World* also tells you which systems are the fastest. According to the results from application-based tests performed by National Software Testing Laboratories (NSTL), the machines in this roundup fall into two performance classes: Those PCs with memory caching—like the winning Everex Step 386/20—are significantly faster overall than those without.

This review also features the NSTL Crash Test, a rigorous set of compatibility benchmarks using 272 functions from 12 programs. While most machines passed this test with flying colors, one displayed a major compatibility problem.

For the purpose of head-to-head price comparisons, we've developed a standard *PC World* configuration that provides enough mass storage and graphics punch to match 20-MHz CPU power. Thus, the prices quoted in the reviews include 2MB RAM, an ESDI

hard disk (as close to 100MB as possible), a 1.2MB floppy drive, a VGA board and monitor (if available), one parallel and one serial port, and a 101-key keyboard. The selection of hard disks and the availability of VGA graphics vary from case to case; the exceptions to the standard configuration are noted.

For more information on shopping for high-performance PCs, see the "Buyers' Guide: 20-MHz 386 Systems" in this issue.

### **Acer 1100/20**

Healthy performance, a stiff price, and free on-site service distinguish the Acer 1100/20 from the average 20-MHz clone. Although the 1100/20 uses a memory interleaving scheme instead of memory caching, it beat IBM's PS/2 handily in the speed tests. It's a pretty fast ride, but not a free one. In the standard *PC World* configuration, the 1100/20 retails for \$8650, making it the most expensive unit in the roundup.

The 1100/20's memory options are a mixed bag. On the upside, the system comes with 2MB of 256-kilobit, 85-nanosecond (ns) RAM already installed on the motherboard (which has sockets for an additional 2MB). The downside is that the board designed for the system's sole high-speed 32-bit slot holds just 4MB; this can be raised to 8MB (but no more) with an optional daughterboard. (Upgrades come in 2MB increments; at press time they cost a reasonable \$1195 each.)

A 12MB maximum of 32-bit RAM might sound like a lot, but in fact, room for OS/2's limit of 16MB is desirable, especially if you plan to use the machine as a server or multi-user host. Acer plans to raise the 32-bit RAM ceiling to 16MB in early 1989 by introducing a 12MB board. However, this board will use Single In-line Memory Modules

The Everex Step 386/20's top performance and moderate price place it smack in the middle of the winner's circle. Add server bonus points for a scalable memory cache and superior expandability.





Although the Acer 1100/20 performs respectably, its price is the highest in the roundup.

(SIMMs), so you won't be able to cannibalize any of the chips on the existing board.

The AT-size 1100/20 system unit looks identical to its 16-MHz brother, the Acer 1100 (see "Beware the Cutting Edge," *PCW*, November 1987). A reset button still sits on the front panel and is a bit too easy to bump. The best feature of the casing is external access to three half-height drives. Install a 3½-inch floppy drive along with the essential 1.2MB floppy drive and tape backup, and you have a bridge between disk formats.

The 1100/20's externally accessible half-height bays combined with an internal full-height bay add up to ample device support.

## EXECUTIVE SUMMARY

### Acer 1100/20

20-MHz 80386 computer

High in price and midrange in performance, the Acer 1100/20 includes four months of on-site service in the selling price. The main shortcoming is a 12MB limit on 32-bit RAM, a drawback the company plans to rectify in early 1989.

	POOR	FAIR	GOOD	EXCELLENT
Memory-bus capacity			●	
Expandability			●	
Ergonomic design		●		
Performance			●	
Overall value			●	

In the review unit, the full-height bay held a fast 100MB ESDI Micropolis hard disk with a 23-millisecond (ms) average access time.

Expansion board capacity is typical of AT-type boxes that don't build graphics, disk controllers, and the like onto the motherboard. The ESDI controller and the 16-bit VGA fill two of the five 8/16-bit slots, while the two 8-bit slots are filled by the floppy controller and the serial/parallel board.

Like the Acer 1100, the 1100/20 enables you to select from among six clock speeds—from 20 MHz down to 4.77 MHz—using keyboard commands. The machine also offers a smart mode, which automatically slows the system to 8 MHz for floppy I/O (perfect if you often use older, copy-protected software).

Although the 1100/20's manual is clearer and more complete than the 1100's, and *Windows/386* is now included with the system, configuring an Acer machine still is not a high-tech experience. A setup program in ROM improves little on the IBM AT's bare-bones routine, and a DIP switch block and several jumpers may require your attention during configuration.

After-sale support, however, is impressive. Acer provides a toll-free tech support line plus a one-year warranty on parts and labor, which includes four months of on-site service from TRW.

The 1100/20 distinguishes itself in another way—its lineage. Acer is a subsidiary of the Acer Group, an enormous Taiwanese conglomerate that's not likely to let its U.S. foothold slip. The 1100/20 isn't the fastest or most expandable 20-MHz PC around, but respectable performance, moderate price, and solid support make it a sensible choice.

### AT&T 6386 WGS

If you're hungry for fast, 32-bit RAM, AT&T's 6386 WGS (Work Group System) has it. Although this system's memory interleaving scheme yields mediocre performance for a 20-MHz unit, the 6386 WGS can hold a grand total of 48MB of 32-bit RAM on the motherboard—the largest such capacity we've encountered. Moreover, AT&T recently reduced its prices; the standard *PC World* configuration (except with an 80MB rather than a 100MB hard disk and EGA instead of



## FEATURES EVALUATION

### More 20-MHz Computing for the Money

The prices listed here are for ready-to-run systems, with high-end graphics and mass storage to match 20-MHz 80386 CPU power. All six PCs are considerably less expensive than comparable entries from IBM and Compaq.

	Acer 1100/20	WGS AT/1 6386	Everex Step 386/20	Ferron 80386-20 Plus	HP Ventura 85/20	Protest Model 386-20
● Yes ○ No						
<b>Standard features</b>						
Price <sup>1</sup>	\$8650	\$7539 <sup>2</sup>	\$8292 <sup>3</sup>	\$5534 <sup>4</sup>	\$7995	\$5821 <sup>5</sup>
Coprocessor support	80387; Weitek 1167, 3167	80387	80387, Weitek 1167	80387	80387	80387
Disk caching software	●	●	●	●	●	○
Built into motherboard						
Parallel port	○	●	○	○	○	○
Serial port	○	●	○	○	○	○
Floppy disk controller	○	●	○	○	○	○
Mouse port	○	○	○	○	●	○
<b>Memory-bus capacity<sup>6</sup></b>	12MB	48MB	16MB	10MB	16M3	10MB
<b>Expandability</b>						
8/16-bit expansion slots/number free	5/3	2/1	6/5	6/4	6/4	6/4
8-bit expansion slots/number free	2/0	2/1	2/0 <sup>7</sup>	1/0	2/1	1/0
Half/full-height storage device bays <sup>8</sup>	5/2	5/2	5/2	5/2	6/2	5/2
300MB or larger hard disk available from manufacturer	●	●	●	●	●	●
<b>Ergonomic design</b>						
Switchless setup	○	●	○	○	○	○
Compact footprint	○	○	○	○	●	○
Complete documentation	●	●	●	○	●	○
Tilt-and-swivel monitor	●	●	●	○ <sup>9</sup>	○	●
Front-panel reset button	●	●	●	●	○	●
Front-panel on/off switch	○	●	○	○	●	○

<sup>1</sup> The price listed is based on the standard PC World configuration for 20-MHz 80386 systems, which includes 2MB RAM, a 100MB ESDI hard disk, a 1.2MB floppy drive, a VGA board and monitor, one parallel and one serial port, and a 101-key keyboard. Not all machines were available in this configuration, and exceptions are noted.

<sup>2</sup> With an 80MB ESDI hard disk and EGA graphics.

<sup>3</sup> With a 160MB ESDI hard disk and EGA monitor.

<sup>4</sup> With a 150MB ESDI hard disk and EGA graphics.

<sup>5</sup> With a 90MB ESDI hard disk.

<sup>6</sup> Includes motherboard memory and RAM installable in proprietary 32-bit slots accessed at full CPU speed.

<sup>7</sup> If no 32-bit memory board is present, you can use the single 32-bit slot as an 8-bit slot and still have room for 4MB on the motherboard.

<sup>8</sup> In most cases, two half-height bays can be converted to one full-height bay and vice versa.

<sup>9</sup> Monitor available through dealers only.

VGA graphics) lists for a moderate \$7539.

Low prices for memory upgrades complement the monster RAM capacity. The 6386 WGS has three 32-bit slots; the basic configuration fills one of those slots with a board holding a 1MB SIMM populated with 100ns

256-kilobit chips. Adding another 1MB SIMM costs a mere \$549.

The 6386 WGS's standard memory board holds up to four 1MB SIMMs, yielding a system total of 12MB with all 32-bit slots filled. However, a recently released board can hold four 4MB SIMMs populated with 1-megabit chips, resulting in the humongous 48MB ca-





The AT&T 6386 WGS offers slick setup and an amazing 48MB memory capacity but mediocre performance.

capacity. With one 4MB module, the new board costs \$2999; additional 4MB SIMMs cost \$2899 each. The high-capacity boards are available now, and although you can't mix 1MB and 4MB SIMMs on the same board, you can install both standard and large-capacity boards in the same machine.

Liberal RAM options aside, the 6386 WGS displays more inventiveness than the average AT-style 80386 box. To begin with, the footprint is a bit smaller than that of the IBM AT. And like its PS/2 competitors, one parallel and one serial port are built into the motherboard, as is the floppy controller.

## EXECUTIVE SUMMARY

### AT&T 6386 WGS

20-MHz 80386 computer

The 6386 WGS supports up to 48MB of 32-bit RAM, the largest amount of any machine tested. Software-based configuration eases setup, but you can find better-performing systems for a lower price.

	POOR	FIR	GOOD	EXCELLENT
Memory-bus capacity				●
Expandability			●	
Ergonomic design			●	
Performance		●		
Overall value			●	

You'll find the power switch, a reset button, and a speaker volume control conveniently located on the front panel. When you open up the system (by loosening two screws), you'll discover that the motherboard has been flipped; to get at it you remove a panel on the bottom of the machine. This allows complete access to the motherboard without removing drives or ribbon cables.

One of the machine's two 8/16-bit slots is filled with the ESDI controller, while one of the two 8-bit slots holds the video board. Even taking into account the built-in features, this is less expansion board capacity than most AT-class machines offer.

Device capacity, however, is fully up to snuff. Like the Acer 1100/20, the 6386 WGS provides three externally accessible half-height bays, plus an internal full-height bay. The review unit's full-height 20ms ESDI hard disk was mounted in a protective metal cage that made access difficult.

The setup program is one of the few that rival the PS/2's elegant Reference Diskette software. System configuration is completely software-driven, and as with the Acer 1100/20, you can instruct the machine to slow to 8 MHz for floppy access only. In addition, the first-rate diagnostics enable you to individually test system components using a simple menu-driven routine.

Unfortunately, the NSTL Crash Test indicated that the 6386 WGS's BIOS could stand another revision. Although *Windows/386* is bundled with the machine, the Crash Test revealed that when you close a *Windows/386* window containing *PFS: Professional Write 1.0*, the 6386 WGS bounces you back to the DOS prompt. At press time, AT&T was looking into the problem.

With its competitive price and inexpensive RAM, the 6386 WGS could be a first choice for users who need all the RAM they can get—such as those setting up their machines as multiuser hosts. The painless setup and configuration are also a boon for the non-technical. This is a classy machine, but others in the roundup, including the Acer 1100/20, deliver better performance.



## Everex Step 386/20

The Everex Step 386/20 is the fastest 20-MHz machine *PC World* has ever tested. Its speed, large memory cache, and jumbo expansion capacity make it an excellent server. At \$8292 in the *PC World* configuration (but with a 160MB instead of a 100MB ESDI hard disk and an EGA rather than a VGA monitor), the Step 386/20 is priced a bit higher than the average system in this roundup, but you won't be wasting your money.

While most PCs with memory caching use Intel's 82385 cache controller to manage 32K of 35ns RAM, the Step 386/20 employs its own cache architecture and algorithm. More important, cache size begins at twice that of most others and is expandable in proportion to the number of SIMMs installed.

The Step 386/20's large memory cache promises special advantages in a multiuser environment. Many experts claim that a small cache gets clogged when a system is flooded with simultaneous terminal requests; the larger the cache, the smaller the chance it will become a bottleneck.

Far more controversial is whether multitasking will benefit from a large cache. Current test data is inconclusive, but it's possible that cache size was a factor in the Step 386/20's victory over six other 20-MHz PCs in NSTL's OS/2 tests (see "Is Your PC Ready for OS/2?" *PCW*, October 1988).

The SIMMs for the Step 386/20 hold either 256K in 256-kilobit chips or 1MB in 1-megabit chips. With four SIMMs installed—which results in either a 1MB (\$4599) or a 4MB (\$7699) system, depending on the chip type—the cache size stands at the minimum 64K. Ramp up to eight SIMMs, and you get 2MB or 8MB (for \$5199 or \$11,099, respectively) and a 128K cache. Beyond this, you must install a 32-bit memory board with its own 128K of cache RAM and eight more SIMMs, for a system total of either 2MB (\$6698) or 16MB (\$19,598).

Depending on the upgrade, the cost per megabyte is a reasonable \$600 to \$800, static RAM included. The only fly in the ointment is that you can't mix 256K SIMMs with 1MB SIMMs, and few Everex dealers are likely to let you trade in your 256K SIMMs. So if you plan to run memory-intensive applications, start with 1MB SIMMs.

## EXECUTIVE SUMMARY

### Everex Step 386/20

20-MHz 80386 computer



The Everex Step 386/20 sits at the head of the 20-MHz class, offering an ingenious variable-size memory cache that yields top performance for any application. LED diagnostics and

large expansion capacity add luster to the package.

	POOR	FAIR	GOOD	EXCELLENT
Memory-bus capacity				●
Expandability				●
Ergonomic design			●	
Performance				●
Overall value				●

The Step 386/20's originality doesn't stop with the motherboard. Behind a sliding plastic door on the machine's front panel you'll find a reset button, a speaker on/off switch, a three-position clock-speed switch, and an eight-character LED readout.

The clock switch offers a choice of 20-MHz and 7-MHz speeds plus a middle position labeled 10 MHz; when you boot at this setting you're able to switch among all three speeds from the keyboard. Oddly, if you boot at either the 20-MHz or 7-MHz positions, the 10-MHz setting is disabled.

The LED display tracks the power-on tests of RAM, processor, and peripherals. Error messages alert you to any problems, a particularly useful feature if your machine bombs out before the video comes up. It also helps tech support solve your problems.

Like many AT-size boxes, the Step 386/20 can hold five half-height devices. However, its bays are all externally accessible, making its support for floppy drives and tape backups as extensive as that of many towers. The slot count is also high; of the six 8/16-bit slots, one holds the ESDI controller, one holds the floppy controller, and the rest are free. The 32-bit slot doubles as an 8-bit slot when uncoccupied by a memory board, yielding a total of





The cheapest system in the roundup, the rough-cut Fortron 80386-20 offers impressive speed—along with some clonelike irregularities.

two 8-bit slots, one filled by the video board and the other by the serial/parallel board. You can move one of these boards to an 8/16-bit slot if you want to use the 32-bit slot to add memory.

Taking advantage of this generous expandability can mean tight quarters. All the slots are full length, but as the manual warns, thick, full-length boards could graze a SIMM and cause a short. Another difficulty involves the coprocessor. You can install either a 20-MHz 80387 or a Weitek 1167, but you better have your dealer do it; welded-on drive cages overhang the socket, so access requires removing the motherboard.

The ROM-based setup routine for the Step 386/20 is unimpressive. Press <Delete> as the machine boots, and you get a generic-looking list of peripherals on screen. To set the graphics, you need to flip a switch on the

motherboard; configuring the coprocessor involves moving a jumper. Both RAM disk and disk caching utilities are included.

Whether you use it as a server or as a powerhouse workstation, you're unlikely to find a faster 20-MHz PC than the Step. What's more, the unit received a clean bill of health on the NSTL Crash Test. Its few clonelike rough edges are more than made up for by extras like the front-panel LED display, inexpensive memory upgrades, and plenty of room for boards and drives. The Step 386/20 is clearly the best 20-MHz PC for the money in this roundup.

### Fortron 80386-20 Plus

Best known for its power supplies, Fortron is a relatively new system vendor—and an aggressive one. Its new Fortron 80386-20 Plus is a budget-priced clone with a memory caching architecture that tied for second place in the speed tests. Board and device support are above average, memory upgrades are the cheapest in the roundup, and software compatibility is good enough to withstand the NSTL Crash Test.

What's more, the *PC World* configuration (with a 150MB instead of a 100MB ESDI hard disk and EGA rather than VGA graphics) is dirt cheap at \$5534—which, incredibly, includes a year's on-site service.

Unfortunately, Fortron's quality control also seems to be low budget. The first unit we received had a defective ESDI drive that actually performed worse than a standard AT drive, a fact that Fortron's own subsequent tests confirmed. Fortron replaced the drive and performance revived.

The 80386-20 Plus uses an American Megatrends motherboard, the same one found in the Proteus Model 386-20, also reviewed here. You can't vary the size of the cache on the American Megatrends motherboard, as you can with the Everex Step 386/20, and there's no Intel 82385 cache controller. This is budget memory caching, and the numbers clearly show that the more expensive Compaq and Everex schemes provide faster memory access.

Aside from the 64K cache of 25ns static RAM, all system memory goes on a board that fits in a special 32-bit slot. The board

### 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.



# NSTL TEST REPORT

## 20-MHz 80386 Systems

The three fastest systems—the Everex Step 386/20, Proteus Model 386-20, and Fortron 80386-20—all use high-performance memory caching. However, only the top-rated Step 386/20 beat the standard-setting Deskpro 386/20. The Acer 1100/20 held a clear lead among the machines that do not employ memory caching and even outperformed the PS/2 Model 80-111.

### Microsoft Word

Everex Step	60
Deskpro 386/20	61
Proteus 386-20	64
Fortron 80386-20	65
Acer 1100/20	72
AT&T 6386 WGS	80
PS/2 Model 80	80
HP Vectra RS/20	84

seconds 0 100

### dBASE III Plus

Everex Step	57
Deskpro 386/20	63
Fortron 80386-20	65
Proteus 386-20	65
Acer 1100/20	68
PS/2 Model 80	69
AT&T 6386 WGS	74
HP Vectra RS/20	82

seconds 0 100

The Acer 1100/20 was tested with 1.9MB of RAM and had a 106MB hard disk. The AT&T 6386 WGS was tested with 4MB of RAM and had an 80MB hard disk. The Everex Step was tested with 1.6MB of RAM and had an 89MB hard disk. The Fortron 80386-20 plus tested with 2MB of RAM and had a 117MB hard disk. The HP Vectra RS/20 was tested with 3MB of RAM and had a 103MB hard disk. The Proteus Model 386-20 was tested with 2MB of RAM and had an 89MB hard disk.

### 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.

### 1-2-3

Everex Step	105
Deskpro 386/20	107
Fortron 80386-20	112
Proteus 386-20	113
Acer 1100/20	125
PS/2 Model 80	136
AT&T 6386 WGS	138
HP Vectra RS/20	138

seconds 0 150

### Microsoft C

Everex Step	232
Deskpro 386/20	249
Proteus 386-20	254
Fortron 80386-20	261
Acer 1100/20	277
AT&T 6386 WGS	309
PS/2 Model 80	312
HP Vectra RS/20	320

seconds 0 350

### 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.

### AutoCAD

Deskpro 386/20	52
Fortron 80386-20	56
Proteus 386-20	56
Everex Step	57
AT&T 6386 WGS	63
Acer 1100/20	64
HP Vectra RS/20	64
PS/2 Model 80	64

seconds 0 75

### Microsoft C 5.0

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

### AutoCAD 9

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

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





The nearly indestructible tower chassis of the HP Vectra RS/20 is the machine's greatest asset.

holds up to 2MB of 32-bit RAM in 256-kilobit chips, but an optional daughterboard raises system capacity to a fair-to-middling 10MB—the same as the Acer 1100/20. The daughterboard uses 1-megabit chips and can be populated with either 4MB (for \$1200) or 8MB (for \$2400). You can even leave the basic memory board empty or half empty and still use the daughterboard, giving you a wide choice of memory configurations.

Aside from a front-mounted reset button, the exterior of the 80386-20 Plus is so generic you expect to find a universal price code on the backplane. The footprint is standard AT size, and only two half-height devices are externally accessible.

The box has the usual mix of space for one full-height device and three half-height units. The slot count is nearly as generous as the Step 386/20's, with six 8/16-bit slots and one 8-bit slot. (The 32-bit slot is designed to double as an 8-bit slot, but that would leave no 32-bit RAM in your system.)

Two loose ends put the 80386-20 Plus squarely in the no-name-clone camp. First and most important is that the keyboard socket has no visible means of support other than its pins, which are soldered into the motherboard. This means that these connections—as well as the motherboard itself—withstand the full force of plugging and unplugging the keyboard. In the case of the 80386-20 Plus, the corner of the motherboard where the keyboard socket resides isn't even

anchored properly, which could result in serious motherboard damage.

The second problem is radio frequency emissions. The 80386-20 Plus has an FCC rating of Class A, instead of the more restrictive Class B. Class A machines are approved for business use but not for homes, because the high level of emissions can interfere with TV reception—even on the TV next door.

Other clone trappings prevail. The 80386-20 Plus's generic, unfriendly system setup software is nearly identical to that of the Everex Step 386/20. You also need to set jumpers to install a math coprocessor (80287 as well as 80387 support is provided) and set DIP switches to change the default memory configuration. Furthermore, novice users will find the documentation woefully obscure, and no disk caching software is provided.

The one bright spot in system software is the American Megatrends ROM-based diagnostics. While some tests are on the technical side, the suite is quite complete, from a hard disk media test to a character attribute test of the video board. Only the AT&T 6386 WGS's diagnostics are easier to use, and those are on disk rather than conveniently placed in ROM. And you have the year's free on-site support to back you up.

The real story here is about American Megatrends. The motherboard design en-

## EXECUTIVE SUMMARY

### Fortron 80386-20 Plus

20-MHz 80386 computer

The cheapest PC in the roundup, the 80386-20 Plus provides zippy performance, memory caching, and a year's free on-site service. Its 32-bit RAM is limited to 10MB, however, and some rough edges remind you that this is a lowball clone.

	POOR	FAIR	GOOD	EXCELLENT
Memory-bus capacity				●
Expandability				●
Ergonomic design			●	
Performance				●
Overall value				●



ables the 80386-20 Plus to beat all the non-caching systems handily while keeping costs down and memory expansion flexible. Fortron, on the other hand, seems to be from the slap-it-together school. The Fortron 80386-20's price is eye-popping and the system's performance is very good, but without the year's free on-site service we wouldn't be able to recommend it. As it stands, it's a good buy for technically competent users willing to check a machine thoroughly at the outset.

### Hewlett-Packard Vectra RS/20

Tower PCs offer two basic advantages over desktop units: greater expansion capacity and an under-the-desk footprint. The Vectra RS/20 delivers on both counts, but its performance is the slowest in the roundup, and it's one of the more expensive units reviewed. In the standard *PC World* configuration the machine costs \$7995.

The most unusual feature of the Vectra RS/20 is a removable CPU board at the bottom of the tower. A cage on the board, designed to curb RF emissions, holds the CPU, a socket for a 20-MHz 80387 math coprocessor, and several support chips. Slipping the board in and out is a snap, raising the possibility of future CPU upgrades.

All system memory, in the form of either 256K or 1MB SIMMs, fits on the CPU board. The RS/20 holds a maximum of 16MB of 32-bit RAM, but getting there is more expensive than with the other systems in the roundup, and the configurations are none too flexible. The 256K SIMMs come in bundles of four, or 1MB, for \$649; to go beyond the 4MB limit on the 256K SIMMs you must buy eight 1MB SIMMs for a whopping total of \$7995. And, of course, you can't mix SIMMs of different densities.

The RS/20's tower chassis is built like a tank. Weighing in at over 60 pounds, the unit is the most durable tower we've encountered, including the PS/2 Model 80. Once you pull off the key-locked outer cover, you must remove a sheet-metal plate to access the machine's interior. In addition to adding

## EXECUTIVE SUMMARY

### Hewlett-Packard Vectra RS/20

20-MHz 80386 computer

The Vectra RS/20 might not wow anyone with its speed, but room for a full 16MB of 32-bit RAM, a 60-pound tower chassis, and support for two full-height drives could make the machine a decent server.

	POOR	FAIR	GOOD	EXCELLENT
Memory-bus capacity				●
Expandability			●	
Ergonomic design			●	
Performance		●		
Overall value			●	

strength, the plate also helps ensure the unit's FCC Class B rating.

The capacity of this monolith is somewhat disappointing. It can hold two half-height and two full-height devices, the usual accommodations for a tower. And with six 8/16-bit slots (two filled) and two 8-bit slots (one filled), the board capacity is no more than that of most desktop ATs.

The only integrated feature is a Human Interface Link (HIL) port for special HP devices, such as mice, digitizing pads, touch screens, and the like. Two special 32-bit slots are built into the motherboard, but no options are currently available to fill them.

The RS/20 had one small compatibility problem. Befuddled by the copy protection scheme, the system wouldn't load *1-2-3* release 2 without shifting to 8 MHz, the CPU's only alternate clock rate.

Unlike most systems, the RS/20 also offers a switchable expansion bus, which runs at either 8 MHz or 10 MHz. Fortunately, to maintain compatibility with expansion boards, the default speed is 8 MHz; HP recommends that you use the 10 MHz setting with caution.

Although the operating system is sold separately, HP Vectra DOS offers more extras than any other system software in the roundup. You get the Personal Applications Manager (a DOS shell and file manager) along with a complicated utility for using extended





Basically the same machine as the Fortron 80386-20, the Proteus Model 386-20 has a more polished act.

character sets on HP printers. However, the documentation for this software is so extensive and labored that many users may not want to make the effort.

The setup utility for the RS/20 is similar to that for the AT&T 6386 WGS, but unlike with the AT&T unit you may have to set DIP switches for some configuration tasks. If possible, do it yourself; HP charges \$45 per problem solved.

What you pay for when you get an RS/20 is support for a full 16MB of RAM; name-brand reputability; and a bulletproof, reasonably expandable tower chassis. The HP's performance is not particularly good for a 20-MHz unit, however, and the RAM upgrade scheme may make you pay for more memory than you need. There are better machines for the money.

### Proteus Model 386-20

The Proteus Model 386-20 is essentially the same machine as the Fortron 80386-20 Plus. It has the same American Megatrends motherboard (down to the revision letter), and NSTL's 1-2-3 tests returned virtually identical results. The main difference was that the Proteus unit offered slightly better construction, and we encountered no reliability problems.

Sharp-eyed shoppers will also notice a difference in price. In a configuration identical to that of the Fortron unit, the Proteus costs about \$300 more than the 80386-20 Plus.

(This is partly offset by Proteus's free on-site service, which lasts for 15 months—three months longer than Fortron's, or anyone else's for that matter.) In the standard *PC World* configuration but with a 90MB ESDI hard disk, the system costs \$5821.

Identical motherboards mean identical slot counts (six 8/16-bit slots and one 8-bit slot), coprocessor support, and capacity for a passable 10MB of 32-bit RAM. Memory upgrade increments are also the same, but prices are slightly higher.

Like the 80386-20 Plus, the Proteus rates an FCC Class A, which means it's unsuitable for home use. Another 80386-20 Plus failing shared by the Proteus is an unreinforced keyboard socket. However, the corner of the motherboard where the socket sits is properly attached, so damage to the motherboard is less likely than with the Fortron.

The Proteus has a couple of other small advantages going for it. Although the chassis has the 80386-20 Plus's room for one full-height and three half-height devices, the Proteus makes three half-height bays rather than two externally accessible. In addition, the Proteus offers a turbo switch and indicator light next to a front-mounted reset button. Too bad the switch doesn't work, although the indicator light does go out when you backpedal to 6 MHz using a keyboard command.

Proteus plans to remedy the turbo-switch problem by refitting the Model 386-20 with a new chassis, which will include an LED read-out similar to that of the Everex Step 386/20. Hopefully, the company will also revise its sketchy documentation. In the meantime, the Proteus enjoys the same first-rate, ROM-based diagnostics as the 80386-20 Plus.

A choice between the Proteus and the 80386-20 Plus is close to a toss-up. Judging by the more secure motherboard and three more months of on-site service, the \$300 extra for the Proteus may add up to a bit more peace of mind. When you get down to it, though, both systems are good clone values, and both offer better price/performance than machines lacking memory caching. As always, the only lingering question is whether



these little-known companies will be around to make good on their excellent service agreements.

### Head of the Class

It's easy to spot the top machine in this roundup. With excellent expansion capability, an ingenious approach to memory upgrades, and better benchmark times than even the Compaq Deskpro 386/20, the Everex Step 386/20 is one of the best high-performance PCs you can get for any application.

Tied for second place are the Fortron 80386-20 Plus and the Proteus Model 386-20. Although they're slower than the Deskpro 386/20, these machines are among the first to offer memory-cache performance at budget prices. Both also have excellent service agreements. With 10MB ceilings on 32-bit RAM and fixed 64K caches, however, these units are recommended as workstations rather than multiuser hosts. Also remember that both machines are recommended for technically knowledgeable people who are willing to forgo good documentation and risk their fortunes with a no-name vendor.

For less ambitious users, the superior documentation and quality control offered by larger companies is more appropriate. The Acer 1100/20, the AT&T 6386 WGS, and the HP Vectra RS/20 all inspire more confidence, even though their service agreements aren't as comprehensive.

Provided Acer fulfills promised support for 16MB of 32-bit RAM, the 1100/20 stands (next to the Everex Step 386/20) as the second-best server or multiuser host in the roundup. It costs (in *PC World* configuration) between \$600 and \$1000 more than the AT&T 6386 WGS or the HP Vectra RS/20, but the 1100/20 beats both the AT&T and the HP units by about 10 percent in the speed tests.

For the small minority of users who envision enormously RAM-intensive, multiuser applications, the 6386 WGS, with its support for 48MB of 32-bit RAM, may be the only choice. The 6386 WGS is also by far the easiest machine to configure. The Vectra RS/20's principal attraction is an indestructible chassis and a server-like tower configuration. However, the RS/20 is also the slowest machine in the roundup.

## EXECUTIVE SUMMARY

### Proteus Model 386-20

20-MHz 80386 computer

For \$300 more than the Fortron 80386-20 Plus, you get basically the same high-performance machine in the Proteus. But the free on-site service lasts longer than

Fortron's, and quality control seems better.

	POOR	FAIR	GOOD	EXCELLENT
Memory-bus capacity			●	
Expandability			●	
Ergonomic design		●		
Performance			●	
Overall value			●	

Not every system can be a winner, but users can be. The prices of memory upgrades for several of the machines dropped as this article was being written, an early indication that the memory drought may be easing. The 20-MHz 80386 PC's performance makes multitasking and other high-end applications feasible; if we're lucky, chip prices will fall to the point where such RAM-intensive computing is also affordable. ●

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

### WHERE TO BUY

#### Acer 1100/20

Acer Technologies Corp.  
401 Charcot Ave.  
San Jose, CA 95131  
408/922-0333

**List price:** Model 70 with 2MB RAM, 1.2MB floppy drive, 70MB hard disk, one parallel and two serial ports, 101-key keyboard, mouse, MS-DOS and GW BASIC 3.30 \$6695; Model 100 with 100MB ESDI hard disk \$7495; Model 135 with 135MB ESDI hard disk \$7995; Model 340 with 340MB ESDI hard disk \$9995

#### Accessories: 2MB

RAM in 256-kilobit chips \$1195; unpopulated 32-bit memory board with 4MB capacity \$720; unpopulated 32-bit daughterboard with 4MB capacity \$99; 20-MHz 80387 math coprocessor \$1095; VGA color monitor \$655, VGA monochrome monitor \$225, VGA graphics board \$500

**Warranty:** one year parts and labor including four months on-site service from TRW; remainder of service via authorized dealerships

#### Extended warranty:

\$225 per year for parts and labor, five-day turnaround; \$285 for two-day turnaround

#### Technical support:

unlimited phone support, toll-free number, M-F 7:30-6

#### Other support services:

tech support through CompuServe  
**For more information, circle 860 on reader service card.**



# AT&T 6386 WGS

AT&T

4513 Western Ave.

Lisle, IL 60532

312/971-6000

**List price:** Model 373 with 1MB RAM, 80MB ESDI hard disk, 1.2MB floppy drive, one serial and one parallel port, 101-key keyboard \$5995; Model 374 with 135MB ESDI hard disk \$6895

**Accessories:** 32-bit 1MB SIMM \$549; 32-bit 4MB memory board \$2999; 32-bit 4MB SIMM \$2899; 300MB ESDI hard disk \$11,395; EGA monitor \$745, EGA graphics board \$250; 40MB tape backup \$995, 60MB tape backup \$1495, 125MB tape backup \$1795; intelligent I/O board with eight serial and two parallel ports \$1195; mouse \$150; DOS 3.30 \$120

**Warranty:** one year parts and labor

**Extended warranty:** on-site service available through AT&T (cost depends on configuration)

**Technical support:** unlimited phone support, toll-free number, 24-hour hot line

**Other support services:** BBS

**For more information, circle 861 on reader service card.**

**Everex Step 386/20**  
Everex Computer Systems Division  
48431 Milmont Dr.  
Fremont, CA 94538  
800/356-4283

**List price:** with 1MB RAM (plus 64K cache), 1.2MB floppy drive, one parallel and one serial port, 101-key keyboard, DOS 3.30 \$4599; with 2MB (plus 128K cache) \$5199; with 4MB (plus 64K cache) \$7699; with

2MB (plus 256K cache) \$6698; with 8MB (plus 128K cache) \$11,099; with 16MB (plus 256K cache) \$19,598

**Accessories:** 40MB hard disk \$600, 80MB hard disk \$795, 160MB hard disk \$1995, 160MB ESDI hard disk \$2295, 330MB ESDI hard disk \$3495; VGA board \$399, EGA monitor \$399, EGA board \$160; 20-MHz 80387 math coprocessor \$995; Weitek 1167 math coprocessor \$1895

**Warranty:** one year parts and labor

**Extended warranty:** on-site service available, cost depends on dealer

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

**Other support services:** BBS

**For more information, circle 863 on reader service card.**

**Fortron 80386-20 Plus**

Fortron Corp.  
2380 Qume Dr., Ste. E/F  
San Jose, CA 95131  
800/821-9771,  
408/432-1191

**List price:** with 1MB RAM, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard \$2800; with 1MB RAM, 40MB hard disk, monochrome board and monitor, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard \$3400; with 1MB RAM, 40MB hard disk, EGA board and monitor, 1.2MB floppy drive, one parallel and two serial ports, 101-key keyboard \$3780

**Accessories:** 1MB RAM upgrade \$400; 4MB daughterboard \$1200; 4MB upgrade for daughterboard \$1200; 28ms 40MB hard disk

\$495, 28ms 80MB hard disk \$760, 18ms 150MB ESDI hard disk \$1790, 18ms 300MB SCSI hard disk \$2350; EGA monitor \$385, EGA board \$159; 20-MHz 80387 math coprocessor \$690; 1.44MB floppy drive \$129; 60MB internal tape backup \$595; board with one parallel and one serial port \$75; DOS and BASIC 3.30 \$90

**Warranty:** one year on-site service from PC ServNet

**Extended warranty:** continuing on-site service available through ServNet (cost depends on configuration)

**Technical support:** unlimited phone support, toll-free number, M-F 8-5

**Other support services:** none

**For more information, circle 864 on reader service card.**

**HP Vectra RS/20**

Hewlett-Packard  
Business Computing Systems  
19091 Pruneridge Ave.  
Cupertino, CA 95014  
800/752-0900

**List price:** Model 40 with 1MB RAM, 40MB hard disk, 1.2MB floppy drive, one serial and one parallel port, mouse port, 101-key keyboard \$6595; Model 100 with 2MB RAM, 103MB ESDI hard disk, 1.2MB floppy drive, one serial and one parallel port, mouse port, 101-key keyboard \$7595; Model 106 with 2MB RAM, 103MB ESDI hard disk, VGA board and monitor, 1.2MB floppy drive, one serial and one parallel port, mouse port, 101-key keyboard \$7995; Model 150 with

2MB RAM, 155MB ESDI hard disk, 1.2MB floppy drive, one serial and one parallel port, mouse port, 101-key keyboard \$8195; Model 300 with 2MB RAM, 310MB ESDI hard disk, 1.2MB floppy drive, one serial and one parallel port, mouse port, 101-key keyboard \$10,495; Power User PC with 4MB RAM, 20-MHz 80387 math coprocessor, 103MB ESDI hard disk, 512K VGA board and monitor, 1.2MB floppy drive, 1.44MB floppy drive, 40MB tape backup, one parallel and three serial ports, mouse port, mouse, 101-key keyboard, HP Vectra DOS 3.30 \$13,795

**Accessories:** 1MB memory expansion kit \$649, 8MB memory expansion kit \$7995; VGA graphics board \$445 (with 512K \$595), VGA color monitor \$695, VGA monochrome monitor \$250; 1.44MB floppy drive \$325; 20-MHz 80387 math coprocessor \$1195; I/O board \$150; HP Vectra DOS \$120, Vectra BASIC \$89

**Warranty:** one year parts and labor; \$45 per problem solved (by phone or on site)

**Extended warranty:** \$45 per month for parts and labor after one-year warranty expires

**Technical support:** toll-free phone support (M-F 7:30 a.m.-9 p.m.) only with extended warranty

**Other support services:** none

**For more information, circle 865 on reader service card.**

# Proteus Model 386-20

Proteus Technology Corp.

377 Rte. 17, Airport 17 Center

Hasbrouck Heights, NJ 07604

201/288-8629

**List price:** with 1MB RAM, 40MB hard disk, 1.2MB floppy drive, VGA board and monitor, one parallel and two serial ports, 101-key keyboard \$4155; with 80MB hard disk \$4326; with 90MB ESDI hard disk \$5255; with 150MB ESDI hard disk \$5684; with 330MB ESDI hard disk \$6702

**Accessories:** 1MB memory upgrade \$566, unpopulated daughterboard \$189, 4MB upgrade for daughterboard \$1548; 40MB 28ms hard disk \$507, 80MB 28ms hard disk \$721, 100MB 18ms hard disk \$1169; 150MB 13ms ESDI hard disk \$2064, 330MB 13ms ESDI hard disk \$3229; VGA monitor \$475, VGA board \$259, EGA monitor \$399, EGA board \$129; 1.44MB floppy drive \$121; 20-MHz 80387 coprocessor \$543; 60MB internal tape backup \$895; DOS and BASIC 3.30 \$79

**Warranty:** 15 months on-site service if within a 100-mile radius of a city with a population of 25,000 or more

**Extended warranty:** additional 9 months on-site service \$245, 12 months on-site service \$345

**Technical support:** unlimited phone support, toll-free number, M-F 9-5

**Other support services:** bulletin board tech support

**For more information, circle 866 on reader service card.**





***"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."***

**S**ince 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.

© 1980 Sony Corporation of America. Sony and The One and Only are trademarks of Sony.



Order Status,  
Technical & Other  
Info. (602) 246-2222  
FAX # (602) 246-7805

Call for programs not listed

# WAREHOUSE DATA

PRODUCTS

**MICROSOFT PC Excel  
SPECIAL \$250**

**Call on all Microsoft Mouses**

**TOLL-FREE ORDER LINE 1-800-421-3135**



## Holiday SPECIALS

**Complete Epson Equity I Plus w/Printer \$1249**  
**Complete Epson Equity II Plus w/Printer 2369**  
**Complete AT&T 6386 WGS w/Printer 2795**

### - SOFTWARE -

#### Accounting

Dac Easy Acct. 3.0 Low Price  
Dac Easy Light \$39  
Dac Easy Payroll Low Price  
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 92  
Crosstalk MK4 110  
Flying Dutchman 64  
PC Anywhere III 65

#### Data Base Managers

Clipper \$425  
Condor 3 325  
DataPerfect Low Price  
DBase III Plus 375  
DB-XL Diamond 115  
Fox Base Plus 2.1 194  
Geniter 189  
Paradox 2.0 Premium 435  
PFS: Pro File Call  
Powerbase 169  
Q&A 3.0 Call  
Quicksilver Diamond 329  
Revelation Advanced 485  
R Base For DOS 425  
Rellex 90  
Relate & Report 112  
VP Info 63

#### Desktop Publishing

Pagemaker Ver. 3.0 \$475  
PFS: First Publisher 2.0 73  
Ventura Publisher Call

#### 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 380  
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 84

#### 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 2.0 Call  
Turbo Pascal Call  
Turbo Prolog 2.0 90

#### Multi-User Software

Fox Base + \$299  
Microsoft Word 205  
Word Perfect 5.0 355  
Word Perfect Modules ea 79

#### Project Manager

Microsoft Project \$299  
Super Project Plus 255  
Timeline 3.0 323  
Harvard Total Project Mgr 355

#### Spreadsheet

Lotus 1-2-3 \$295  
Microsoft PC Excel 250  
Quattro 143  
Surpass 329  
Plan Perfect Call  
VP Planner Plus 117

#### Utilities

Core Fast 75  
Copy II PC \$19  
Copywrite 39  
Cubit 39  
Desqview 2.01 72  
Direct Access 49  
Eureka 99  
Fastback Plus Call  
Formtools 56  
Graph in the Box 2 Call  
Mace 55  
Microsoft Windows 286 Ver. 2.1 55  
Norton Advanced 75  
Norton Utilities 48  
PC Tools Deluxe 37  
Prokey 4.0 70  
QDOS II 49  
Rightwriter 75  
Sidekick Plus 115  
Sideways 39  
SOZ Plus 55  
Superkey 59  
Lightning 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 5.0 239  
Wordstar 2000 229

### - HARDWARE -

#### Accessories

Copy II PC Deluxe Bd. \$101  
Curtis Ruby 69  
Logical Connection 429  
Mach III Joystick 36  
Masterpiece 85  
Masterpiece 95  
150 Watt Power Supply 69

#### Boards

AST Rampage/2 Call  
Rampage 286 w/512K \$399  
Sixpac Plus w/64K 129  
**All Other AST Products . . . Call**  
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 286 w/512K 344  
J-Ram/J-Laser Call  
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  
AT&T 6286 WGS 1499  
6300 WGS 919  
6386 WGS, 40 MB H.D. 2999  
6386, 135 MB H.D. 4599  
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**

#### VGA/EGA Boards

AST VGA - (16 Bit) \$349  
ATI EGA Wonder 800 229  
Genoa Super EGA Hi-Res + 186  
Orchid Designer VGA 309  
Paradise Auto 480 179  
Paradise VGA Plus 269  
Paradise VGA Prof. 399  
Vega VGA 275  
**All Other EGA Products Call**

#### EGA Monitors

Casper \$410  
Princeton Ultra Scan 539  
Mitsubishi Diamond Scan 509  
NEC - Multisync II 599  
Zenith 14" Flat Screen 650

#### Hard Cards

Plus 20 MB \$529  
Plus 40 MB 659

#### Hard Drives

Seagate ST-225 20 MB w/cont \$265  
Seagate ST-238 30 MB w/cont 295  
Seagate 40 MB AT 251-2 Call  
Seagate 80 MB AT 579  
Seagate ST-125 w/cont 319  
Seagate ST-138 w/cont 399  
Priam Call

#### 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 1379  
OKIDATA OKI 320 Call  
OKI 321 Call  
OKI 390 499  
OKI 391 679  
STAR MICRONICS NX 1000 179  
NX 1000 Color 238

#### Modems

AZ 2400 INT 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/o soft 289  
Hayes 2400 EXT w/o Soft 435  
Migent Pocket Modem 114  
U.S. Robotics 2400 w/o Soft 335

#### Mice

Z-Nix \$37  
Logitech 68  
Microsoft Bus w/Paintbrush 92  
Microsoft Serial 92  
Optimouse w/Dr Halo III 89  
Optimouse w/DPG 185

### 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) DR. DATA LABEL.

**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.

## WAREHOUSE DATA PRODUCTS

2727 West Glendale Ave. • Phoenix, AZ 85051

We do not guarantee compatibility



No Charge for  
MasterCard or Visa

Servicing our PC buyers with  
low pricing and technical  
experience since 1979.

Phone Hours:  
Monday thru Friday 6:30 am-9:00 pm.  
Saturday 9:00 am-5:00 pm MST.

Circle 243 on reader service card



# 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.\***

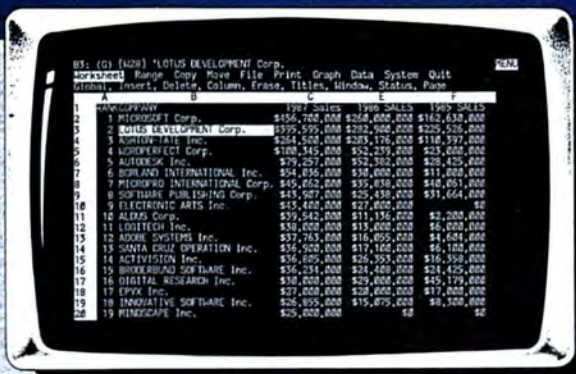
To order, or for more information and the name of your nearest dealer, call:

**800-325-9035**

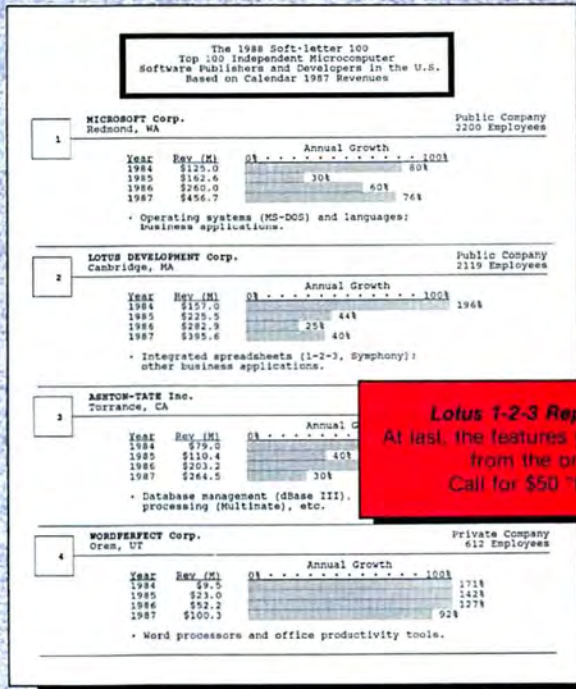
In Mass., call 508-366-1122.

\*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

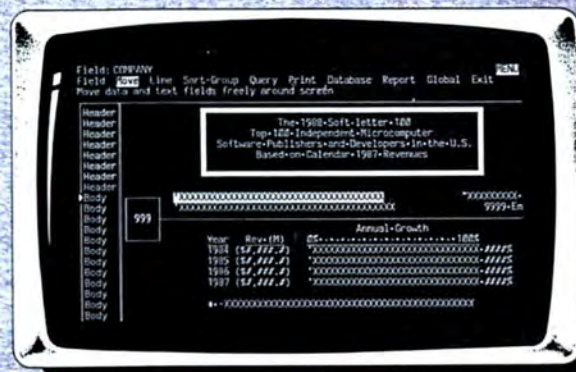


A Lotus database is a range or an entire worksheet having field names in the first row and records of data in rows below.



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.



# Laptops With Storage to Spare

**You don't have to give up desktop performance when you hit the road.**

**PC World picks the best of seven full-featured, battery-powered hard disk laptops.**

Once you become accustomed to fast, powerful desktop PCs, going on the road for even the shortest business trip can produce acute withdrawal symptoms. While a floppy-drive laptop with a hard-to-read LCD screen is better than nothing, many business users consider those machines little more than instruments of exquisite torture.

Help seems to be at hand. Over the last 18 months or so, several companies have introduced shockproof hard drives small enough and light enough to fit in a laptop. The bad news is that these hard disks eat battery power fast and can be woefully slow. The good news is that laptops are starting to offer RAM expansion up to 4MB and beyond, which allows users to create RAM disks large enough to ameliorate the slow disk problem. A few 80286-based laptops are making their debut as well—some with new, high-speed, low-power hard disks. With 2400-bps internal modems, easy-to-read backlit displays, and CPU speeds in the 10-MHz range also becoming more common, business users can finally buy laptops that combine portability with serious computing power—if they buy carefully.

To help you choose, *PC World* looks at seven of the most popular hard disk laptops: the Data General/One 2T, the Epson Equity LT, the Grid Gridlite Plus, the Hewlett-Packard Portable Vectra CS Model 20, the Sharp PC-4521, the Toshiba T1200H, and the Zenith SupersPort 286 Model 20. Three machines are outstanding values: Zenith's SupersPort 286, Epson's Equity LT, and Toshiba's T1200H.

For this roundup, we set up the machines (with a few exceptions) in a standard *PC World* laptop configuration: at least 640K of RAM, a 20MB hard disk, a built-in 3½-inch floppy drive, an internal modem, a backlit LCD display (CGA compatible, with minimum resolution of 640 by 200), support for an external CGA monitor, at least one serial and one parallel port, a carrying case, and DOS. All the laptops except one featured automatic head parking.

Since weight is a major issue for laptop users, all laptops were weighed in traveling mode—with battery, charger/power supply, modem, and carrying case. Traveling

**John  
Diebold**



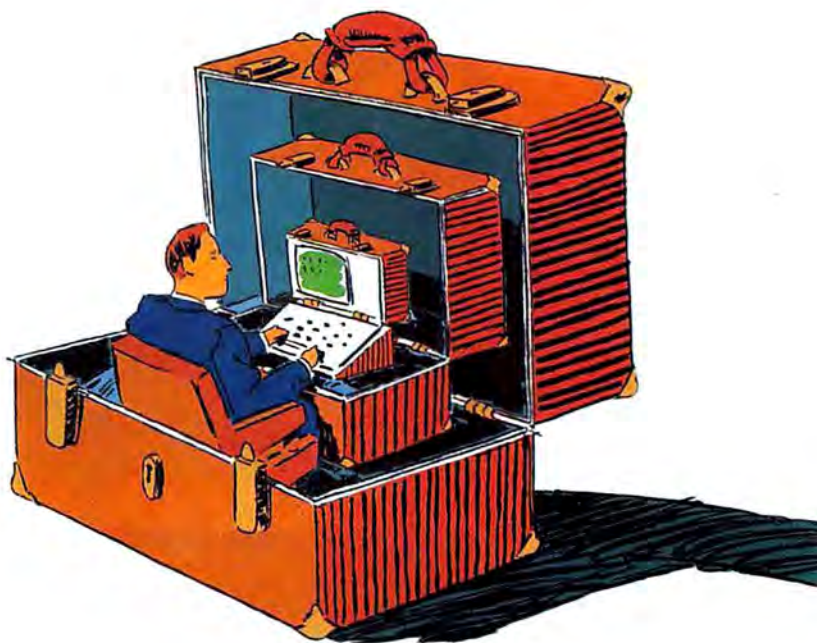
weights ranged from 14 to 25 pounds; 18 pounds was average.

Battery life was tested in two modes: normal, with the hard drive, backlighting, and modem on; and power saving, with hard drive and modem turned off (if possible). While backlighting uses power too, turning it off entirely makes the screen almost impossible to read, so power-saving tests were made with backlighting dimmed but still readable. The shortest battery life was slightly under 2 hours; the longest, nearly 7. Under "normal" use, 2 hours was about average. Finally, one problem worth noting is that with the exception of the HP Vectra, software compatibility was not too hot. All but one laptop failed the National Software Testing Laboratories (NSTL) Crash Test for *Microsoft Windows*, and several other software problems were found as well. To make sure you don't get stung, always try essential software before you buy.

### Data General/One 2T

The guiding philosophy behind the \$3939 Data General 2T seems to be "less is more." Although it's fairly inexpensive, it is one of the slowest machines in the roundup, with the shortest battery life. Moreover, you get only 512K of RAM, and there's no external control for adjusting the display's brightness or contrast.

The 2T weighs in at a bit over 18 pounds, but its 12-by-15-by-3-inch frame is a tad on the large side. A 4.77/7.16-MHz zero-wait-state 80C88 CPU runs the show, and the machine can handle a 7.16-MHz 8087 math co-processor. The 2T packs 512K of 150ns RAM out of the box, making it the only machine in the roundup with less than 640K. Memory is upgradable to 2.5MB on the motherboard, but the next increment over 512K is 768K, which means you may end up paying for more RAM than you want. A 720K floppy drive is mounted on the right side of the machine; a 75ms 20MB hard disk and a 2400-bps modem complete the package.



Two proprietary expansion slots are built in, but if you want to connect an external CGA monitor and a 5¼-inch disk drive, kiss those slots good-bye.

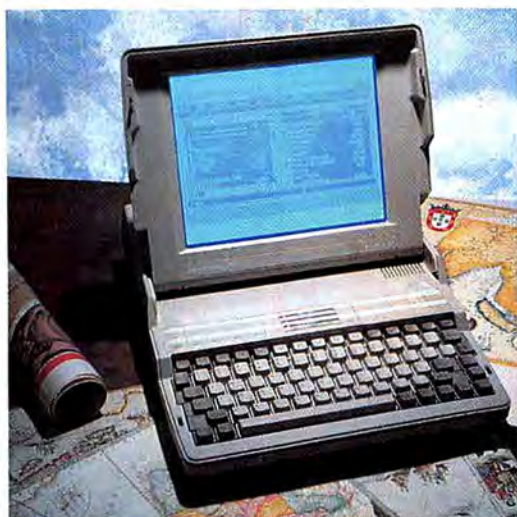
The 2T did quite poorly on NSTL's benchmarks: It came in next to last in every test. Furthermore, the NSTL Crash Test found that the machine had major problems with *Windows*, *Excel*, and *SideKick*.

The 2T's battery life is underwhelming. In normal use, power failed in less than 2 hours—the worst score of any laptop in the roundup. Turn off the hard disk, modem, and backlighting, and the 2T will do better, running a decent 3½ hours. A low-battery warning pops up on the screen, but there is no audible alarm.

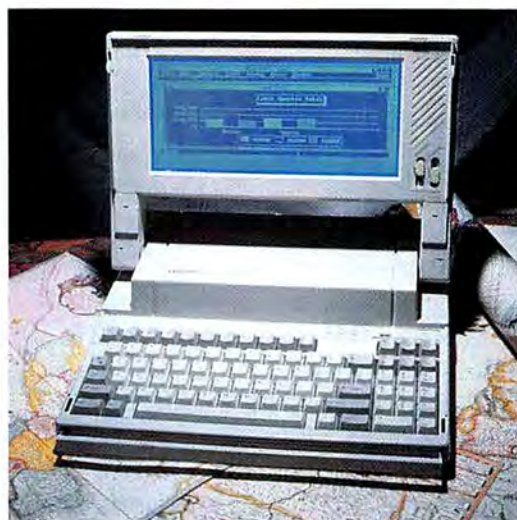
The 2T's large display is bright, clear, and crisp. Unfortunately, brightness and contrast can be controlled only via keyboard commands. The 80-key keyboard is a bit cramped, the function keys are small, and the "clicky" touch is a bit disturbing. As is true of many laptops, the numeric pad is emulated by letter keys used in combination with the <Spcl> key. In fact, these toggled



The Data General/One, based on the 80C88 CPU, is inexpensive, but it's fairly slow and suffers from software incompatibilities.



The fast, low-priced Epson Equity LT sports a 10-MHz V30 CPU and runs at zero wait states—but cannot be expanded past 640K.



The Gridlite Plus weighs less than 14 pounds—but there's no floppy. Adding an external drive raises the weight—and the price.



## EXECUTIVE SUMMARY

### Data General/One 2T

*PC-compatible laptop*

Despite 2MB of RAM expandability and a good screen, the Data General is an undistinguished machine. Slow performance, software incompatibilities, and brief battery life are its biggest failings, and at over 18 pounds it's no lightweight.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity			●	
Expandability		●		
Portability			●	
Ergonomic design				●
Performance		●		
Overall value		●		

keys are the prime suspects in a number of Crash Test incompatibility problems.

In addition to DOS 3.20, the Data General includes a ROM-based utility that enables power-saving options, sets COM port parameters, and so on. Documentation is poorly organized, and while most of the information seems to be there, there's no one place to look for a complete tour of controls and features.

The Data General/One 2T is a less-than-distinguished machine whose poor performance, software incompatibilities, short memory count, and brief battery life recommend against its purchase. In this case, less is less.

### Epson Equity LT

The Epson Equity LT is a fast, solid machine—and at \$3846 it boasts the next-to-lowest price in the roundup. Its only serious drawbacks are a 640K RAM limit and a cooling fan that sucks power (and can't be turned off).

At 18 pounds plus, the LT is no featherweight, and at 14 by 12 by 3 inches, it's best described as a midsize model. A 4.77/10-MHz, 16-bit V30 CPU runs at zero wait states; there's no coprocessor socket. The 640K of 120ns RAM is standard, with no ex-



## FEATURES EVALUATION

### Laptop Lineup: Feature by Feature

Seven hard disk laptops go head-to-head. Prices are calculated for the standard PC World laptop configuration. The Epson, Toshiba, and Zenith systems provide the best values for their price.

- Yes
- No
- ◐ Deficient

	One 21 Data General/	Epson Equity LT	Gridlite plus	HP Portable Vectra GS	Sharp PC-4521	Toshiba T1200WS	Zenith Supersport 286
<b>Standard features</b>							
Price <sup>1</sup>	\$3939	\$3846	\$4580	\$4615	\$3724	\$4098	\$4857
CPU	80C88	V30	80C86	V30	V40	80C86	80C286
Clock speed (MHz)	4.77/7.16	4.77/10	4.77/8	4.77/7.16	4.77/7.16	4.77/9.54	6/12
Wait states	0	0	0	0	1	1	0
Coprocessor support	8087	○	8087	○	○	8087	80287
Parallel port	●	●	●	●	●	●	●
Serial port	●	●	●	◐ <sup>2</sup>	●	●	●
Floppy/hard disk controller	●	●	●	●	●	●	●
External monitor connector	◐ <sup>2</sup>	●	●	●	●	●	●
External floppy drive connector	◐ <sup>2</sup>	●	●	○	●	●	●
Mouse port	○	○	○	○	○	○	○
Modem speed (bps)	2400	1200	2400	2400	1200	1200	2400

#### Memory capacity

Amount shipped with basic unit	512K	640K	640K	640K	640K	1MB <sup>3</sup>	1MB
Maximum installable	2.5MB	640K	1.6MB	4.5MB	1.6MB	1MB	2MB

#### Expandability

AT-compatible slots	0	0	0	0	0	5 <sup>4</sup>	3 <sup>4</sup>
Proprietary slots/number free	2/1	0	0	4/1	2/0	0	0
40MB or larger hard disk available from maker	○	○	○	○	○	○	●

#### Portability

Weight (pounds) <sup>5</sup>	18.2	18.3	16.0	25.1	14.9	14.3	18.8
Size (inches)	12x15x3	14x12x3	13x12x3	16x14x4	12x14x3	12x12x3	12x15x3
Battery life (minutes)							
Normal use	110	115	115	280	125	120	300
Power-saving mode	200	215	125	280	140	295	405
Turns off hard disk	●	●	○	○	○	●	●
Turns off modem	●	○	●	○	●	●	●
Turns off backlighting	●	●	●	n/a	●	●	●
Automatic head parking	●	●	○	●	●	●	●

#### Ergonomic design

ROM-based setup software	●	○	●	○	●	●	●
Screen tilt (degrees)	180	135	120	165	180	180	180
Front-panel reset button	○	●	○	○	○	○	○
Complete documentation	●	●	●	●	○	●	●

<sup>1</sup> Price based on standard PC World laptop system configuration: 640K of RAM; 3 1/4-inch floppy drive; 20MB hard disk; backlit LCD screen; internal modem; serial, parallel, and RGB ports; battery charger; DOS; and carrying case. Exceptions: The DG/One was configured with 512K; the Gridlite's floppy drive is external; and the HP Portable has a supertwist LCD screen (backlighting is not available).

<sup>2</sup> On optional board.

<sup>3</sup> 384K as expanded memory only.

<sup>4</sup> With optional expansion unit.

<sup>5</sup> Traveling weight, including battery, charger/power supply, modem, and carrying case.



pansion capability. A 720K floppy drive is located on the right side of the box; in the standard *PC World* setup, you also get a 78ms 20MB hard disk and a 1200-bps internal modem.

The Equity's performance is outstanding. It came in second overall (after the 80286-based Zenith) in every NSTL test except *dBASE III*, where it slipped to third place. Its compatibility rating is less impressive. The NSTL Crash Test encountered major problems when running *Windows* and *SmartCom II*.

The Equity delivers about 2 hours of battery power in normal use. You can turn off the hard disk and backlighting, but unfortunately there seems to be no straightforward way to shut down the modem or the built-in cooling fan. With as many features disabled as possible, the LT ran for a respectable 3½ hours. Unlike most laptops, the Epson's battery is not user-replaceable, so carrying spares may increase your forearm muscles but won't do you any good.

The LT's screen is small (9 by 4 inches), but it's admirably clear and sharp. Brightness and contrast controls are conveniently

located right next to the screen. Epson provides an 85-key keyboard with a full numeric keypad—a reasonable facsimile of an AT layout—though I found the keys a bit too bouncy for my taste.

The LT comes with a diagnostics disk; a utility for setting power-saving options, COM port parameters, and so on; DOS 3.20; and GW BASIC. Documentation is unspectacular but complete, including a user guide and separate manuals for DOS and BASIC.

The Epson Equity LT offers impressive value. While it could be lighter, price and performance are outstanding, battery life is acceptable, and its highly readable screen makes working with it a pleasure.

## Gridlite Plus

With its all-black case and keyboard, the Gridlite Plus is quite stylish. At less than 14 pounds, it's also one of the lightest laps in the roundup. There's only one catch: It has no built-in floppy drive! While an external 3½-inch drive is available, this represents a major loss in portability, raises the weight to 16 pounds (still on the light side), and boosts the price to \$4580.

The Gridlite Plus is a compact 13 by 12 by 3 inches in size. Its 80C86 CPU runs at 8 MHz with zero wait states (software switchable to 4.77 MHz), and an 8-MHz 8087 co-processor is available as a factory-installed option. It comes with 640K of 150ns RAM, upgradable to 1.6MB on the motherboard. A 78ms 20MB disk and a 2400-bps modem round off the package.

The Gridlite has tried to compensate for its missing floppy drive with a number of ROM-based software options. For instance, DOS 3.21 is available on a ROM chip, as is *Crosstalk*. Four empty ROM sockets for custom software chips are also provided.

The Grid's performance is decent but unimpressive. While it came in near the bottom on NSTL's processor-intensive 1-2-3 benchmark, it did a little better on disk-intensive tests like *dBASE III*, with a fifth-place showing. Like most of the other laptops, it had major problems with *Windows* but did fine on the rest of the NSTL Crash Test.

Two hours of battery life is all you'll get from the Gridlite Plus in normal use. Its cus-

## EXECUTIVE SUMMARY

### Epson Equity LT

PC-compatible laptop



The Epson Equity LT is an outstanding bargain, combining very strong performance with one of the lowest prices (\$3846) in the roundup. RAM is limited to 640K, battery life is merely acceptable, and the machine weighs 18 pounds plus; but its compact case, readable screen, and full 85-key keyboard are sufficient compensation.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity			●	
Expandability		●		
Portability				●
Ergonomic design				●
Performance				●
Overall value				●



# NSTL TEST REPORT

## Laptop Roundup

Predictably, the 80286-based Zenith SupersPort walks away with every event. The Epson Equity LT comes in second in all tests except dBASE III Plus, where it slides to third place.

### Microsoft Word

Zenith SupersPort 286	150
Epson Equity LT	271
Toshiba T1200H	336
HP Portable Vectra CS	352
Gridlite Plus	411
Data General/One 2T	595
Sharp PC-4521	616

seconds 0 120 240 360 480 600

### dBASE III Plus

Zenith SupersPort 286	212
Toshiba T1200H	313
Epson Equity LT	515
HP Portable Vectra CS	586
Gridlite Plus	723
Data General/One 2T	813
Sharp PC-4521	822

seconds 0 200 400 600 800 1000

All systems were tested with 640K of conventional RAM. Expanded memory was used for disk caching for those machines that had expanded memory. All machines had 20MB hard disk drives, but none were equipped with coprocessors. The Toshiba T1200HB was not available for testing.

No disk caching was used for the 1-2-3 benchmark. For the other tests, Super PC-Kwik was used to provide a 64K disk cache in conventional memory for all systems except the T1200H, which had a 256K disk cache in expanded memory, and the SupersPort 286 and HP Vectra CS, each of which were tested with a 64K disk cache in conventional memory provided by their own disk-caching programs.

### 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

### 1-2-3

Zenith SupersPort 286	244
Epson Equity LT	451
Toshiba T1200H	585
HP Portable Vectra CS	608
Gridlite Plus	704
Data General/One 2T	1042
Sharp PC-4521	1054

seconds 0 240 480 720 960 1200

### Microsoft C

Zenith SupersPort 286	603
Epson Equity LT	1075
Toshiba T1200H	1303
HP Portable Vectra CS	1313
Gridlite Plus	1551
Data General/One 2T	2184
Sharp PC-4521	2278

seconds 0 600 1200 1800 2400 3000

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 XUSP, 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.

tomized DOS MODE command lets you turn off the modem and the backlighting, but the hard disk cannot be disabled; hence, you can't push the edge of that 2-hour power envelope very far. This is unacceptably short for power-saving mode.

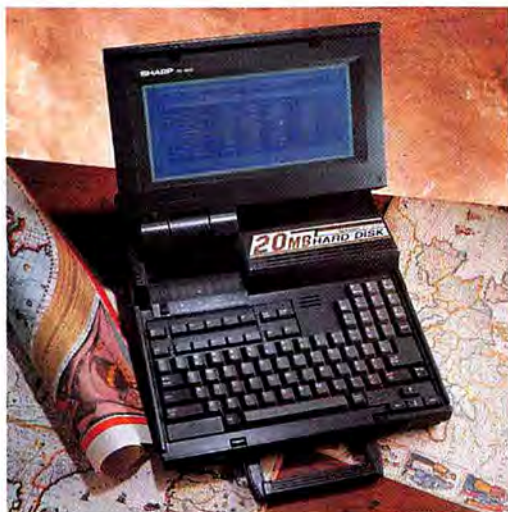
The 8-by-6-inch display is bright and attractive. Contrast and brightness controls are conveniently located right next to the display. The Gridlite's 71-key keyboard, however, is the most confusing of any in the roundup. While its feel is adequate and the keys are full size, no fewer than 26 keys are



**Hewlett-Packard's Portable Vectra CS is big, heavy, and expensive—but boasts long battery life and top software compatibility.**



**Sharp's PC-4521, with a 7.16-MHz V40 CPU, is the slowest laptop in the roundup—but it's very light and very low priced.**



## EXECUTIVE SUMMARY

### Gridlite Plus

*PC-compatible laptop*

The Gridlite Plus is small and light. Unfortunately, it has no built-in floppy disk, which means you'll need to carry an awkward external unit. Performance is decent but unimpressive, as is battery life, and the lack of automatic power-down head-parking raises the possibility of lost data.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability		●		
Portability			●	
Ergonomic design			●	
Performance			●	
Overall value			●	

forced to do double duty in combination with the <Code> and function keys.

The Gridlite Plus comes with a rudimentary utility that reports on what hardware is currently installed. DOS (on disk) is also included in the price of *PC World's* standard configuration, but you'll have to pay extra for a package of integrated desktop utilities, which includes a basic telecommunications program, spreadsheet, and word processor. The documentation is decent, including a useful owner's guide and a DOS manual.

The Gridlite has one serious problem: While the hard disk parks its heads automatically after a short period of inactivity, heads are *not* automatically parked when power goes off—whether you throw the switch or run out of power. This can lead to disk damage and lost data.

Aside from its light weight and ROM software capability, the Gridlite Plus has little to recommend it. Performance is unimpressive, the external floppy drive requirement is awkward, head-parking is less effective than it should be, and the battery lasts only 2 hours. You can do better.

## Hewlett-Packard Portable Vectra CS

### Model 20

The \$4615 HP Portable Vectra CS is the biggest, heaviest laptop in the roundup. It's also one of the most expensive—only \$242 below the 80286-based Zenith SupersPort. However, its battery life is impressive, and it's the only laptop in the roundup to pass the NSTL Crash Test without a single problem.

The Vectra CS weighs in at a shoulder-bruising 25 pounds and measures 16 by 14 by 4 inches. It comes with a 4.77/7.16-MHz, zero-wait-state, 16-bit V30.

Unfortunately, there's no support for a math coprocessor. The standard 640K complement of 120ns RAM is upgradable to a generous limit of 4.5MB via proprietary RAM expansion boards that also provide a serial port. Expansion RAM is accessed at full CPU speed. A 1.44MB floppy drive and the 78ms 20MB hard disk are mounted in the same pop-up module, located just above the keyboard. The modem runs at 2400 bps.



## EXECUTIVE SUMMARY

### HP Vectra CS Model 20

#### PC-compatible laptop

The HP Vectra CS is big and heavy, has a hard-to-read screen, and costs a bundle. Nonetheless, it boasts a generous 4.5MB RAM ceiling, excellent battery life, and a handy fuel gauge to show battery charge. It is also the only laptop to pass the NSTL Crash Test without a single problem.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability			●	
Portability	●			
Ergonomic design		●		
Performance			●	
Overall value		●		

The CS has four proprietary expansion slots, but between the modem, the hard disk controller, and a serial port board, three are used up. Two handy compartments in the case flip out to provide plenty of room for disks.

Performance is fairly good. The CS falls squarely in the middle of the pack on most tests, and it aced the NSTL Crash Test without a single glitch.

The CS's heft is due, in part, to a powerful battery with enough juice for almost 5 hours of normal use—one of the best ratings in the roundup. While the system provides no battery-saving options, it does include an extremely useful, case-mounted fuel gauge to show you how much battery time is left.

No backlighting is available, which makes the screen difficult to read despite its relatively large size (9 by 7 inches). The full-size 92-key keyboard has a familiar AT-style layout; the touch is adequate but a bit mushy.

Disk caching software is included with the machine. DOS 3.30 is sold separately and includes a utility to translate ASCII text files from one character set to another for printing

on various HP plotters and printers. Documentation is excellent, complete with plenty of helpful illustrations.

The HP Vectra CS is a something of a mixed bag. Strong suits include excellent software compatibility, RAM expandability, and a long battery life. Drawbacks include a crummy screen, heavy weight, high price, and awkward size. You'll have to decide if its pluses outweigh its minuses.

### Sharp PC-4521

The Sharp PC-4521 enjoys the dubious distinction of being the slowest laptop in the roundup. However, at \$3724 it's also the cheapest, and at just under 15 pounds it's the second lightest.

Inside its medium-size 12-by-14-by-3-inch case, the Sharp sports a 4.77/7.16-MHz, one-wait-state V40 CPU. It does not support a math coprocessor. The system comes with 640K of 150ns RAM expandable to 1.6MB via a memory board. A 720K floppy drive is mounted on the right, and in *PC World's* standard laptop configuration you also get a 78ms 20MB hard disk and a 1200-bps modem. There are two proprietary expansion slots; the modem occupies one, leaving the second available for expansion RAM or a connector for an external monitor.

The Sharp came in dead last on every performance test. The NSTL Crash Test found a minor problem running *Excel* and major problems with *Windows*.

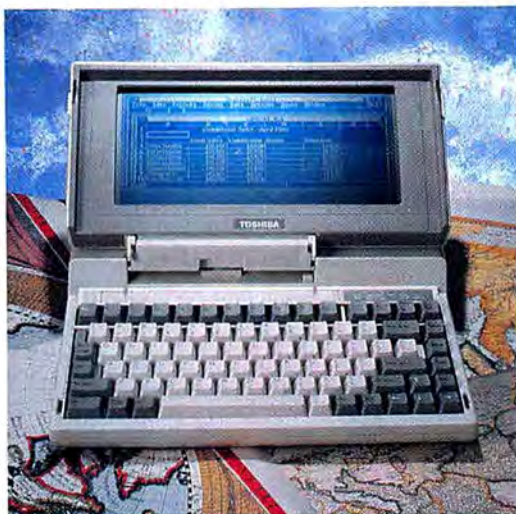
Two hours of battery life is all the Sharp delivers under normal operation. You can turn off the modem and the backlighting, but there's no provision for turning off the hard disk or built-in fan. In any case, even in power-saving mode, slightly more than 2 hours was the best I could get. This is among the worst power-saving ratings in the roundup.

The 9-by-4-inch screen is small but readable; however, contrast and brightness controls, placed low on the side of the console, are hard to reach. The 88-key AT-style keyboard is unusually large and includes a full numeric pad, a separate 4-key cursor pad, and a special key to invoke the power-saving options.



The smallest and lightest laptop in the roundup, the Toshiba T1200H(B) is relatively inexpensive and its performance is decent.

Zenith's SuperPort 286, with its 12-MHz 80C286 CPU, is the fastest laptop here—and (as you might expect) the most expensive.



## EXECUTIVE SUMMARY

### Sharp PC-4521

#### PC-compatible laptop

The Sharp PC-4521 is the slowest laptop in the roundup—but it's also light, small, and extremely inexpensive. A clear screen and a large, 88-key keyboard are additional pluses, but battery life is unimpressive.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability	●			
Portability				●
Ergonomic design				●
Performance	●			
Overall value			●	

In *PC World's* standard laptop configuration, the Sharp comes with a diagnostics disk, DOS 3.21, and GW BASIC. It also includes a nifty option that sets the computer to turn itself on when its modem receives an incoming call. Documentation is minimal; you get a basic guide to the features of the machine, plus brief sections on DOS and BASIC. Full DOS and BASIC manuals are extra.

Low price and light weight are convincing arguments for buying the Sharp PC-4521. On the other hand, poor performance and an unimpressive battery life argue against it. If the bottom line is your highest priority, this machine makes sense, but most business users will find it a bad choice.

### Toshiba T1200H(B)

The Toshiba T1200H(B) is the smallest, lightest laptop in the roundup; boasts a long battery life; and is fairly inexpensive. It even includes an automatic, goof-proof data-saving feature in case of battery failure.

The T1200 comes in three flavors: vanilla (with floppies), H (with a hard disk), and B (with backlighting). Toshiba was unable to provide a backlit HB model, so a T1200H was tested. With backlighting, in the standard *PC World* configuration, the T1200HB costs \$4098.

The T1200H weighs only 14 pounds and stands a mere 12 by 12 by 3 inches. It uses a 4.77/9.54-MHz, one-wait-state 80C86 CPU and is socketed for a 9.54-MHz 8087 coprocessor. It comes with 1MB of 120ns RAM, with no provision for additional memory; 384K of that RAM can be used as expanded memory. (Toshiba supplies an expanded memory RAM disk utility.) There are no expansion slots. However, an optional expansion chassis provides five 8-bit, XT-compatible slots. A 720K floppy drive sits just above the 78ms 20MB hard drive on the right side of the case. The modem runs at 1200 bps.

The T1200H performs quite respectably. It places in the middle of the pack on the processor-intensive 1-2-3 benchmark and



## EXECUTIVE SUMMARY

### Toshiba T1200H(B)

PC-compatible laptop



The Toshiba T1200H is the smallest, lightest laptop in the roundup (we were unable to test the backlit HB model). Performance is excellent, battery life is outstanding, and its price is fairly low. A "hard RAM" safety feature saves data in case of an unexpected battery power failure. A 1MB memory ceiling is its only serious drawback.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability		●		
Portability				●
Ergonomic design				●
Performance				●
Overall value				●

takes a strong second place (right behind the 80286-based Zenith) on the disk-intensive dBASE test. The NSTL Crash Test uncovered a minor problem with *Excel* and a major one with *Windows*.

Although Toshiba's laptops have a reputation for a long battery life, the T1200H seems to have a shorter normal endurance span than many others in the roundup. Even with a low-power LCD screen, normal battery life was a mediocre 2 hours; presumably, the backlit screen would reduce this time to under 2 hours. On the other hand, hard disk and modem can be switched off, and in power-saving mode the T1200H ran happily for nearly 6 hours—an impressive figure exceeded only by the Zenith 286. Battery monitoring facilities include a pop-up charge-level display, a flashing low-battery light, and an audible warning.

The smallish, 9-by-4-inch, supertwist LCD proved somewhat difficult to read in dim light. An 82-key keyboard is laid out to resemble the standard IBM keyboard but lacks the IBM's numeric pad and good feel.

One of the Toshiba's most attractive features is its "hard RAM." If the juice runs low, the system automatically shuts down and

switches to an auxiliary battery, which is good for about three days. Recharge within that time, and you won't lose the contents of the 384K expanded memory RAM disk. If the T1200H's "resume" feature is active, you won't even lose a keystroke; just recharge, turn the power back on, and you can pick up right where you left off. Toshiba provides a pop-up utility to enable the power-saving options and change system configuration; DOS 3.30 is included too. Documentation is extremely meticulous, with separate user, DOS, and modem manuals.

While the Toshiba is no speed demon, it combines a low price with extremely light weight, long battery life (at least in power-saving mode), and a tempting hard-RAM safety feature. It may not be flashy, but it's solid.

### Zenith SupersPort 286 Model 20

At the moment, there are only two 80286-based battery-powered laptops readily available: the GridCase 1520 (see *The Hardware Shelf*, PCW, September 1988) and the Zenith SupersPort 286. The SupersPort sets a new standard for laptop performance and battery life. Its 12-MHz 80C286 CPU and high-speed, 28ms 20MB hard drive make it the fastest laptop in the roundup by a wide margin. Furthermore, since its hard drive draws very little current, the 286 enjoys unusually long battery life. Naturally, this kind of performance doesn't come cheap; the SupersPort 286 lists at \$4857, making it the most expensive machine in the roundup.

This powerhouse system weighs in at 18 pounds and change, and at 12 by 15 by 3 inches it's rather bulky. A 6/12-MHz 80C286 CPU runs at zero wait states, and there's a socket for a 10-MHz 80287 math coprocessor. The system comes standard with 1MB of 100ns RAM expandable via a proprietary expansion board to 2MB; expansion RAM is accessed at full speed. A 1.44MB 3½-inch floppy drive is mounted on the right side of the machine. A 28ms 20MB hard disk and a



**EXECUTIVE SUMMARY****Zenith SupersPort 286***AT-compatible laptop*

Zenith's SupersPort 286 will set you back a cool \$4857, but that buys an 80C286-based speed demon with an unusually fast hard disk and an excellent display. Disk-caching software is included at no extra cost. This laptop is clearly the top performer in the roundup.

Battery life is outstanding, too.

	POOR	FAIR	GOOD	EXCELLENT
Memory capacity				●
Expandability			●	
Portability			●	
Ergonomic design				●
Performance				●
Overall value				●

2400-bps modem fill out the features. An optional expansion chassis provides three 8-bit AT-compatible slots.

The SupersPort 286 performs every bit as well as you'd expect. It took first place on every NSTL benchmark. While it ran into problems with *Windows* on the NSTL Crash Test, it handled everything else easily.

The SupersPort delivers an exceptional 5 hours of battery life in normal use. The back-lighting, modem, and hard disk can all be shut down, and in power-saving mode the 286 runs for an amazing 7 hours, the best score in the roundup.

The Zenith's large display (8 by 6 inches) is extremely easy to read. The 79-key keyboard is very close to the standard IBM layout, except that the numeric keypad is emulated by letter keys combined with a special function key. <Page Up>, <Page Down>, <Home>, and <End> keys are emulated by the cursor keys in a similar fashion. Despite these limitations, the keyboard is easy to use and has a responsive touch.

To speed throughput even more, Zenith includes disk-caching software at no extra

cost, along with DOS 3.21 and a ROM-based utility that includes an assembly language debugger.

Documentation is excellent, including both a user guide and an extensive DOS manual.

The Zenith SupersPort 286 Model 20 is pricey, but if you are willing to pay the cost to be the boss, it's the only choice. With its high-speed CPU, fast hard disk, and long battery life, it is undoubtedly the most powerful battery-powered laptop on the market today. For many business users, however, it may be somewhat overqualified.

**Power to the Portables**

Three laptops make it to the top of the heap. The 80286-based Zenith SupersPort 286 is the clear winner in two out of four categories: performance and battery life. Unfortunately, at \$4857 it is quite expensive. The \$3846 Epson Equity LT is also quite fast, second only to the Zenith, and is very inexpensive. However, it is limited to 640K of RAM. The compact Toshiba T1200HB is the lightest laptop in the roundup, and at \$4098 the backlit T1200HB model is only \$252 more expensive than the Epson. It boasts good battery life in power-saving mode and an easy-to-read screen, but like the Epson, it allows no RAM expansion.

Two machines, the HP Portable Vectra CS and the Sharp PC-4521, are mixed bags. The \$4615 CS is heavy and expensive, with a murky screen, but it delivers outstanding battery life, RAM expandability, and software compatibility. The Sharp is very slow and the battery life is short, but it's admirably light, and at \$3724 it's the cheapest system in the roundup. The Data General/One 2T and the Gridlite Plus are poor performers with short battery life and little to redeem them.

The most exciting news here is that the best of these hotshot hard disk laptops deliver more power than many desktop units. The golden age of laptop computing has dawned at last. ●

*John Diebold is a marine geophysicist specializing in computer analysis of seismic data.*



## WHERE TO BUY

### Data General/One Model 2T

Data General Corp.  
4400 Computer Dr.  
Westboro, MA 01580  
800/343-8842

**List price:** with 512K RAM, 20MB hard disk, 720K floppy drive, serial and parallel ports, backlit LCD, DOS 3.20 \$3195

**Accessories:** 256K RAM \$200, 1MB RAM \$495, 2MB RAM \$895; RGB monitor adapter and port \$245; 2400-bps modem \$500, 1200-bps modem \$400; external 5¼-inch floppy disk drive \$795; 5¼-inch floppy disk controller and port \$155; extra battery pack \$95; quick charger \$95; external numeric keypad \$125; soft carrying case \$99

**Warranty:** one year limited parts and labor  
**Extended warranty:** service contracts available

**Technical support:** toll-free number, M-F 9-5

**Other support services:** none  
**For more information, circle 780 on reader service card.**

### Epson Equity LT

Epson America Inc.  
2780 Lomita Blvd.  
Torrance, CA 90505  
213/386-8776

**List price:** with 640K RAM, 20MB hard disk,

720K floppy drive, serial and parallel ports, backlit LCD, DOS 3.20, GW BASIC \$3498

**Accessories:** 1200-bps modem \$299, external 13-inch CGA monitor \$449, soft carrying case \$49

**Warranty:** one year parts and labor  
**Extended warranty:** none

**Technical support:** toll-free number, M-F 9-5

**Other support services:** none  
**For more information, circle 781 on reader service card.**

### Gridlite Plus

Grid Systems Corp.  
47211 Lakeview Blvd.  
Fremont, CA  
94537-5003  
415/656-4700

**List price:** with 640K, 20MB hard disk, serial and parallel ports \$3425

**Accessories:** 512K RAM \$395, 1MB RAM \$495; 8087 coprocessor \$195; 2400-bps modem \$595; DOS 3.21 (3½-inch disk) \$150, DOS 3.21 (ROM chip) \$200; soft carrying case \$60; external 720K 3½-inch floppy drive \$350, external 5¼-inch floppy drive \$395; extra battery \$70; external battery charger \$90; Diconics portable printer \$495

**Warranty:** 90 days parts and labor  
**Extended warranty:** service contracts available

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

**Other support services:** none  
**For more information, circle 782 on reader service card.**

### HP Portable Vectra CS Model 20

Hewlett-Packard Co.  
1820 Embarcadero Rd.  
Palo Alto, CA 94303  
800/367-4772

**List price:** with 640K RAM, 20MB hard disk, 1.44MB 3½-inch floppy drive, parallel ports, supertwist LCD, disk-caching software \$3675

**Accessories:** 1MB expansion board and serial port \$595, 2MB expansion board and serial port \$1195; serial port \$220; 2400-bps modem \$695, 1200-bps modem \$450; soft carrying case \$150; DOS 3.30 \$120

**Warranty:** one year limited parts and labor  
**Extended warranty:** \$45 per month

**Technical support:** toll-free number, M-F 7 a.m.-9 p.m.

**Other support services:** none  
**For more information, circle 783 on reader service card.**

### Sharp PC-4521

Sharp Electronics Corp.  
Sharp Plaza  
Mahwah, NJ  
07430-2135  
201/529-8200

**List price:** with 640K, 20MB hard disk, 720K floppy drive, serial and parallel ports, backlit LCD, DOS 3.21, GW BASIC \$2995

**Accessories:** 1MB RAM board \$599, 1200-bps modem with extra serial port \$399, extra serial port \$99, RGB video adapter \$255, external 5¼-inch floppy drive \$499, soft carrying case \$75, DOS and BASIC manuals \$65

**Warranty:** one year parts and labor  
**Extended warranty:** choice of service contracts

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

**Other support services:** none  
**For more information, circle 784 on reader service card.**

### Toshiba T1200H(B)

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

**List price:** T1200H with 1MB RAM, 20MB hard disk, 720K floppy drive, serial and parallel ports, DOS 3.30, soft carrying case \$3499; T1200HB in same configuration plus backlighting \$3699

**Accessories:** 1200-bps modem \$399, expansion chassis \$1298, 5¼-inch external floppy drive \$499, battery quick charger \$279, extra battery \$79, 17-key numeric keypad \$99

**Warranty:** one year parts and labor

**Extended warranty:** two years

**Technical support:** toll-free number, M-F 7-5

**Other support services:** CompuServe forum, in-house bulletin board  
**For more information, circle 785 on reader service card.**

### Zenith SupersPort 286

Zenith Data Systems  
1000 Milwaukee Ave.  
Glenview, IL 60025  
312/699-4848

**List price:** with 1MB RAM, 20MB hard disk, 1.44MB floppy drive, serial and parallel ports, backlit LCD, DOS 3.21 \$4499

**Accessories:** 1MB RAM board \$1299; 80C287 coprocessor \$525; 2400-bps modem \$449, 1200-bps modem \$299; expansion chassis \$449; external 5¼-inch floppy drive \$399; extra battery pack \$159; external battery charger \$89; 24-key numeric keypad \$129; soft carrying case \$59

**Warranty:** one year parts and labor

**Extended warranty:** yes

**Technical support:** through dealers only

**Other support services:** in-house BBS  
**For more information, circle 786 on reader service card.**

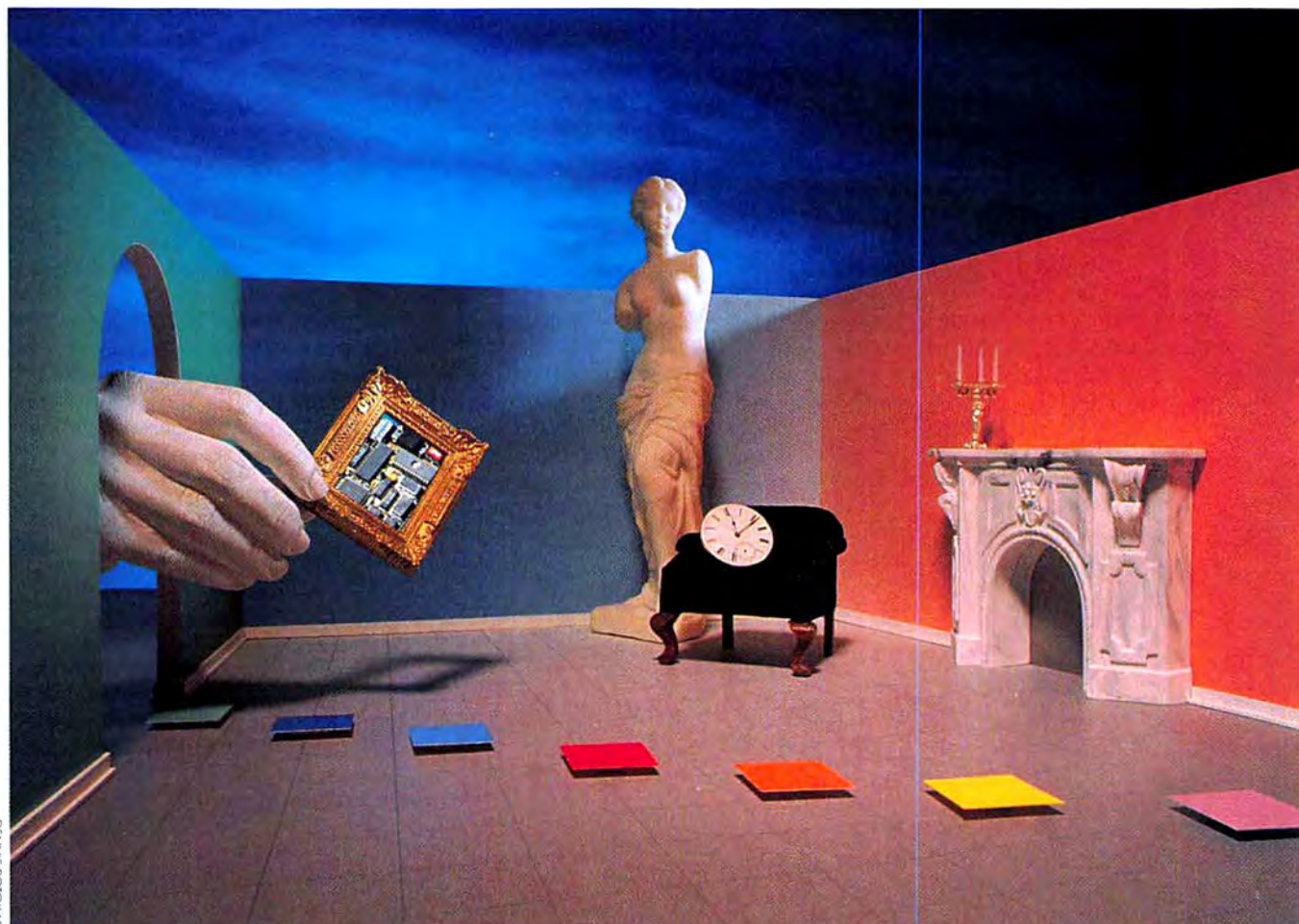


# VGA Boards— The Second Generation

With more colors, more pixels,  
and more extended modes,  
why wait?

Ten VGA boards prove that you  
can enjoy a first-rate display  
without having to buy a PS/2.

*TJ Byers*



DENNIS FODORAR



**N**ot long ago the EGA was *the* video status symbol, but already users and software developers are turning in droves to the larger palette and greater resolution offered by the Video Graphics Array (VGA). Although IBM created the VGA standard, you don't need a PS/2 to enjoy it; there are dozens of VGA-compatible adapters for the PC, and many offer features missing from the PS/2's built-in VGA circuitry.

This review examines ten VGA adapters for the PC with base prices ranging from \$399 to \$799. With EGA boards currently selling for about \$150 (and offering 640 by 350 resolution and 16 colors), budget-minded buyers may question the value of VGA's marginally higher 640 by 480 resolution. But keep in mind that most of the reviewed boards go well beyond VGA's standard 17 modes, offering higher resolution graphics- and text-mode drivers for many popular programs. Many of the boards offer drivers that expand VGA's 320 by 200 resolution (with 256 colors from a palette of 262,144) to an impressive 640 by 480 or even 800 by 600. Want to run *AutoCAD* at 1024 by 768 resolution? Open *Windows* at 800 by 600? Work with a 1-2-3 spreadsheet in 132 columns? Pick the right board, and you can get all that and then some.

VGA boards herald a significant shift from digital to analog video technology. Analog monitors driven by VGA boards not only cost less than digital displays but can generate a virtually unlimited number of hues and shades. If you're worried about obsolescence, a VGA board/analog monitor combination is the smart long-term buy (see "VGA Monitors—Cheap and Smart" in this issue).

Just remember two things: Tapping graphics modes with resolutions of 800 by 600 and above means buying a multiscan monitor, and very high resolution modes (1000+) demand an interlace monitor such as the IBM 8514. If you're willing to bite the golden bullet, then shop for a VGA board offering the extended-mode drivers that support your applications. (*Don't* get conned by boards that offer lots of extended modes but no matching drivers.) Then consider the niceties: digital output (if you want to drive your old mono-

chrome or color display), a better warranty, and support for Hercules monochrome graphics.

### Compatibility Assured

Early VGA boards attempted to emulate the PS/2's VGA circuitry by means of BIOS-level compatibility—with decidedly mixed results. The VGA boards reviewed here, however, expand upon this software-based scheme by claiming 100 percent register-level compatibility. This means the boards imitate every register in the IBM board and thus should run any VGA-compatible application without a hitch.

For the most part, National Software Testing Laboratories (NSTL) Crash Tests bear out such claims. After exhaustive testing with ten tricky applications, only the Everex EVGA exhibited notable compatibility problems. NSTL tested each adapter in an 8-MHz Compaq Deskpro 286 and a Deskpro 386/20 connected to an IBM 8513 analog monitor, then ran VGA-configured applications through their paces. The programs—*Splash*, *AutoCAD*, *Microsoft Word*, *PC Paintbrush*, *IBM Storyboard Plus*, *Microsoft Windows/286*, *Windows/386*, *Ventura Publisher*, and *SideKick Plus*—and Compaq's OS/2 passed by the boards with only a few stumbles. Control tests were also run on a 10-MHz IBM PS/2 Model 50 and a 16-MHz PS/2 Model 80-071.

Although the VGA standard embraces all previous IBM video modes, a few programs (such as 1-2-3 release 1A and *Flight Simulator*) refuse to work with IBM's VGA emulation of CGA or EGA. All the reviewed adapters except IBM's solve the incompatibilities with proprietary emulators that bypass the VGA BIOS. In most cases you must load these utilities manually, but several boards offer an auto-switching feature that senses troublesome software and automatically loads the correct emulator. This is not to be confused with the automatic mode switching shared by all the products tested, which lets them work with 99 percent of non-VGA software.



## FEATURES EVALUATION

## VGA Boards Compared

IBM's VGA board is soundly routed in the features wars, as rivals heap on the extras.

	STB VGA Extra/EM	Paradise VGA Professional	Genoa Super VGA	Andek VGA Adapter/132	Orchid Designer VGA	Sigma VGA/M	AST VGA Plus	Video-7 V-RAM VGA	IBM PS/2 Display Adapter	Everex E1VGA
● Yes ○ No										
<b>Standard features</b>										
Price	\$399	\$599	\$429	\$445	\$545	\$399	\$599	\$799	\$595	\$399
Warranty (years)	2	3	1	1	2	1	2	5	1	1
TTL output	●	○	●	○	●	●	○	○	○	●
512K RAM	● <sup>1</sup>	●	○	○	●	○	● <sup>1</sup>	● <sup>1</sup>	○	○
Slot size required	half	half	half	half	half	3/4	half	full	full	full
<b>Enhanced features</b>										
16-bit interface	○	●	○	○	○	○	●	●	○	○
Auto-switching	○	○	○	○	○	●	○	●	○	●
BIOS relocation	●	●	○	●	●	●	●	●	○	○
Zoom	●	○	○	●	●	○	○	○	○	●
Custom fonts/editor	○	○	○	●	●	○	○	○	○	●
<b>Proprietary emulators</b>										
EGA	○	○	○	●	●	●	●	○	○	●
CGA	●	●	●	●	●	●	●	●	○	●
MDA	○	●	●	●	●	○	●	○	○	●
HGC	●	●	●	●	●	●	●	●	○	●

<sup>1</sup> Requires extra-cost memory upgrade.

Almost all major applications support the VGA, but even if your program doesn't, you may be in luck. Most of the reviewed units come with standard 640 by 480, 16-color VGA drivers for *1-2-3*, *Symphony*, *AutoCAD*, *Ventura Publisher*, and *Windows*, although selections vary. If there's no driver for your program, you can still run it, but you'll have to settle for CGA or EGA colors and resolution.

#### More Than Meets the Eye

As the following reviews and accompanying table demonstrate, most of these VGA boards are pretty similar. Installation is a matter of popping a board into a slot and running configuration software; you flip switches only on boards that support both digital and analog monitors. Output is gener-

ally sharp and crisp, with a few exceptions.

The key feature that distinguishes one clone from another is support for extended mode drivers, which is largely a factor of memory. Half of the reviewed adapters are limited to 256K; three start at 256K but can be upgraded to 512K at extra cost, and two ship with 512K as standard.

Using a VGA board with anything but an analog monitor is like ladling caviar on a hot dog. Yet some users may not be able to afford both components at once. Fortunately, half the VGA boards reviewed can drive digital TTL monitors, so you can still use a monochrome, CGA, or EGA display.

Half the boards are also built around Tseng's VGA chip, which offers two interesting features that the boards may or may not support. The zoom feature is just the ticket for CAD users, since it allows you to zoom, pan, and scroll images. While Tseng's zoom is somewhat faster than software-based



zoom features, it merely magnifies the image, rather than increasing resolution. Furthermore, the function doesn't work with text screens and is incompatible with some graphics applications, including *Ventura 1.1* and *AutoCAD 9.0* (it does work with other *AutoCAD* versions).

Tseng's BIOS relocation feature copies the board's video BIOS into system RAM, which should boost performance—whenever software developers get around to supporting the function. Some boards can relocate the BIOS only on 16-bit systems, while others support both 8- and 16-bit machines. If performance is crucial right now, turn to one of the three reviewed boards that offer a 16-bit interface, which quadruple screen refresh rates when plugged into a 16-bit slot.

## STB VGA Extra/EM



**PROS:** Very high resolution mode, cheap

**CONS:** Requires upgrade to 512K for most extended modes

The STB VGA Extra/EM is the best deal in the roundup. The board supports a fairly generous assortment of extended modes and sports 8/16-bit BIOS relocation, zoom functions, and TTL output. Priced at \$399, the STB is clearly a Best Buy.

In its minimum configuration, the VGA Extra/EM supports 132-column mode for *1-2-3* and *Symphony* and 800 by 600 extended graphics modes for *AutoCAD*, *GEM*, *Ventura*, and *Windows*. If you buy the \$499 512K version (and an interlace monitor), you can enjoy the STB's very high resolution 1024 by 768, 16-color graphics mode for all the graphics-based programs listed above. However, *Ventura* and *Windows* are limited to 2 and 8 colors, respectively, rather than 16. You also get two 256-color drivers for *AutoShade*, Autodesk's color-shading add-on for *AutoCAD*.

## Paradise VGA Professional



**PROS:** 16-bit interface, 256-color Windows driver, money-back guarantee

**CONS:** No TTL output, no very high resolution drivers

If you use *Windows*, you're going to love the Paradise VGA Professional. Thanks to its built-in 512K of RAM, you can enjoy *Windows* applications in 256 colors at 640 by 480 resolution. The roster of drivers is thorough and well thought out and the warranty superb. In a 16-bit slot, the board rapidly refreshes the screen. Despite its \$599 price tag and lack of very high resolution drivers, these many assets earn the VGA Professional a Best Buy rating.

The Paradise offers an excellent library of 800 by 600 graphics drivers for *AutoCAD*, *Cadvantage*, *Excel*, *GEM*, *Ventura*, and *Windows*, plus a 132-column driver for *Framework II*. Although it doesn't have a Tseng chip, the Paradise offers 8/16-bit BIOS relocation.

The VGA Professional's warranty is the best in the roundup. If any VGA-compatible application fails to run with the adapter—but runs on the same PC with the IBM PS/2 Display Adapter—Paradise will replace the board or refund your money.

## Genoa SuperVGA

**PROS:** Cheap

**CONS:** No very high resolution mode

The Genoa SuperVGA offers numerous extended video modes but only a moderate number of drivers to support them. If 800 by 600 resolution is enough and you're on a budget, this \$429 board bears consideration.

The SuperVGA's 800 by 600 graphics mode drivers cover *AutoCAD*, *Framework II*, *GEM*, *Ventura*, and *Windows*; 132-column drivers for *1-2-3* and *Framework II* are also part of the deal. Despite its Tseng chip, however, the SuperVGA lacks both BIOS relocation and a zoom function.



## FEATURES EVALUATION

### VGA Standard and Extended-Mode Drivers

(in number of colors per driver)

	Amdek	AST	Everex	Genoa	Orchid	Paradise	Sigma	STB	Video-7	IBM
1-2-3 2.0										
640 x 480	○	16 16 <sup>1</sup>	○	○	○	○	○	16 <sup>1</sup>	○	○
132 column	16	16 <sup>1</sup>	16 <sup>1</sup>	16	16	○	○	16	16	○
100 column	○	○	○	○	○	○	○	○	16	○
80 column	○	○	○	○	○	○	○	○	16	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	○	16 16 <sup>1</sup>	○	○	○	○	○	○	16 256 <sup>2</sup>	○

#### Symphony

640 x 480	○	16	○	○	○	○	16	○	○	○
132 column	16	16	○	○	16	○	16	16	16	○
100 column	○	○	○	○	○	○	○	○	16	○
80 column	○	○	○	○	○	○	○	○	16	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	○	16	○	○	○	○	○	○	16 256 <sup>2</sup>	○

#### Framework II

640 x 480	○	○	○	16	○	16	○	○	○	○
132 column	○	16	○	16	○	16	○	○	○	○
800 x 600	○	16	○	16	○	16	○	○	○	○

#### Excel

640 x 480	○	○	○	○	○	16 256	○	○	○	○
800 x 600	○	○	○	○	○	16	○	○	○	○

#### Windows 2.0

640 x 480	○	16 256 <sup>2</sup>	8 <sup>3</sup>	16	16 <sup>3</sup>	16 256	16 <sup>3</sup>	○	16 256 <sup>2</sup>	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
752 x 410	○	○	8 <sup>3</sup>	○	○	○	○	○	○	○
800 x 600	16	16	8 <sup>3</sup> 16 <sup>4</sup>	16	16	16	16	8	16 256 <sup>2</sup>	○
1024 x 768	○	○	○	○	16 <sup>3</sup>	○	○	8,8 <sup>3</sup>	4,16 <sup>2</sup>	○
1280 x 600	○	○	4 <sup>3</sup>	○	○	○	○	○	○	○

<sup>1</sup> 1-2-3 version 1A driver.

<sup>2</sup> Requires extra-cost memory expansion.

<sup>3</sup> Windows 1.03/1.04 driver.

<sup>4</sup> Windows 2.1 driver.

<sup>5</sup> AutoCAD 9.0 driver.

	Amdek	AST	Everex	Genoa	Orchid	Paradise	Sigma	STB	Video-7	IBM
GEM										
640 x 480	○	○	○	16	16	○	16	○	○	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	16	16	16	16	16	16	○	16	16 256 <sup>2</sup>	○
1024 x 768	○	○	○	○	○	○	○	16 <sup>2</sup>	○	○

#### Ventura Publisher

640 x 480	○	○	○	16	○	○	16	○	16	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	16	16	16	16	16	16	16	2	16 256 <sup>2</sup>	○
1024 x 768	○	○	○	○	○	○	○	2 <sup>2</sup>	4,16 <sup>2</sup>	○

#### AutoCAD

640 x 480	16	○	8	16	16 256	16	16	16 <sup>5</sup>	16 256 <sup>2</sup>	○
752 x 410	○	○	8	○	○	○	○	○	16	○
640 x 350	○	○	○	○	○	○	○	○	16	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	16	16	16	16	16 256	16	16 <sup>5</sup>	16 <sup>5</sup>	16 256 <sup>2</sup>	○
1024 x 768	○	○	○	○	16	○	○	16 <sup>2,5</sup>	4,16 <sup>2</sup>	○
1280 x 600	○	○	4	○	○	○	○	○	○	○
800 x 560	○	○	○	○	○	○	16 <sup>5</sup>	○	○	○

#### AutoShade

640 x 480	○	○	○	○	256	○	○	256 <sup>2</sup>	16 256 <sup>2</sup>	○
752 x 410	○	○	○	○	○	○	○	○	16	○
640 x 350	○	○	○	○	○	○	○	○	16	○
720 x 540	○	○	○	○	○	○	○	○	16 256 <sup>2</sup>	○
800 x 600	○	○	16	○	256	○	○	256 <sup>2</sup>	16 256 <sup>2</sup>	○
1024 x 768	○	○	○	○	○	○	○	○	4,16 <sup>2</sup>	○
512 x 480	○	○	256	○	○	○	○	○	○	○
640 x 400	○	○	256	○	○	○	○	○	○	○

#### Cadvice

640 x 480	○	○	○	○	○	16	○	○	○	○
800 x 600	○	○	○	○	○	16	○	○	○	○



## Amdek VGA Adapter/132

---

**PROS:** Custom screen fonts, cheap

---

**CONS:** No TTL output, no very high resolution modes

---

**F**or a reasonable \$445, Amdek's VGA Adapter/132 delivers the basics and some nice extras such as custom screen fonts and support for 1-2-3 release 1A graphics without an emulator. Although it lacks a TTL connector and has a somewhat limited list of standard drivers, the Adapter/132 is a solid value.

The Amdek's catalog of extended-mode drivers is above average. It offers 132-column drivers for 1-2-3 and *Symphony* and 800 by 600 drivers for *AutoCAD*, *Windows*, *GEM*, and *Ventura*. Zoom and 16-bit BIOS relocation are included.

The Amdek is the only adapter that doesn't mimic IBM's VGA character set, but this limitation doesn't affect software compatibility. Amdek provides eight custom fonts plus a font editor that lets you create your own for character-based applications.

## Orchid Designer VGA

---

**PROS:** Very high resolution mode, good warranty, custom screen fonts

---

**CONS:** Minor compatibility problem

---

**I**n its high-resolution extended modes, Orchid's Designer VGA generates the most vibrant images in the roundup. The \$545 price tag is reasonable when you consider the board's 512K RAM, numerous standard- and extended-mode drivers, and a generous two-year warranty that can be extended to four years. *Word 4.0* users should note, however, that the board peppers that program's screen with small colored dots. If not for this flaw, the Orchid board would be a top contender.

With the help of an interlace monitor, the Designer VGA boasts an impressive 1024 by 768, 16-color graphics mode for *Windows* and *AutoCAD*. It also offers the usual 132-column modes for 1-2-3 and *Symphony* and delivers

800 by 600 support for *AutoCAD*, *GEM*, *Ventura*, and *Windows*. For extra thrills, one driver lets *AutoCAD* sparkle in 256 colors. At press time Orchid announced 640 by 480 and 800 by 600 drivers for *Dr. Halo*, *Generic CADD*, and *PC Publisher's Paintbrush*.

Like the Amdek, the Designer VGA features eight custom fonts and a font editor, plus BIOS relocation and zoom.

## Sigma VGA/H

---

**PROS:** Cheap; auto-switching

---

**CONS:** Limited extended-mode drivers

---

**P**riced at a trim \$399, the Sigma VGA/H offers a solid list of features, including TTL output and a decent lineup of standard drivers. Unfortunately, despite the many extended modes, extended drivers only support a 132-column text mode for *Symphony* and 800 by 600 graphics modes for *AutoCAD* and *Windows*. Until Sigma expands its driver list, this is a board for bargain hunters only.

## AST VGA Plus

---

**PROS:** 16-bit interface, 256-color *Windows* driver

---

**CONS:** Expensive, no TTL output

---

**T**he AST VGA Plus matches the Paradise VGA Professional's price and chip and, like the Paradise, it throws in a 256-color, 640-by-480 *Windows* driver to boot. The only snag: You'll have to pony up \$350 extra for the necessary 256K RAM option. Considering the stiff RAM tariff and the board's lack of very high resolution modes, the VGA Plus is only marginally recommended.

The board offers speedy screen refresh when it's in a 16-bit slot, as well as 8/16-bit BIOS relocation. The basic package also delivers a respectable set of drivers, with 800 by 600 modes available for *AutoCAD*, *GEM*, *Ventura*, *Windows*, 1-2-3, *Symphony*, and *Framework II*.



## Video-7 V-RAM VGA

**PROS:** Fast screen refresh, numerous drivers, very high resolution mode, 16-bit interface, five-year warranty

**CONS:** Expensive, hardware incompatibilities, fuzzy text output, no TTL output

If you're a speed-hungry *AutoCAD* or *Ventura* user, Video-7's V-RAM VGA is likely to intrigue you. With its super high resolution drivers, speedy RAM, and 16-bit interface, the V-RAM VGA is the most sophisticated board in the roundup. The downside: It's priced at \$799 (currently \$1099 for the 512K version), generates somewhat fuzzy text, and won't work with certain systems and expansion boards.

Thanks to its dual-ported video RAM, which lets the CPU and the screen access video memory simultaneously, and its 16-bit interface, the V-RAM VGA offers the fastest screen refresh of the reviewed units. Auto-switching is available, as is 8/16-bit BIOS relocation.

The V-RAM VGA's list of drivers is more than twice as long as those of its tested rivals. The drivers for *AutoCAD*, *AutoShade*, and *Ventura* are exhaustive, including 4-color, 1024 by 768 graphics modes. Other high-resolution drivers support *1-2-3*, *Symphony*, *GEM*, and *Windows*. Upgrade to 512K, and you can boost most of the high-resolution modes to 256 colors and the very high resolution modes to 16 colors. Another plus: The board's software permanently attaches the appropriate drivers to *AutoCAD*, so you don't have to load them every time you run the program.

But the bad news may put you off: The V-RAM VGA failed to work on an AMT 286 computer, and Video-7 warns that the adapter may conflict with some EMS boards, such as Intel's AboveBoard.

## IBM PS/2 Display Adapter

**PROS:** None

**CONS:** No standard or extended modes, no TTL output, not Hercules compatible

IBM's VGA board is already showing its age. The first board to clone the PS/2's VGA standard is a pricey \$595, and it's devoid of emulators and extended video modes. You don't even receive any standard 640 by 480 drivers. Despite its heritage, it can't be recommended.

IBM's offering is the only board reviewed that doesn't support the Hercules Graphics Card mode. Although the board claims perfect VGA compatibility, it still can't cope with CGA and EGA emulation lawbreakers such as *1-2-3 1A* in graphics mode and *Flight Simulator*.

## Everex EVGA

**PROS:** Very high resolution mode, custom fonts, cheap

**CONS:** Uneven scrolling, slightly fuzzy text, not OS/2-compatible

The Everex EVGA delivers a bounty of features for a scant \$399, but it's not recommended. Why? Of the units reviewed, the Everex EVGA gave the most headaches.

The EVGA has some attractive features, including auto-switching, a library of 22 fonts, and a custom font editor. You can display *1-2-3 1A* graphics without a special emulator, and the repertoire of extended-mode drivers is impressive. Notably, you get 1280 by 600 drivers for *AutoCAD* and *Windows* and two 256-color *AutoShade* drivers.

Unfortunately, the EVGA's performance leaves much to be desired. Jerky scrolling makes you feel like you're at a nickelodeon, and images lack the sharp edge produced by the other adapters reviewed. In addition, the EVGA is the only board in the roundup that suffers from major software compatibility problems. *Word 4.0* is limited to 8 colors instead of 16, and the EVGA colors don't



match *Word*'s default colors. Worse, as demonstrated by the NSTL Crash Test, you can't view the far left and right areas of the screen when running Compaq's OS/2, and after you load several sessions with Compaq OS/2, the screen splits in two. A low price and superb features can't compensate for such fundamental flaws.

### Never a Dull Screen

Because compatibility is generally not an issue in this roundup, extended-mode support and pricing played the major roles in *PC World*'s evaluation. The STB VGA Extra/EM

and the Paradise VGA Professional strike the best balance between price and performance and accordingly share the Best Buy label. Genoa's low-priced SuperVGA and the Amdek VGA Adapter/132 are also good purchases, taking third and fourth place, respectively. Only the IBM and the Everex units receive an unqualified thumbs-down.

Although this second generation of VGA clones is plainly superior to the first, not all 100-percent-register-level-compatible boards are created equal. Some are more equal than others—so keep your eyes wide open. ●

*TJ Byers is a contributing editor for PC World.*

### WHERE TO BUY

#### Amdek VGA Adapter/132

Amdek Corp.  
3471 N. First St.  
San Jose, CA 95134  
408/922-5700  
**List price:** \$445  
**Warranty:** one year parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 790 on reader service card.

#### AST VGA Plus

AST Research  
2121 Alton Ave.  
Irvine, CA 92714  
714/863-1333  
**List price:** \$599 with 256K, \$949 with 512K  
**Warranty:** two years parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, no toll-free number, M-F 8-5  
**Other support services:** company BBS  
For more information, circle 791 on reader service card.

#### Everex EVGA

Everex Systems, Inc.  
48431 Milmont Dr.  
Fremont, CA 94538  
415/498-1111  
**List price:** \$399  
**Warranty:** one year parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, no toll-free number, M-F 8-5  
**Other support services:** company BBS  
For more information, circle 792 on reader service card.

#### Genoa SuperVGA

Genoa Systems Corp.  
75 E. Trimble Rd.  
San Jose, CA 95131  
408/432-9090  
**List price:** \$429  
**Warranty:** one year parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, no toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 793 on reader service card.

#### IBM PS/2 Display Adapter

IBM  
900 King St.  
Rye Brook, NY 10573  
800/IBM-2468  
**List price:** \$595  
**Warranty:** one year parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 794 on reader service card.

#### Orchid Designer VGA

Orchid Technology  
45365 Northport Loop W  
Fremont, CA 94538  
415/683-0300  
**List price:** \$545  
**Warranty:** two years parts and labor  
**Extended warranty:** four years with receipt of warranty card  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 795 on reader service card.

#### Paradise VGA Professional

Paradise Systems, Inc.  
99 S. Hill Dr.  
Brisbane, CA 94005  
415/960-3353  
**List price:** \$599  
**Warranty:** three years parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 796 on reader service card.

#### Sigma VGA/H

Sigma Designs  
46501 Landing Pkwy.  
Fremont, CA 94538  
415/770-0100  
**List price:** \$399  
**Warranty:** one year parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** none  
For more information, circle 797 on reader service card.

#### STB VGA Extra/EM

STB Systems, Inc.  
P.O. Box 850957  
Richardson, TX 75085  
214/234-8750  
**List price:** \$399 with 256K, \$499 with 512K  
**Warranty:** two years parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 7:30-6:30  
**Other support services:** none  
For more information, circle 798 on reader service card.

#### Video-7 V-RAM VGA

Video-7  
46335 Landing Pkwy.  
Fremont, CA 94538  
415/656-7800,  
415/656-0503 (BBS)  
**List price:** \$799 with 256K; upgrade to 512K currently \$300, price announced daily  
**Warranty:** five years parts and labor  
**Extended warranty:** none  
**Technical support:** unlimited phone support, toll-free number, M-F 8-5  
**Other support services:** BBS  
For more information, circle 799 on reader service card.



# VGA Monitors— Cheap and Smart

**When it comes to VGA monitors,  
it's hard to find a bad one.**

**PC World reviews 15 units and  
gives you the lowdown on the  
best values.**

**L**ike brightly colored mushrooms that appear overnight, monitors compatible with IBM's Video Graphics Array (VGA) are popping up everywhere. With 640-by-480-pixel resolution and superior color capability (up to 256 simultaneous shades), the VGA clearly represents the new video standard. Software packages are rushing to support it, AT-compatible VGA boards abound (see "VGA Boards—The Second Generation" in this issue), and increasing numbers of systems include a VGA adapter on the motherboard. Furthermore, VGA monitors are *affordable!* Not only do they cost less than multiscans, they are even lower priced than the average EGA monitor.

To help you get the most for your money, *PC World* took a look at 15 of the most popular VGA monitors. Out of the 15, only 3 were lemons—and there were no fewer than 4 Best Buys: Amdek's 12-inch 732, Wyse's 12-inch WY-650, Tatung's 12-inch CM-1296, and the Relisys 14-inch RE9513. If price is no ob-

ject, Zenith's \$999, 14-inch ZCM-1490 has the best picture you can buy.

Ultimately, the most important factor in buying a monitor is image quality: brightness, color saturation, image stability, focus, and good color convergence (no bleeding of colors). All the monitors reviewed were stable, with bright, vivid colors. The significant differences were in focus and color convergence.

Although both focus and color convergence can be affected by the design and adjustment of focusing electronics, the biggest factor is dot pitch, the distance between the phosphor dots that cover the face of the monitor. All else being equal, the smaller the dot pitch, the sharper the image. Dot pitch on these monitors ranges from .28mm to .39mm.

Another consideration is glare. Deep bezels and tilt-and-swivel bases help keep ambient light from reflecting off the screen, but the best glare defeater is a flat screen. A flat-screen monitor also produces less geometric distortion. On the downside, flat-screen monitors cost more, and many have trouble maintaining sharp focus from corner to corner. The only truly flat screen in this

**TJ  
Byers**





roundup belongs to the Zenith ZCM-1490.

A word of caution before you read these reviews: Focus can vary significantly among otherwise identical monitors; even bumps in the road en route from the factory to the retailer to your office can affect sharpness. Thus focus problems we cite may pertain to the sample we tested rather than to the brand in general. The safest solution is to give the monitor you want to buy a close look before you put your money down.

## Amdek 632

**PROS:** Very low price

**CONS:** Soft focus, glare, hard-to-reach controls, tilt-and-swivel base extra

The Amdek 632 is a bulky, 14-inch monitor with a slightly fuzzy image, due not to factory misadjustment but to a coarse dot pitch. A greater distance between dots is a common problem with larger monitors, but this unit has the coarsest dot pitch of all those reviewed. Worse yet, adjusting the brightness control causes the size of the image to change (a malady called blooming). The screen seems to reflect a lot of glare, too, and you'll pay an extra \$29 for a tilt-and-swivel base. The 632's only saving grace is its \$595 list price, the lowest in the roundup.

## Amdek 732



**PROS:** Low price, razor-sharp focus, trackball controls, tilt-and-swivel base

**CONS:** Green-only text switch

The Amdek 732's image is so sharp and its colors so vibrant, only the pricey Zenith ZCM-1490 can surpass it—yet the Amdek costs only \$635. As a bonus, conveniently located trackball controls let you adjust brightness and contrast without taking your eyes off the screen. The only criticism: the pseudomonochrome text switch offers only green text, not a choice of text colors. But this is a cavil; the 12-inch 732 is a real find.

## CTX CC-2431P

**PROS:** Low price, decent image, tilt-and-swivel base

**CONS:** Inconvenient controls, touchy vertical hold control

The 14-inch CTX CC-2431P is a low-priced monitor (\$625) with acceptable focus and color convergence. The brightness and contrast controls, located behind a lip on the side of the cabinet, are a bit inconvenient to reach. A vertical hold control, which keeps the screen from rolling as it shifts between CGA, EGA, and VGA modes, is in there too; it's a delicate adjustment, but once you've got it set, the monitor is steady. The CTX is a perfectly usable unit, even if it's no superstar.

Left to right:

12-inch Amdek 732,  
14-inch CTX  
CC-2431P, 14-  
inch Amdek 632





Left to right:  
14-inch imTEC-1453Q, 14-inch Magnavox Pro VGA, 14-inch Mitsubishi XC-1429C, 14-inch Quimax DM-3114, 12-inch Princeton PSC-28, 12-inch Quimax DM-3112

## Leading Technology imTEC-1453Q

**PROS:** Convenient controls

**CONS:** Fairly expensive, fuzzy image, slicky tilt-and-swivel base

The 14-inch imTEC-1453Q is a big disappointment, especially given its relatively high \$695 price. Its worst failing is the image, which is noticeably fuzzy. On the upside, the controls are conveniently placed: Brightness and contrast knobs lie under the front apron, and the power switch is on the front panel. You get a free tilt-and-swivel base, but it sticks so badly it's worth exactly what it costs. All in all, this is not a unit to seek out.

## Magnavox Professional VGA Color Display

**PROS:** Convenient controls, tilt-and-swivel base

**CONS:** Poor focus and color convergence

Buying the \$649 Magnavox Professional VGA is something of a gamble. Although the colors on this 14-inch monitor are good and its dot pitch is small, the review unit had

poor color convergence and strikingly bad focus. On the bright side, the controls are easy to reach behind a small hatch on the front of the monitor. Factory service may fix the focus, but then again it may not. Judged by the specs, a well-adjusted unit *should* be a top contender, so try before you buy.

## Mitsubishi XC-1429C

**PROS:** Sharp focus

**CONS:** Expensive, no tilt-and-swivel base, ineffective brightness control

At \$685, the 14-inch Mitsubishi XC-1429C is a bit pricey, and while its image is crisp and sharp, it has some problems. The large power switch is conveniently located on the front panel, but contrast and brightness controls are harder to reach under the front apron. Worse yet, the brightness control has virtually no effect, and Mitsubishi's high price doesn't include a tilt-and-swivel base. This is a usable monitor, but several units offer superior performance at lower prices.

## Princeton PSC-28

**PROS:** Excellent focus, text switch, tilt-and-swivel base

**CONS:** Plug-in video cable

Princeton's \$695 PSC-28 is an impressive 12-inch monitor with a good, sharp image. Brightness, contrast, and on/off controls are





side mounted for easy access, and a text switch gives you a choice of white, blue, amber, or green characters. There are three small annoyances: The Princeton's video cable needs to be plugged into the monitor, its text colors are a bit washed out, and the

brightness control fogs the image if it's set too high. Nonetheless, given the unit's good image, these are problems you can live with.

## FEATURES EVALUATION

### VGA Monitors

Fifteen VGA color monitors range from \$595 to \$999 in price and from .28mm to .39mm in dot pitch. The best price/performance bargains are the Amdek 732, the Wyse WY-650, the Tatung CM-1296, and the Relisys RE9513.

- Yes
- No
- ◐ Deficient

	Amdek 632	Amdek 732	CTX CC-2431P	ImTEC 14530	Magnavox Professional VGA	Mitsubishi XC-1429C	Princeton PSC-28	Quinmax DM-312	Quinmax DM-314	Relisys RE9513	Tatung CM-1296	Tatung CM-1496	Wyse WY-650	Zenith 1390	Zenith ZCM-1490
<b>Standard features</b>															
Price	\$595	\$635	\$625	\$695	\$649	\$685	\$695	\$639	\$659	\$645	\$625	\$685	\$669	\$799	\$999
Diagonal measurement (inches)	14	12	14	14	14	14	12	12	14	14	12	13	12	13	14
Flat screen	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
Tilt-and-swivel base	◐ <sup>1</sup>	●	●	●	●	○	●	●	●	●	●	●	●	○	◐ <sup>2</sup>
Dot pitch (millimeters)	.39	.28	.31	.31	.31	.28	.28	.28	.31	.31	.28	.31	.28	.31	.31
<b>Externally accessible controls</b>															
Horizontal phase	●	○	○	○	●	○	○	○	○	●	●	●	○	○	○
Horizontal size	○	○	○	○	●	○	○	○	○	○	○	○	○	●	●
Vertical hold	○	○	●	○	○	●	○	○	○	●	○	○	○	○	○
Vertical size	●	○	●	●	○	●	○	○	○	●	○	○	○	○	●
Focus	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○

<sup>1</sup> Available at extra cost.

<sup>2</sup> Some dealers charge extra.





Left to right:  
13-inch Tatung  
CM-1496, 12-  
inch Tatung  
CM-1296, 14-  
inch Relisys  
RE9513

## Quimax DM-3112

**PROS:** Sharp focus, tilt-and-swivel base, excellent warranty

**CONS:** No text switch, crooked image

Aside from a few minor flaws, the low-priced (\$639) Quimax DM-3112 is a perfectly decent 12-inch monitor, with a sharp image, flawless color convergence, and an excellent warranty. The picture was a bit crooked, but this kind of problem is caused by factory misadjustment and can be fixed. Controls are conveniently placed: Brightness and contrast are under the front apron, and the power switch is on the front panel. Slight fogging occurs at higher brightness settings. Were it not for the crooked picture, this unit might have rated a Best Buy—especially considering the two-year warranty.

## Quimax DM-3114

**PROS:** Tilt-and-swivel base, excellent warranty

**CONS:** Blurry, bowed image; glare; inconvenient power switch

Of all the monitors reviewed, Quimax's \$659 14-inch DM-3114 had the most problems. The lower left corner of the screen was blurry, and the image was noticeably narrower in the center of the screen than at the top and bottom (a malady called pincushioning). Although brightness and contrast controls are conveniently located under the front

apron, the power switch location is awkward, and a shallow bezel admits objectionable glare. The only solid plus is that Quimax gives you the same two-year warranty it offers for its DM-3112.

## Relisys RE9513



**PROS:** Tilt-and-swivel base, convenient controls

**CONS:** Minor color convergence problem, retailers hard to find

The Relisys RE9513 costs \$645 and delivers one of the nicest pictures of any 14-inch monitor reviewed. The test unit had a slight color convergence problem near the top of the screen, but not enough to cause eyestrain. All the controls are conveniently located just below the screen. In fact, this monitor's only serious problem is that it is not widely distributed.

## Tatung CM-1296



**PROS:** Low price, excellent image, text switch, tilt-and-swivel base

**CONS:** None

The \$625 Tatung CM-1296 delivers an image so sharp and bright you'd think you were looking at a color slide. The side-mounted





controls (brightness, contrast, on/off) are easy to reach, and the range of brightness and contrast is excellent—although some fogging occurs when brightness is set too high. A text switch lets you choose white on black, amber on black, white on blue, or green on black. Given its low price, this is one of the best 12-inch monitors in the group.

## Tatung CM-1496

**PROS:** Text switch, tilt-and-swivel base

**CONS:** Slightly soft focus, minor color convergence problem

The 13-inch Tatung CM-1496 is a larger version of the outstanding CM-1296. It costs \$685, \$60 more than the 1296, and has a slightly coarser pitch, which makes it a bit fuzzier. Moreover, the review unit had a slight color convergence problem near the top of the screen. Is the extra inch worth the softer focus and the extra bucks? Probably not.

## Wyse WY-650



**PROS:** Low price, razor-sharp focus, trackball controls, tilt-and-swivel base

**CONS:** Curved screen, slightly more expensive than identical Amdek 732

The 12-inch Wyse WY-650 is more than a kissing cousin of the Amdek 732—apart from a slightly different cabinet, it's an iden-

tical twin. In fact, Wyse makes both units. The only significant difference is that the \$669 Wyse costs \$34 dollars more. However, if you can't find the Amdek 732, the Wyse still stands as a bargain.

## Zenith 1390

**PROS:** Sharp focus

**CONS:** Expensive, glare, no tilt-and-swivel base

Zenith's 13-inch 1390 boasts impeccable focus and color convergence. Brightness, contrast, and on/off controls are conveniently located on the front apron. Unfortunately, its shallow bezel makes glare a problem. Moreover, the first 1390 test unit I looked at failed after 4 hours of operation. At \$799 this is also one of the most expensive monitors tested.

## Zenith ZCM-1490

**PROS:** Flat screen, unusually bright and crisp image, excellent contrast

**CONS:** Very expensive, noisy, heavy

The 14-inch flat-screen Zenith ZCM-1490 delivers a gorgeous picture, the best of any monitor in the roundup: bright, sharp, steady, remarkably free from glare. But

Left to right:  
12-inch Wyse  
WY-650, 13-inch  
Zenith 1390, 14-  
inch Zenith  
ZCM-1490



you'll pay for it; this monitor lists for a whopping \$999. Brightness and contrast controls are recessed on top of the unit, which is a bit inconvenient, and the power switch is a gorilla-stretch away on the back of the cabinet. A tilt-and-swivel base is available, but some retailers charge extra for it. The ZCM-1490 also needs its own cooling fan, which adds noticeably to the noise level. Finally, cutting-edge technology can be hard to mass-produce; some 1490s have focus and convergence problems that require adjustment before they are up to snuff. Still, this comes under the heading of paying the cost to be the boss. The ZCM-1490 puts out the best VGA image money can buy.

### Good News Continues

The conclusion of this roundup is unmistakably upbeat: You'll have to work hard to find a really bad VGA display. Furthermore, the prices noted here are all list; you'll find many of the best monitors for sale at street prices from \$200 to \$400 lower. Just make sure you look before you leap. ●

*TJ Byers is a contributing editor for PC World.*

### WHERE TO BUY

#### Amdek 632

Amdek Corp.  
1901 Zanker Rd.  
San Jose, CA 95112  
408/436-8570  
**List price:** \$595

**Warranty:** one year parts and labor  
**For more information,** circle 701 on reader service card.

#### Amdek 732

Amdek Corp.  
**List price:** \$635  
**Warranty:** one year parts and labor  
**For more information,** circle 702 on reader service card.

#### CTX CC-2431P

CTX Int'l  
260 Paseo Tesoro  
Walnut, CA 91789  
714/595-6146  
**List price:** \$625  
**Warranty:** two years parts, one year labor  
**For more information,** circle 703 on reader service card.

#### imTEC 1453Q

Leading Technology  
10430 S.W. Fifth Ave.  
Beaverton, OR 97005  
503/646-3424

#### List price: \$695

**Warranty:** one year parts and labor  
**For more information,** circle 704 on reader service card.

#### Magnavox Professional VGA Color Display

N.A.P. Consumer Electronics Corp.  
P.O. Box 6950  
Knoxville, TN 37914  
615/521-4366

**List price:** \$649  
**Warranty:** one year parts and labor  
**For more information,** circle 705 on reader service card.

#### Mitsubishi XC-1429C

Mitsubishi Electronics America, Inc.  
991 Knox St.  
Torrance, CA 90502  
213/515-3993  
**List price:** \$685  
**Warranty:** one year parts and labor  
**For more information,** circle 706 on reader service card.

#### Princeton PSC-28

Princeton Graphic Systems  
601 Ewing St., Bldg. A  
Princeton, NJ 08540  
609/683-1660

**List price:** \$695  
**Warranty:** one year parts and labor  
**For more information,** circle 707 on reader service card.

#### Quimax DM-3112

Quimax Systems  
844 Del Rey Ave.  
Sunnyvale, CA 94086  
408/773-8282

**List price:** \$639  
**Warranty:** two years parts and labor, additional year \$19.95  
**For more information,** circle 708 on reader service card.

#### Quimax DM-3114

Quimax Systems  
**List price:** \$659  
**Warranty:** two years parts and labor, one additional year \$19.95  
**For more information,** circle 709 on reader service card.

#### Relisys RE9513

Relisys  
320 S. Milpitas Blvd.

Milpitas, CA 95035  
408/945-9000

**List price:** \$645  
**Warranty:** two years parts, one year labor  
**For more information,** circle 710 on reader service card.

#### Tatung CM-1296

Tatung Co. of America, Inc.  
2850 El Presidio St.  
Long Beach, CA 90801  
213/637-2105

**List price:** \$625  
**Warranty:** one year parts and labor  
**For more information,** circle 711 on reader service card.

#### Tatung CM-1496

Tatung Co. of America, Inc.  
**List price:** \$685  
**Warranty:** one year parts and labor  
**For more information,** circle 712 on reader service card.

#### Wyse WY-650

Wyse Technology  
3571 N. First St.  
San Jose, CA 95134  
408/843-6614

#### List price: \$669

**Warranty:** one year parts and labor  
**For more information,** circle 713 on reader service card.

#### Zenith 1390

Zenith Data Systems Corp.  
1000 Milwaukee Ave.  
Glenview, IL 60025  
312/699-4848

**List price:** \$799  
**Warranty:** one year parts and labor  
**For more information,** circle 714 on reader service card.

#### Zenith ZCM-1490

Zenith Data Systems Corp.  
**List price:** \$999  
**Warranty:** one year parts and labor  
**For more information,** circle 715 on reader service card.



# I'M WELL CONNECTED.



- 150 Megabytes
- Internal Cassette
- Compatible with PC, XT, and ATs and PS/2 Models 50, 60, 70, and 80
- Fast 6.6 MB/min backup
- Easy to use — Award Winning Software
- Novell Approved
- XENIX Compatible
- One Year Warranty

## AND I CAN BACK IT UP.

It's finally complete. I now have all of our PC workstations integrated into five operating department LANs. A lot of vital information is flowing through these networks every day. Information my company can't afford to lose! That's why I've put a MaynStream 150 cassette backup from Maynard Electronics in each of my supervisor stations.

With a mixture of Compaq's and PS/2's it was important to find a compatible, high performance, internal tape backup system that would fit into all of my supervisors' workstations. It turned out that MaynStream is the only 150 megabyte, high performance drive in the market that fits into both a 3½ inch AND a 5¼ inch bay. And the MaynStream 150 cassette is 3 times faster than any other internal 3½" form factor product. The MaynStream 150 has all

of the features we've grown to expect around here. It's fast, easy to use, and it's compatible with our other MaynStream products.

**Now, I'm well connected, and I can back it up. Can you?**



**Maynard Electronics**  
We're backing you one-hundred percent.

460 E. Semoran Blvd., Casselberry, FL 32707 407/331-6402



# ATomizer 286 and 386 Performance Solutions.



CORE's ATomizer 286/12 and 386/20 based PCs offer high-performance solutions to today's complex applications and operating environments.

## High-Performance Internals

Both ATomizer 286/12 and 386/20 are equipped with a high-performance controller and up to two CORE internal drives. They can be configured with a range of ST-506 drives, from 30 to 144MB or ES drives, from 40 to 760MB. Combining access times as low as 10ms with CORE's disk caching system (over 4,000KB/sec.) for unsurpassed performance.



**Backup.** The ATomizer can be configured with powerful backup systems. COREfast for diskette, winner of PC Magazine's Editor's Choice for two consecutive years, and COREtape from 40 to 250MB.

**Network File Servers.** Novell, Inc. has certified CORE's HC Series drives and controllers for use with NetWare version 2.1. Up to 3 gigabytes of storage may be configured.

ATomizer 286 and 386 PCs also support other major LANs, including IBM Token Ring, 3Com and PC Net.

**COREpower** your LAN, CAD or desktop publishing system. Contact your nearest dealer or CORE representative today.

Northeast Region: 203/357-1339 Southern Region: 407/997-6051

Central Region: 312/439-0511 Western Region: 213/312-8131

International Sales: 407/997-6044, FAX: 407/997-6000



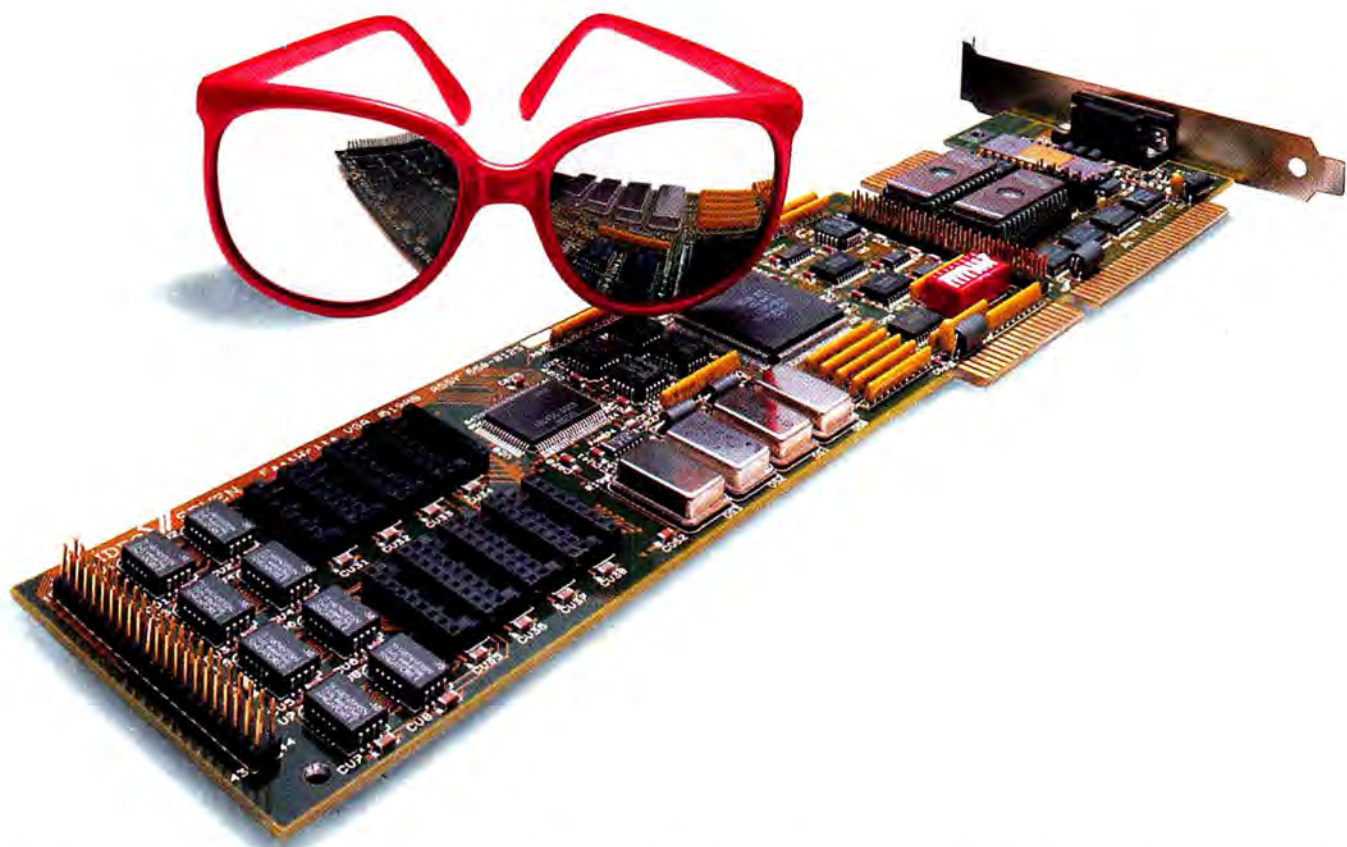
Products listed and shown are registered trademarks of the respected manufacturers. CORE International, CORE, COREfast, COREtape, HC Series and ATomizer are registered trademarks of CORE International, Inc.

© Copyright 1988 CORE International, Inc.

Circle 254 on reader service card



# Some People Buy FastWrite VGA™ For Its Blinding Speed.



And then again, some people buy it for its high resolution. Or its 100% hardware compatibility.

But whatever you buy it for, FastWrite VGA is guaranteed to give you VGA performance like you've never seen before. Because FastWrite VGA outperforms all competitive VGA boards. Pure and simple.

You see, this powerhouse surpasses standard IBM VGA in both color and resolution. Which means you get resolution up to 800 x 600 with 16 colors, or 640 x 400 with 256 colors.

We even offer a 256K memory upgrade that gives you 640 x 480 with 256 colors and our exclusive non-interlaced 1024 x 768 with 4 colors.

And not only is FastWrite VGA 100% register level compatible, it's also the only VGA solution that's form factor compatible. It has the same daughter card con-

nectors as the IBM PS/2 Display Adapter, to accommodate hardware add-ons in the future.

What's more, your current VGA software—or any you plan to buy—is guaranteed to run on FastWrite VGA. Even OS/2 products. It's backwards compatible with EGA, CGA, MDA and Hercules modes. So all your software will run faster than ever before.

Of course once you buy, you get free technical support, guaranteed VGA compatibility and a full five-year warranty. All for a price that won't leave you staring blindly into your wallet.

So visit your local dealer and find out more about FastWrite VGA.

We guarantee that you'll see the difference.

**VIDEO  SEVEN**

46335 Landing Pkwy., Fremont, CA 94538. (415) 656-7800.

The following are registered and unregistered trademarks of the companies listed: FastWrite VGA, Video Seven Inc.; PS/2, Display Adapter, International Business Machines Corporation; Variable frequency monitor required for greater than 640 x 480 resolution. Monitor capable of 48 KHz needed for 1024 x 768. Video Seven reserves the right to change specifications without notice.

Circle 277 on reader service card



# Jingle bells, crunch those cells,

*Profit's on the way.*

*Oh what fun it is to write*

*New projections every day.*

- ☐ 3 1/2" format available from us. Specify when ordering.  
☒ package includes both 5 1/4" and 3 1/2" disks.  
☒ 3 1/2" 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.

<b>Aldus ... NCP</b>	
<input type="checkbox"/> PageMaker 3.0	call
<b>Alpha Software ... NCP</b>	
<input type="checkbox"/> Advanced Keyworks 1.0	175.
<input checked="" type="checkbox"/> AlphaWorks 1.0 (integrated package)	115.
<input type="checkbox"/> ALPHA/three 1.0 (dBase file compatible)	219.
<b>American Small Business Computers</b>	
<input type="checkbox"/> Design CAD 3.1 (NCP)	159.
<input type="checkbox"/> Design CAD 3D 1.1 (NCP)	159.
<b>Application Techniques ... NCP</b>	
<input checked="" type="checkbox"/> Pizazz Plus 1.12	75.
<b>Ashton-Tate ... NCP</b>	
<input type="checkbox"/> dBASE IV 1.0	call
<input type="checkbox"/> Sign Master 5.11	159.
<input type="checkbox"/> Byline 1.0	199.
<input type="checkbox"/> RapidFile 1.2	219.
<input type="checkbox"/> Diagram Master 5.02	219.
<input type="checkbox"/> Chart Master 6.21	239.
<input checked="" type="checkbox"/> Map Master 6.01	239.
<input type="checkbox"/> MultiMate Advantage II 1.0	299.
<input type="checkbox"/> Master Graphics 1.0	299.
<input type="checkbox"/> Draw Applause 1.0	309.
<input type="checkbox"/> Framework III 1.0	459.
<b>Autodesk</b>	
<input checked="" type="checkbox"/> Autosketch Standard 1.04	55.
<input checked="" type="checkbox"/> Autosketch Speed Enhanced 1.04	65.
<b>Barron's ... CP</b>	
<input checked="" type="checkbox"/> SAT (Test preparation program)	35.
<b>Best Programs ... NCP</b>	
<input type="checkbox"/> Label Master 3.1 (mailing label program)	29.
<input checked="" type="checkbox"/> Fixed Asset System 5.0	359.
<input checked="" type="checkbox"/> Report Manager 5.0	189.
<b>Bible Research ... NCP</b>	
<input type="checkbox"/> The Word 4.2 (King James version)	159.
<input type="checkbox"/> The Word 4.2 (New International version)	159.
<b>Bloc Publishing ... NCP</b>	
<input type="checkbox"/> FormTool 2.01	55.
<b>Borland International ... NCP</b>	
<input type="checkbox"/> Turbo C Professional Pack (includes assembler)	169.
<input type="checkbox"/> Turbo Pascal Professional Pack (includes assembler)	169.
<input type="checkbox"/> Paradox OS/2 1.0 (3 1/2" only)	479.

## PC Connection Software Special

through December 31, 1988

**Stone & Associates ... NCP**

- ☒ My Letters, Numbers, Words  
☒ Second Math

Drill and rote, ho ho, who needs it?! Stone & Associates Educational Software *delights* as it teaches those essential "basics."

- **My Letters, Numbers, Words** (ages 2-6) gets youngsters excited to learn the alphabet, numbers 1-10, and early word concepts— even early keyboarding skills
- **Second Math** (ages 7-16)—Tutorials that "teach," plus 6 fun activities cover: addition, subtraction, multiplication, division, decimals, percents, fractions—even pre-algebra! Includes editing and printing capabilities

Both programs support CGA, EGA, and Hercules monochrome graphics cards, and are installed easily on floppy or hard drive systems with menu-driven commands. Educational preview disk included with purchase.

My Letters, Numbers, Words ..... \$22.  
 Second Math ..... 22.

<input type="checkbox"/> Prolog 2.0	99.
<input type="checkbox"/> Turbo C 2.0	99.
<input type="checkbox"/> Turbo Pascal 5.0	99.
<input type="checkbox"/> Turbo Assembler & Debugger 1.0	99.
<input type="checkbox"/> Reflex 1.1	99.
<input checked="" type="checkbox"/> Sidekick Plus 1.0	135.
<input checked="" type="checkbox"/> Sprint 1.0	135.
<input checked="" type="checkbox"/> Quattro 1.0 w/SQZ!Plus 1.0	165.
<input checked="" type="checkbox"/> Paradox 2.0	call
<input type="checkbox"/> Turbo Editor Toolbox 4.0	69.
<input type="checkbox"/> Turbo Database Toolbox 4.0	69.
<input checked="" type="checkbox"/> Turbo Basic Editor Toolbox 1.0	69.
<input type="checkbox"/> Turbo Basic Database Toolbox 1.0	69.
<input type="checkbox"/> Turbo Lightning 1.0	69.
<input type="checkbox"/> Superkey 1.1	69.
<b>Bourbaki ... NCP</b>	
<input type="checkbox"/> 1DIR+ 2.11	49.
<b>Bridgeway Publishing ... NCP</b>	
<input type="checkbox"/> FasTrax 3.9	35.
<b>Broderbund ... CP</b>	
<input type="checkbox"/> Print Shop 2.41 (includes Graphics Library 1)	39.
<input type="checkbox"/> Memory Mate 3.01 (NCP)	45.
<b>Chipsoft ... NCP</b>	
<input checked="" type="checkbox"/> TurboTax Personal/1040 6.0	45.
<input checked="" type="checkbox"/> State Packages Personal/1040 6.0	each 29.

<input checked="" type="checkbox"/> TurboTax Proseries/1040 5.0	\$229.
<input checked="" type="checkbox"/> Tally Ho (financial calculator)	32.
<b>Chronos Software ... NCP</b>	
<input checked="" type="checkbox"/> Who•What•When (people, projects, time)	119.
<b>Computer Associates ... NCP</b>	
<input checked="" type="checkbox"/> SuperCalc 5 1.0	319.
<b>Compuware ... NCP</b>	
<input type="checkbox"/> Powerbase 2.3	189.
<b>Core International ... NCP</b>	
<input type="checkbox"/> Corefast 2.0	95.
<b>Crosstalk Communications ... NCP</b>	
<input type="checkbox"/> Crosstalk XVI 3.61	95.
<input type="checkbox"/> Crosstalk MK.4 1.02	124.
<b>Dac Software ... NCP</b>	
<input type="checkbox"/> Dac-Easy Payroll 3.0	59.
<input type="checkbox"/> Dac-Easy Light 1.0	45.
<input type="checkbox"/> Dac-Easy Accounting 3.0	59.
<b>DayFlo ... NCP</b>	
<input type="checkbox"/> Tracker 1.1	59.
<b>Delrina Technologies ... NCP</b>	
<input checked="" type="checkbox"/> Per:FORM 1.0	159.
<b>Digital Research ... NCP</b>	
<input type="checkbox"/> Gem Desktop 3.0	35.
<input type="checkbox"/> Gem Draw Plus 2.01	189.
<input checked="" type="checkbox"/> Gem Desktop Publisher 1.1	179.
<b>5th Generation ... NCP</b>	
<input checked="" type="checkbox"/> Fastback Plus 2.01	call
<b>Fox Software ... NCP</b>	
<input checked="" type="checkbox"/> Foxbase Plus 2.1 (single user)	209.
<input checked="" type="checkbox"/> Foxbase + 386 2.1	319.
<b>Funk Software ... NCP</b>	
<input type="checkbox"/> Sideways 3.21 (creates wide printouts)	42.
<input checked="" type="checkbox"/> Worksheet Utilities 1.0 (1-2-3 utilities)	59.
<input checked="" type="checkbox"/> Inword 1.0	59.
<input checked="" type="checkbox"/> Allways 1.0	89.
<input checked="" type="checkbox"/> Noteworthy 1.0	49.
<b>General Information ... NCP</b>	
<input type="checkbox"/> Hot Line Two 2.0	57.
<b>Generic Software ... NCP</b>	
<input type="checkbox"/> Generic CADD Level 1	35.
<input checked="" type="checkbox"/> Generic CADD Level 2	55.
<input checked="" type="checkbox"/> Generic CADD Level 3 1.05	109.
<input type="checkbox"/> Level 3 Dot Plot	35.
<input checked="" type="checkbox"/> 3D Solids 2.2	189.
<input type="checkbox"/> Estimator	159.
<input type="checkbox"/> Basic Home Design 3.0	35.
<b>Harvard Associates ... NCP</b>	
<input checked="" type="checkbox"/> PC LOGO 3.0	59.
<b>Hayes ... NCP</b>	
<input checked="" type="checkbox"/> Smartcom II 3.0	89.
<b>Hilgraeve Software ... NCP</b>	
<input type="checkbox"/> HyperACCESS 3.31	89.
<b>Individual Software ... NCP</b>	
<input checked="" type="checkbox"/> Typing Instructor Encore 2.13	26.
<input type="checkbox"/> Professor DOS (with Smartguide)	33.
<b>Intuit ... NCP</b>	
<input type="checkbox"/> Quicken 2.0	35.

For IBM Personal Computers exclusively.

# PC CONNECTION®



# Graphs are swell, it even spells,

*Computing sure does pay.  
The work gets done so quickly now,  
You have more time to play.*

## Lotus ... NCP

Agenda 1.0	\$289.
1-2-3 2.01 (upgrade free to version 3.0)	call
Hal 1.0	109.
Freelance Plus 2.0	345.
Manuscript 2.0	359.
Graphwriter II 1.0	349.

## MECA ... NCP

Managing Your Money 4.0	119.
Andrew Tobias' Tax Cut 1040 for 1988 Taxes	49.

## 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.

## Microim ... NCP

R:BASE for DOS (version 2.1)	449.
R:Base for OS/2	599.

## Microsoft ... NCP

Learning DOS (for any DOS version)	35.
Windows 286 2.1	69.
Windows 286 2.1 w/Mouse	145.
Works 1.05	99.
Windows 386 2.1	129.
Word 4.0	209.
Chart 3.0	259.
Excel 2.1 (requires 80286/80386 CPU)	319.
Word 4.0 Network Version	499.

## CD-ROM

Bookshelf 1.0 w/Amdek Laser Drive	799.
Programmers Library 1.0	269.

## LANGUAGES

Quick BASIC 4.0	69.
Quick C 1.01	69.
Macro Assembler 5.1	99.
Basic Compiler 6.0	199.
Pascal 4.0	199.
Fortran 4.1	289.
C Compiler 5.1	299.
Cobol 3.0	599.

## Nantucket Software ... NCP

Clipper (Summer '87, dBase Plus compiler)	429.
---	------

## New England Software ... NCP

Graph-in-the-Box Release 2	75.
GB-Stat 1.0	159.
GB Analytic 1.0	105.

## Nolo Press ... NCP

WillMaker 3.0	35.
---------------	-----

## North Edge Software ... NCP

Timeslips III 3.3	119.
-------------------	------

## Owl International ... NCP

Guide 2.0	143.
-----------	------

## PC Connection Software Special

through December 31, 1988

### Kemeny/Kurtz Math Series by True BASIC, Inc.

Sharpen your math skills with the Kemeny/Kurtz Math Series by True BASIC—the ideal holiday gift. Each package is a "stand-alone," menu-driven application that will help you grasp the toughest math concept with ease.

- Experiment with your own examples for self-study
- Powerful enough for engineers and other professionals to use for plotting & calculations
- Not textbook specific—will fit into any classroom curriculum
- See the steps to the right answers—graphically

Algebra, Precalculus (incl. Trigonometry), Calculus, Probability or Discrete Math (all new version—3.0) ... each \$32.

### Paperback Software ... NCP

VP-Info 1.4	65.
VP-Planner Plus 2.0	145.
VP-Expert 2.0	145.

### Paul Mace ... NCP

H/Test-H/Format 2.0 (hard-disk tools)	49.
Mace Utilities 4.1 (DOS utilities)	55.
Grasp 3.1	79.
Nvelope 1.01	29.

### PC Support Group ... NCP

Lightning 4.82	57.
Lucid 3-D 1.22	89.

### Personics ... NCP

SmartNotes 2.0	49.
SeeMORE 1.0	49.
Look&Link 1.01	59.
Ultravision 1.0	69.
@BASE 1.1	119.

### Peter Norton ... NCP

Norton Editor 1.21	39.
--------------------	-----

# 1-800/243-8088



PC Connection

6 Mill Street

Marlow, NH 03456

603/446-3383 FAX 603/446-7791

550W

Norton Commander 2.0	\$45.
Advanced Utilities 4.5	79.
Dan Bricklin's Demo Program 2	99.

### Quarterdeck ... NCP

DESQView 2.2	79.
DESQView Companion 1.1	59.
Expanded Memory Manager 4.1	39.

### Reference Software

Grammatik III (electronic proofreader)	52.
Reference File (pop-up database manager)	49.

### Relay Communications

Relay Gold 3.0	149.
----------------	------

### Revolution Software ... NCP

VGA Dimmer (screen saver)	19.
DJ (disk manager)	39.

### Rightsort ... NCP

Rightwriter 3.0	54.
-----------------	-----

### Simon & Schuster ... NCP

Professional Thesaurus 1.0	79.
Typing Tutor IV	33.

New World Writer II 1.0	65.
-------------------------	-----

### Softlogic Solutions ... NCP

Software Carousel 2.02	49.
Disk Optimizer 4.01 (w/Data Guardian)	45.

@Liberty 1.1	119.
--------------	------

Cubit 2.02	45.
------------	-----

Double DOS 4.02	45.
-----------------	-----

Magic Mirror 1.0	59.
------------------	-----

### Software Group ... NCP

Enable 2.0	399.
------------	------

### Software Publishing ... NCP

Professional Plan 1.01	59.
PFS:First Publisher 2.0	79.

PFS:First Graphics 1.0	95.
------------------------	-----

PFS:First Choice 3.0	99.
----------------------	-----

Professional Write 2.0	125.
------------------------	------

Professional File 2.0	189.
-----------------------	------

Office Writer 6.0	259.
-------------------	------

Harvard Graphics 2.1	309.
----------------------	------

Harvard Graphics Accessories	call
------------------------------	------

Harvard Project Manager 3.0	439.
-----------------------------	------

### Spinnaker ... NCP

Resume Kit 1.0	25.
----------------	-----

Eight-in-One 1.1	39.
------------------	-----

Splash 1.0	59.
------------	-----

Pinstripe Presenter 1.0	115.
-------------------------	------

### Springboard ... NCP

Newsroom Pro 1.0	45.
------------------	-----

Certificate Maker	34.
-------------------	-----

Clip Art 1	19.
------------	-----

Clip Art 2	25.
------------	-----

Clip Art 3	19.
------------	-----

### Symantec ... NCP

SOZIPlus 1.11	59.
---------------	-----

4Word 2.0	59.
-----------	-----

Q & A Write 1.01	119.
------------------	------

For IBM Personal Computers exclusively.

# PC CONNECTION®

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



# Dashing through the glow, Of a screen that's VGA, O'er the fields you go, Sorting all the way.

Grandview 1.0	\$175.
Q & A 3.0 (database, word processor)	209.
Breakthrough Timeline 3.0	349.
Spreadsheet Analyst 2.5	89.
Note-It Plus 1.02	49.
Think Tank 2.4NP	115.
4 Views 1.0	89.
Q&A Network Pak 1.0 (requires Q&A)	179.
<b>T/Maker ... NCP</b>	
Scrapbook+	79.
ClickArt Business Images	42.
ClickArt Christian Images	42.
ClickArt Holidays	42.
EPS (PostScript) Illustrations	79.
<b>The XTREE Co. ... NCP</b>	
XTREE Pro 1.0	69.
Hot 4.0	95.
<b>TOPS ... NCP</b>	
Flashcard (AppleTalk network card; 1 year warranty)	169.
NetPrint 2.0 (share printers)	119.
TOPS 2.0	119.
TOPS Repeater (extends network)	132.
<b>Traveling Software ... NCP</b>	
Battery Watch 1.0 (3 1/2" only)	27.
Laplink Mac 1.2 (Mac-PC transfer)	79.
Laplink Plus 2.1	85.
Desklink 2.21	99.
<b>True BASIC, Inc. ... NCP</b>	
True BASIC 2.03 (now includes Runtime)	57.
Algebra (includes both I & II)	32.
Kerneny/Kurtz Math Series	special
True Basic Libraries	32.
<b>Vericomp ... NCP</b>	
SoftBytes 2.0	35.
SoftBytes 386 2.53	49.
<b>WordPerfect Corp. ... NCP</b>	
WordPerfect Library 2.0	69.
WordPerfect 5.0	255.
WordPerfect Office 1.0	269.
WordPerfect Network Server 5.0	349.
DataPerfect	299.
WordPerfect Executive	129.
WordPerfect 5.0 Addit'l Network Stations	84.
<b>Wordtech ... NCP</b>	
DBXL 1.2	119.
<b>Xerox ... NCP</b>	
Ventura Publisher 2.0	549.
<b>XyQuest ... NCP</b>	
XyWrite III Plus 3.0 w/A-la-Carte Menus	239.
<b>RECREATIONAL/EDUCATIONAL</b>	
<b>Accolade ... CP (reqs. graphics brd.)</b>	
Bubble Ghost	22.
Mean 18	29.
Hardball (baseball simulation)	11.

## PC Connection Hardware Special

through December 31, 1988

### Kraft Systems ... 1 year Premium 3-Button Joystick Plus Microsoft ... NCP Flight Simulator 3.0

For anyone who has ever imagined flying, our bundle of Microsoft's Flight Simulator 3.0 and Kraft's Premium 3-Button Joystick is just the ticket to get you into the wild blue yonder!

- **Kraft Premium 3-Button Joystick** with self-centering or float-free operation; has an extra fire button on the top of the stick for ease of use
- **Microsoft's Flight Simulator 3.0**, now not copy-protected, offers 640 x 350 resolution graphics on EGA or VGA screens, as well as a fully instrumented Cessna 182, WWI Sopwith Camel or a Gates Lear jet—you decide

Microsoft's Flight Simulator 3.0 . . . reg. \$35.  
Kraft's Premium 3-Button Joystick . . . reg. 33.  
Buy both for just . . . 59.

Testdrive (driving simulation)	24.
Jack Nicklaus' 18 Greatest Holes	29.
Grand Prix	22.
4th & Inches	22.
<b>Broderbund ... CP</b>	
Where in the World is Carmen San Diego?	25.
Where in the USA is Carmen San Diego?	25.
Where in Europe is Carmen San Diego?	29.
Toy Shop	39.
Ultima IV	35.
Ultima V	39.
<b>Electronic Arts ... CP (reqs. graphics brd.)</b>	
One-on-One/Bird vs Jordan	29.
Chuck Yeager's Flight Simulator	32.
Chessmaster 2000	32.
Earl Weaver Baseball	32.
Empire	35.
Mavis Beacon Teaches Typing	35.
Sentinel Worlds	39.
Grand Slam Bridge	45.
<b>Infocom ... NCP</b>	
Zork Trilogy	33.
<b>Lifestyle Publishing Group ... NCP</b>	
Golf Doctor (improve your game)	33.
Golf's Best Pinehurst #2 (play the best)	12.
Golf Statkeeper (includes USGA Handicapper)	27.

<b>19th Hole Special (3 Golf programs above bundled with Mr. Boston Micro Bartender's Guide)</b>		\$79.
Mr. Boston Official Micro Bartender's Guide	18.	
Micro Video Companion	24.	
Take Control of Cholesterol	24.	
<b>Microprose ... CP</b>		
F-19 Stealth Fighter (requires CGA or EGA)	39.	
F-15 Strike Eagle (requires CGA)	22.	
Gunship (requires CGA or EGA)	32.	
<b>Microsoft ... NCP</b>		
Flight Simulator 3.0 (reqs. graphics brd.)	35.	
<b>Parlor Software ... CP</b>		
Bridge Parlor (best Bridge simulation)	49.	
<b>Sierra On-Line ... CP</b>		
(All require CGA or EGA)		
Leisure Suit Larry	25.	
Space Quest II	33.	
King's Quest IV	33.	
Manhunter	33.	
Police Quest	33.	
Police Quest II	33.	
Leisure Suit Larry II	33.	
Thexder	24.	
3D Helicopter	33.	
<b>Simon &amp; Schuster</b>		
Star Trek: Rebel Universe	29.	
<b>Sphere, Inc. ... NCP</b>		
Orbiter (shuttle simulation)	27.	
GATO (submarine simulation)	12.	
Tetris (addicting mind teaser)	24.	
Falcon (F-16 simulation, reqs. graphics brd.)	32.	
<b>Spinnaker ... NCP</b>		
Sargon III (chess game)	15.	
Kids on Keys (ages 3 to 9)	19.	
Facemaker Gold (ages 3 to 8)	25.	
Kindercomp Gold (ages 3 to 8)	25.	
SAT Preparation Program	25.	
Kidwriter Gold (ages 6 to 10)	32.	
Homework Helper—Math (grades 7-12)	32.	
Homework Helper—Writing (grades 7-12)	32.	
<b>Stone &amp; Assoc. ... NCP (reqs. graph. brd.)</b>		
Algebra Plus (ages 13 to adult)	27.	
Memory Master (ages 2 to 6)	27.	
My Letters, Numbers, Words (2 to 6)	special	
Second Math (ages 7 to 16)	special	
<b>Sublogic ... NCP</b>		
Jet 2.1 (requires EGA or CGA)	33.	
Scenery Disks	each 15.	
San Francisco Star Scenery Disk	18.	
Japan Scenery Disk	15.	
<b>The Learning Company ... CP</b>		
Math Rabbit (ages 4 to 7)	26.	
Reader Rabbit (ages 4 to 7)	26.	
Writer Rabbit (ages 6 to 12)	26.	
<b>XOR ... NCP</b>		
NFL Challenge 2.0	69.	

For IBM Personal Computers exclusively.

# PC CONNECTION®





# PC Presents.

## You better not pout!

### ('Cause Santa Dos is coming to town.)

**H**ere in the yuletide town of Marlow, NH (pop. 556), most of our neighbors have rather traditional ideas of holiday gift giving. For software, a nice new pair of red thermal underwear would be a real hearth warmer. Hardware? Well, a chainsaw might be really sharp. And, as for utilities, a telephone and running water would be welcome additions to some homes. Nevertheless, being hip to the trendy tastes of the microcomputer age, our very presentable mascots are making sure that we're well-stocked with PC games and gadgets for the byte-bitten on your Christmas or Hanukkah list.

## It's a wrap!

People often ask us why we go to such lengths to satisfy customers. Well, our Customer Service Director thinks it's good business. Our Advertising Director thinks it makes good copy. Our mothers think it's their influence. But, actually, we give such

nice (as opposed to naughty) service because of that famous list that Santa and his raccoons are making (and checking twice, we hear). But, frankly, we're a little worried about companies who don't give toll-free support, or who charge your credit card before they ship, or who don't ship backorders free, or who have developed any of those other naughty mail order habits. It's lump o' coal city for those dudes.

## You're gonna get what's coming.

At our modest headquarters in the former Christmas Trees Inn in Marlow, we're frantically doing our last minute holiday shopping. If you want to be on our list, just place an order of \$500 or more by January 31st, and you will get your very own surprise present from PC Connection! Specially programmed to self-destruct if opened before Christmas.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit please call ahead.



A surprise present which will no doubt feature our most gifted mascot. Offer not available to net accounts. One per customer.

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.



# Jingle bells, give us a yell, PC Connection knows the way. We hope you have a great New Year and happy holidays.

## MSC Technologies ... lifetime

OmniMouse w/Designer Pop-up menus  
(serial only; 1 year warranty) ..... \$57.  
PC Mouse II w/PC Paint+ (bus or serial) ... 89.  
PC Mouse II w/Autosketch (bus or serial) ... 105.

## NEC ... 2 years

Multisync Plus (960 x 720 max. resolution) . 949.  
Multisync II (800 x 560 max. resolution) ... call

## NSI Logic ... 3 years

Smart VGA (supports full VGA specs) . . . . . 229.

## Orchid Technologies ... 2 years

RAMquest Xtra 0k (for PS/2 50/60/70/80) . 379.  
Tiny Turbo 286 (accelerator board) . . . . . 289.  
Designer VGA . . . . . 349.  
RAMquest 2 1 Meg (for PS/2 50/60) . . . . . 549.

## PC Power & Cooling Systems ... 1 year

**REPLACEMENT POWER SUPPLIES**  
Turbo Cool 150 (run 25° - 40° cooler) . . . . . 129.  
Turbo Cool 250 (run 25° - 30° cooler) . . . . . 169.  
Silencer 150 (84% noise reduction) . . . . . 115.  
Silencer 200 (69% noise reduction) . . . . . 149.

## PC Support Group ... 1 year

Breakthrough 286 Accel. Board (8 MHz) . . . 299.  
Breakthrough 286 Accel. Board (12 MHz) . . 449.

## Practical Peripherals ... 5 years

1200 Baud Internal Modem (w/ProComm) . 69.  
1200 Baud External Modem (mini) . . . . . 79.  
P/Link (parallel line extender/32k) . . . . . 109.  
Microbuffer Inline (par. print buffer/32k) . 135.  
2400 Baud Internal Modem . . . . . special  
2400 Baud External Modem . . . . . special

## Princeton Graphics ... 1 year

Ultrasync (supports CGA, EGA, VGA) . . . 549.  
Max15 Amber Monochrome Monitor . . . . . 269.

## Safe Power Systems ... 2 years

Safe 250W (standby power backup) . . . . . 249.  
Safe 425W (standby power backup) . . . . . 369.

## Toshiba ... 1 year

P321SL printer (80 col., 216 cps, w/tractor) 529.  
P351SX Printer (132 col., 360 cps) . . . . . 999.  
T1000 Laptop (80C88, 6.4 lbs., 5 hr. battery) call  
T1200 Laptop (80C86, 10 MHz, 20 Meg) . . . call  
T1200HB Laptop w/Backlit screen . . . . . call  
T1200F Laptop Dual Floppy System . . . . . call  
T1200FB Laptop Dual Floppy System w/Backlit screen . . . . . call  
T3100/20 Laptop (80286, 8 MHz, 20 Meg) . call  
T3200 Laptop (80286, 12 MHz, 40 Meg) . . . call  
T5100 (80386, 16 MHz, 40 Meg) . . . . . call  
External 5 1/4" Drive for Laptops . . . . . 369.  
768k RAM Card for T1000 . . . . . 299.  
1 Meg EMS Card for T1100 + T1200 . . . . . 499.

## Video 7 ... 5 years

VEGA Deluxe (supports 640x480) . . . . . 219.  
VEGA VGA (supports full VGA specs) . . . . 287.  
FastWrite VGA . . . . . 399.  
VRAM VGA . . . . . 529.

## DRIVES

### IOMEGA ... 1 year

Dual 20 Meg Bernoulli Box (8") . . . . . \$1679.  
20 Meg Cartridge (8") . . . . . 82.  
20 Meg Tripak (8") . . . . . 244.  
Bernoulli II Single 20 Meg Internal (5 1/4") . 767.  
Bernoulli II Dual 20 Meg External (5 1/4") . 1659.  
20 Meg cartridge (5 1/4") . . . . . 59.  
20 Meg Tripak (5 1/4") . . . . . 169.  
PC2 Card . . . . . 169.  
PC2B Card (bootable card for PC/XT/AT) . 229.  
PC4 Card (for PS/2 Model 50/60/70/80) . . 299.

### Mountain Computer ... 1 year

40 Meg Internal Tape Drive (XT, AT or PS/2) 379.  
40 Meg External Tape Drive (XT, AT or PS/2) . 479.  
40 Meg External Tape Drive w/Power Supply (XT, AT, or PS/2) . . . . . 569.

### Plus Development ... 1 year

Hardcard 20 Meg (49 ms) . . . . . 549.  
Hardcard 40 Meg (28 ms) . . . . . 699.  
Passport (20 or 40 Meg removable drives) . call

### Seagate ... 1 year

**FREE PCTV® Hard Drive Installation Tape with the purchase of 20, 30 or 40 Meg Seagate drive for the IBM PC (not for AT). Specify Beta or VHS.**  
20 Meg Internal Hard Drive ST225 (w/controller and cables, 65 ms) . . . . . 299.  
30 Meg Internal Hard Drive ST238 (w/controller and cables, 65 ms) . . . . . 329.  
40 Meg Internal Hard Drive for AT (40 ms) 399.  
40 Meg Internal Hard Drive for XT (w/controller and cables, 40 ms) . . . . . 469.  
40 Meg Internal HD ST251-1 for AT (28 ms) . . . . . 469.  
80 Meg Internal HD ST4096 for AT (28 ms) . . . . . 689.

### TEAC ... 1 year

PC, XT 360k Drive (5 1/4" half-height) . . . . 89.  
720k Drive (3 1/2" half-height, specify XT or AT) . . . . . 95.  
1.44 Meg Drive for AT (3 1/2" half-height, includes Basteck software utilities) . . . . . 125.

### Toshiba ... 1 year

AT 360k Drive (5 1/4" half-height) . . . . . 89.  
AT 1.2 Meg Drive (5 1/4" half-height) . . . . . 99.

## DISKS

All disks have a lifetime warranty.

### 5 1/4" DS/DD Disks for PC & XT (360k)

Fuji MD2D (10 disks per box) . . . . . 12.  
Sony (10 disks per box) . . . . . 12.  
Maxell MD2-D (10 disks per box) . . . . . 13.  
Verbatim Datalife (10 disks per box) . . . . 13.

### 5 1/4" DS/High Density Disks for AT (1.2 Meg)

Fuji MD2HD (10 disks per box) . . . . . \$22.  
Sony (10 disks per box) . . . . . 23.  
Maxell MD2-HD (10 disks per box) . . . . . 23.  
Verbatim Datalife (10 disks per box) . . . . 22.

### 3 1/2" DS/DD Diskettes (720k)

Sony (10 disks per box) . . . . . 19.  
Fuji (10 disks per box) . . . . . 19.  
Maxell (10 disks per box) . . . . . 20.

### 3 1/2" DS/High-Density Diskettes (1.44 Meg)

Sony (10 disks per box) . . . . . 55.  
Fuji (10 disks per box) . . . . . 55.  
Maxell (10 disks per box) . . . . . 59.

## MISCELLANEOUS

### CompuServe

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

### Cables ... lifetime

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

## 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®



# Bells on our phones ring,

*Making spirits bright,  
What fun it is to ship these things  
That keep your PCs right... Oh!*

## HARDWARE

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

### Alloy ... 1 year

Tape System/2 (for PS/2 MicroChannel) . . \$299.  
Retriever/40 (for IBM AT & compatibles) . . 349.

### AST Research ... 2 years

I/O Mini 2 C/S/P . . . . . 89.  
SixPakPlus 64k C/S/P (upgrades to 576k) 129.  
Advantage Premium 512k S/P  
(upgrades to 1 Meg or 2 Meg  
w/Piggyback) . . . . . call  
Advantage 2 512k (for PS/2 Models 50/60). call  
Advantage 2-386 (for PS/2 Model 80) . . . call  
RAMpage Plus 286 512k (for XT286/AT) . . call  
RAMpage! Plus MicroChannel 512k  
(for PS/2 Models 50/60) . . . . . call

### Amdek ... 90 days

LaserDrive-1 (external CD-ROM Drive) . . 629.  
LaserDrive-2 (internal CD-ROM Drive) . . 629.

### Compucable ... 2 years

2-Position switch box . . . . . 29.  
3-Position switch box . . . . . 39.

### Cuesta ... 1 year

Datasaver 400 Watt (standby power backup unit) . . . . . 459.

### Curtis ... lifetime

#### ACCESSORIES

Curtis Clip CC-1 . . . . . 6.  
Disk Holder DB-1 (holds 50 5 1/4" disks) . . 8.  
3 1/2" Disk Holder DB-2 (holds up 40 disks) . 8.  
3 1/2" Diskette Cleaning Kit CK-2 . . . . . 16.  
Printer Stand PS-1 . . . . . 18.  
Universal System Stand SS-3 . . . . . 25.  
Static Mat SM-2 . . . . . 25.  
Toolkit TK-1 . . . . . 25.  
DS-1 Switch Box (controls 2 printers) . . . 33.

#### CABLES

Smartmodem-to-PC Cable EC-7 (9 feet) . . 17.  
Printer-to-IBM cable EC-6 (9 feet) . . . . 17.  
PS/2 Keyboard Extension Cable EC-9 . . . 25.  
Keyboard Extension Cable EC-2 . . . . . 25.

#### SURGE SUPPRESSORS

Safestrip SP-3 (6 outlets; 1 year warranty) . 19.  
Filtered SafeStrip SPF-3 . . . . . 21.  
Diamond SP-1 (6 outlets) . . . . . 29.  
Emerald SP-2 . . . . . 36.  
Diamond Plus SP-1 Plus . . . . . 41.  
Sapphire SPF-1 . . . . . 45.  
Ruby SPF-2 (6 outlets; EMI/RFI filtered; 6 ft cord) . . . . . 55.  
Ruby-Plus SPF-2 Plus (w/FAX & modem protection) . . . . . 69.

## PC Connection Hardware Special

through December 31, 1988

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

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

- Hayes asynchronous compatible
- Compatible with virtually all current communications programs
- Separate line and set connectors to accommodate data and voice calls
- Automatic answer mode
- Made in the U.S.A.
- Full 5 year warranty

2400 SA (external modem) . . . . . \$181.  
PM2400 (internal modem w/ProComm) 151.

### DCA ... 1 year

Irma 2 (3270 emulation board) . . . . . 729.  
Irma 2 Micro Channel (for PS/2 Models 50/60/70/80) . . . . . 729.

### Epson ... 1 year

We are an authorized Epson Service Center.

FX-850 (80 col., 264 cps, 9 pin) . . . . . call  
FX-1050 (136 col., 264 cps, 9 pin) . . . . . call  
LQ-500 (80 col., 180 cps, 24 pin) . . . . . call  
LQ-850 printer (80 col., 264 cps, 24 pin) . . call  
LQ-1050 printer (136 col., 264 cps, 24 pin) call  
LQ-2550 printer (136 col., 400 cps, 24 pin) call  
LX-800 printer (80 col., 180 cps, 9 pin) . . . call  
Printer-to-IBM cable (6 feet) . . . . . 15.

### Everex ... 1 year

1200 Baud Internal Modem . . . . . 79.  
2400 Baud Internal Modem . . . . . 149.

### 5th Generation ... 1 year

Logical Connection 256k . . . . . 479.  
Logical Connection 512k . . . . . 539.

### Hayes ... 2 years

Smartmodem 1200 . . . . . 299.

# 1-800/243-8088



PC Connection

6 Mill Street

Marlow, NH 03456

603/446-3383 FAX 603/446-7791

550W

Smartmodem 1200B (with Smartcom II) . \$299.  
Smartmodem 1200B (hardware only) . . . 265.  
Smartmodem 2400 . . . . . 449.  
Smartmodem 2400B (with Smartcom II) . . 449.

### Hercules ... 2 years

Graphics Card Plus . . . . . 189.  
Network Card Plus (with TOPS DOS) . . . 339.  
Incolor Card . . . . . 229.

### Intel ... 5 years

2400B Modem 2 (internal modem for PS/2 Models 50/60/80) . . . . . 269.  
Inboard 386/PC w/1 Meg . . . . . 799.  
Inboard 386/AT 0k (req. installation kit) . . 899.  
Inboard Installation Kit (specify computer) 139.  
Above Board 286 512k . . . . . 379.  
Above Board PS/286 512k S/P . . . . . 419.  
Above Board Plus 512k . . . . . 429.  
Above Board 2 Plus 512k . . . . . 479.  
Above Board Plus I/O 512k . . . . . 529.  
Connection Coprocessor (FAX board plus) . . . . . 769.  
Optional 2400 Baud Modem for Connection Coprocessor . . . . . 229.

### MATH COPROCESSORS

8087 (for IBM-PC & XT) . . . . . 105.  
8087-2 (8 MHz, 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) . . . . 439.  
80387-20 (for 20 MHz PS/2 Model 80) . . . 499.

### Kensington Microware ... 1 year

Masterpiece (with \$15 rebate thru Dec.) . . 94.  
Masterpiece Plus (with \$15 rebate thru Dec.) 109.

### key tronic ... 3 years

101 Plus Keyboard (enhanced layout) . . . 99.

### Kraft ... 1 year

Three-button Joystick . . . . . 33.  
High Speed Joystick Adapter Card . . . . 25.

### KYE International ... lifetime

Dyna Mouse GM-6 Plus (w/Dr. Halo III) . . 54.  
**Logitech ... lifetime**  
Series 2 Mouse (for PS/2 50/60/70/80) . . . 65.  
HiREZ Mouse (bus only) . . . . . 89.  
Mouse w/Paint Show (bus or serial) . . . . 95.  
Mouse w/LogiCAD (bus or serial) . . . . . 119.  
ClearCase Mouse (serial only) . . . . . 99.  
ScanMan (hand held scanner) . . . . . 199.

### Microsoft ... lifetime

Mach 20 . . . . . 349.  
Disk + Option (for Mach 20) . . . . . 69.  
Memory + Option (for Mach 20) . . . . . 339.  
Mouse with Paintbrush (bus or serial) . . . 109.  
Mouse with Easy CAD (bus or serial) . . . 125.  
Mouse with Windows/286 (bus or serial) . . 145.

### Migent ... 1 year

Pocket Modem (1200 baud, incl. software) . 109.

For IBM Personal Computers exclusively.

# PC CONNECTION®

\* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION.



# THE SOFTWARE SHELF

## 170 **Agenda 1.0**

Lotus's long-awaited personal information manager gives users power, but it's hard to learn. Among other tricks, *Agenda* automatically categorizes information according to parameters you define.

## 172 **IBM Interleaf Publisher**

LAN work groups that need WYSIWYG, an intuitive interface, and graphics sleight of hand should consider this high-end publishing tool.

## 178 **Framework III**

Polishing an already excellent integrated package, Ashton-Tate melds a faster spreadsheet, an improved data base, and built-in E-mail into a definite Best Buy.

## 182 **Flight Simulator 3.0**

Visit exotic locales in a Learjet, fly by modem with a friend, and customize every detail of your flights with this update to a best-seller.

## 186 **Mah Jongg 2.5**

Hone your strategic skills with a handsome solitaire version of the ancient Chinese board game.

## 186 **Test Drive**

The Highway Patrol is but a dim memory in your Lamborghini's rearview mirror as you finesse mountain hairpins and dodge clumsy big rigs at 173 mph. Choose from five dream machines.

## 190 **Apollo 18: Mission to the Moon**

Play both flight director and crew commander on recovery missions to the moon. Type A personalities will love the tricky landings.

## Agenda 1.0

*Personal information manager*

**PROS:** Automatically indexes text by user-defined categories, sorts information into multiple views

**CONS:** Hard to learn, poor file import/export facilities, no windowing capability

Once you've created a program like *1-2-3*, what do you do for an encore? When Lotus founder Mitch Kapor set out to create *Agenda*, a general-purpose tool that would let users manipulate text as freely as *1-2-3* users crunch numbers, he naturally took his cue from the best-selling spreadsheet. But now that *Agenda* is finally here, detail-crazed users hoping for the ultimate organizing program may be disappointed.

Certainly, the \$395 program can generate anything from a high-powered to-do list to a flexible archive of correspondence. Its wealth of controls lets you customize a data base in any number of ways. But *Agenda* is daunting to learn and single-minded in use. *Agenda*'s maximum file size is limited, yet it won't let you open more than one data base at a time. Nor can it display multiple views of the information on screen. *Agenda* requires *Windows* or *Desqview* to be truly useful.

*Agenda* is best known for launching the wave of personal information managers (PIMs) which includes Valor Software's *Info-XL*, Persoft's *Ize*, Symantec's *GrandView* (see *The Software Shelf*, PCW, August, September, and November 1988, respectively) and Micro Logic's *Tornado*. Though they all claim to organize scraps of information for busy users, these products have little in common beyond an ability to sort text for easy recall. *Agenda* beats most other personal information managers in versatility but not in ease of use.

*Agenda* offers a host of powerful tools for relating, filtering, and viewing information, and you can successfully adapt it over time to fit your personal working habits. What



*Agenda* gives in flexibility, however, it takes away in the lengthy setup process you're likely to endure when building a data base of any complexity.

The raw materials of any *Agenda* application are a combination of *items* and *notes*, indexed for retrieval by *category*. You enter text into an *Agenda* data base in items up to 350 characters in length, and you can tag any item with a note up to 10K long. (This works both ways: You can turn text from a note into an item, or gather multiple items into a note.) The trick to keeping related items and notes corralled is to group them by categories. You can define categories at two points: when working directly with an item, or in an outline view of the data base called the Category Manager.

The Category Manager, the key to *Agenda*'s powerful data filtering techniques, lets you build a hierarchy of categories that the program uses for sorting the text in items and notes. You can define conditions and actions that tie categories together (or exclude them from each other), and you can narrow the data shown in any view by specifying a range of search dates. When you've defined these parameters *Agenda* starts to hum. It automatically assigns most incoming text to its appropriate categories and displays it in any number of customized views.

While *Agenda*'s conditions and actions are hard to grasp at first, they let you draw powerful relations between disparate pieces of information. For example, you can readily create views that duplicate those built into more structured programs like *Info-XL*. The hitch is that you have to do it all yourself.

*Agenda*'s filtering tools are so numerous that you can spend hours tweaking a data base—and if you don't watch out, you will. It's possible to sink frightening amounts of time into defining a complex category hierarchy or building multiple views.

Some limitations are guaranteed to irk novices and power users alike. *Agenda* files top out at 4MB, yet you can keep only one data base file open at a time. To ease the space problem, you can attach note files to

items rather than importing them directly into the data base. Just be sure you don't intend to delete the attached file, and be aware that editing the file changes the information displayed in the data base.

*Agenda* also lacks *GrandView*'s handy ability to place multiple views on screen in windows. The program doesn't support a mouse, but its rich keyboard interface speeds you through most chores once you've mastered the shortcuts. Macros are mediocre at best, failing to match those in Lotus's *Metro*. And unlike *Ize*'s welcome-mat approach to outside files, *Agenda* awkwardly imports information in ASCII format only.

Finally, *Agenda* should really be RAM resident, at your fingertips whenever you need to add or find information. A *Metro* utility lets you enter data that can be imported into *Agenda* later, but you can't use it to examine the data base. Users should seriously consider running *Agenda* under *Windows/386* or *Desqview*. At press time a character-based OS/2 version of *Agenda* was slated to appear sometime in late 1988.

Considering *Agenda*'s complexity, the program's first release is remarkably bug-free. Documentation is well written and clear, except where the authors stumble over such arcane concepts as how to decide when it's better to apply a condition than an action to a





File: C:\AG\SALES1		10/05/88	10:24
View: Activities			
<b>Calls</b>	<b>Priority</b>	<b>Contact</b>	
» Don't forget to call Anna Lasky with the information she requested.	Medium	Anna Lasky	
• Call Marketing to arrange a Rapidfire demo for Abigail Scheer this Tuesday.	High	Abigail Scheer	
• Check with Abigail Scheer on meeting times.	Low	Abigail Scheer	
• Contact Daniel Fiske--get feedback!	Medium	Daniel Fiske	
<b>Follow-ups</b>	<b>Priority</b>	<b>Contact</b>	
• What is Abigail Scheer's favorite restaurant?	Low	Abigail Scheer	
• Follow up CopyCat demo by sending more literature to Anna Lasky.	High	Anna Lasky	
• Send Daniel Fiske more literature on Rapidfire copier.	Medium	Daniel Fiske	
<b>Suggestions</b>	<b>Priority</b>	<b>Contact</b>	
• Sarah Wu suggests Nadine attend our next meeting.	Medium	Sarah Wu	
• Daniel Fiske says we can improve our sales		Daniel Fiske	
F1	F2	F3	F4
F5	F6	F7	F8
F9	F10		
Help	Edit	Copy	Done
Note	Move	Mark	Un Mgr
Cat Mgr	Menu		

Agenda indexes items and notes by means of categories that you define either when working directly with an item or in an outline view of the data base called the Category Manager.

category. Context-sensitive help permits you to skip around from subject to subject almost as easily as you can with *Excel's* hypertext help facility. A demo and tutorial are also available.

For such a difficult application, however, Lotus should have given users a jump start by providing a library of useful templates that could be integrated into their own applications—for example, a phone book, appointment calendar, or project-tracking template. *Agenda* does include four applications that you can modify for your own use, but they're too simple to be of much value.

*Agenda* isn't a casual tool for users who need some software to organize their lives. If that's the object, then *Info-XL*, *GrandView*, or even *SideKick Plus* makes much better sense. Nor is it really suited, like *Ize*, to importing and sorting large volumes of text and numbers. Instead, *Agenda* offers dedicated users unprecedented flexibility in fashioning customized data bases out of text. But it will have to improve in both power and ease of use before its talents will be appreciated by more than a few. —Richard Landry

#### WHERE TO BUY

##### Agenda 1.0

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

**List price:** \$395

**Requirements:** 640K, hard disk,  
DOS 2.00 or later version

Not copy protected

**Technical support:** unlimited, no toll-free number, M-F 8:30-8

**Other support services:** Compu-Serve forum (GO LOTUSB)

For more information, circle 720 on reader service card.

## IBM Interleaf Publisher

Desktop publishing program

**PROS:** 100 percent WYSIWYG display; excellent long-document handling; accessible interface; graphics editor; charting package

**CONS:** Expensive, requires a DOS/80386 system and 4MB RAM, weak word processing, can't display full page on most monitors

The *IBM Interleaf Publisher* is the DOS/80386-based scion of a family of high-priced UNIX programs long dominant in professional and technical publishing. While *Ventura* and *PageMaker* pick up where the word processor leaves off, *Interleaf* combines word processing, sophisticated graphics, page composition, document management, and LAN support in a single package. Furthermore, *Interleaf* can update a page of graphics as quickly as a word processor refreshes a screen of text, and its icon-driven interface makes the program easy to use.

However, *Interleaf* costs nearly \$2500, has stiff hardware requirements, and strays somewhat from PC desktop publishing standards. The program lacks such niceties as automatic kerning and text flow around graphics, for example, and won't let you preview an entire page.

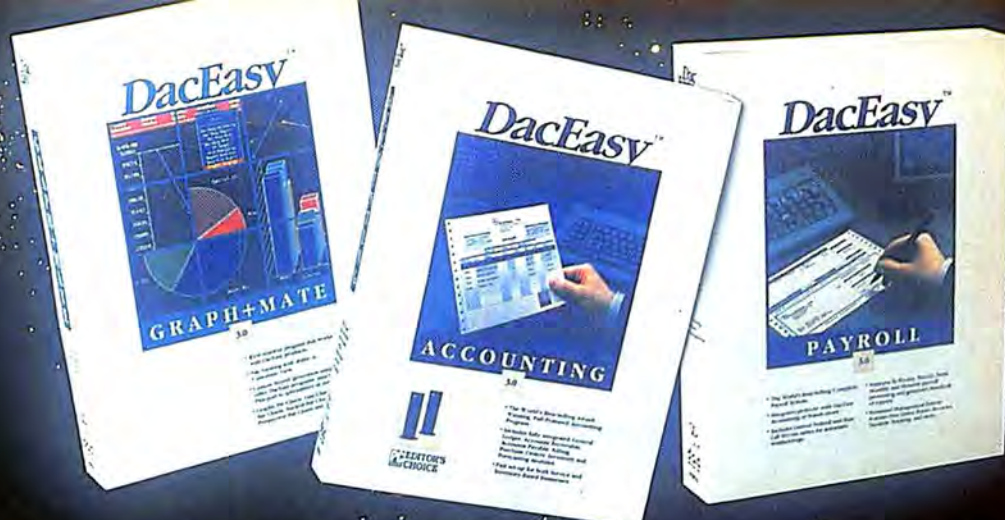
IBM recommends that you run the 32-bit *Interleaf* software on an 80386 system with a 40MB (minimum) hard disk, 6MB of RAM, a mouse, and a PostScript-compatible laser printer. The program itself requires a minimum of 4MB of RAM. Yet driver support for graphics boards is weak. Although *Interleaf* supports the VGA and EGA, the only high-resolution graphics boards it currently supports are IBM's 1024-by-768-pixel 8514/A and the new 19-inch 1280-by-960 8507.



**New  
Version 3.0**

**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.

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

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



## 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.)



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.

# DacEasy™

**Call 1-800-877-8088**

(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 (512K for Graph+Mate). Trademarks: IBM, PC-DOS, MS-DOS. DacEasy is a trademark of Dac Software, Inc., 17950 Preston Road, Suite 800, Dallas, TX 75252-5740. 5.25" & 3.5" disks available. Copyright © 1988, by Dac Software, Inc. All rights reserved. CODE #204



## FEATURES EVALUATION

## IBM Interleaf Publisher: A Complete PC Publisher

*Except for some weaknesses in file importing, Interleaf Publisher offers a wealth of features not found in the competition.*

	IBM Interleaf Publisher 1.0	PageMaker 3.0	Ventura Publisher 1.1
<b>Pagination and layout controls</b>			
Style sheets/templates	●	●	●
Automatic text flow across pages	●	●	●
Adjustable widow and orphan control	●	○	●
Automatic column balancing on last page	●	○	●
Column balancing above straddles	●	○	○
Vertical justification	●	○	○
Automatic table-of-contents generation	●	○	●
Automatic index generation	●	○	●
Automatic footnotes	●	○	●
Anchors graphics to text	●	○	●
Anchors captions to graphics	●	○	●
Master headers and footers	●	●	●
<b>Typographic features</b>			
Automatic and manual hyphenation	●	●	●
Exception dictionary	●	●	●
Automatic kerning	○	●	●
Tracking control	○	○	●
Automatic first-line indents	●	●	●
Reverse type	○	●	●
Includes scalable font outlines	●	●	○
Globally reformats tagged elements	●	○	○
<b>Text/graphics handling</b>			
Global search and replace	●	○	○
Automatic text flow around graphics	○	●	●
Draws lines and boxes	●	●	●
Isometric conversions	●	○	○
Freehand drawing	●	○	○
Scales/crops graphics	●	●	●
Automatic spot-color separations	○	●	○ <sup>1</sup>
<b>Imports text files</b>			
ASCII	●	●	●
dBASE	○	●	○
.WKS, .WK1	○	●	○
MultiMate	●	●	●
WordStar 3.x	●	●	●
WordPerfect 4.2	○	●	●
Microsoft Word	●	●	●
XyWrite III	○	●	●
<b>Imports graphics files</b>			
EPS	●	●	●
GEM	○	○	●
.PCX, .PCC	○	●	●
.PIC	○	●	●
TIFF	●	●	○
CGM	○	●	●
HPGL	●	●	●

● Yes ○ No ◐ Deficient

<sup>1</sup> Requires significant document reformatting.

For document formatting, *Interleaf* has such advanced features as text flow across pages, column balancing, automatic list and header numbering, style sheets, and vertical justification. It supports only Bitstream fonts, in sizes ranging from 6 to 72 points. You can pluck bigger type sizes, letter by letter, from *Interleaf*'s clip art library.

Because of *Interleaf*'s fondness for icons, document management is a snap. The program's book icon, for example, lets you automatically group document icons into

chapters. To reorder chapters, you simply rearrange the document icons inside the book icon—and *Interleaf* instantly updates all internal references to the chapter number. An *Interleaf* book can be copied into another icon where other projects of the same scale are maintained. This is important on a LAN, where one icon can be used to give access to all projects in a department.

*Interleaf*'s window is 100 percent WY-SIWYG, in the sense that what you see on



# 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.

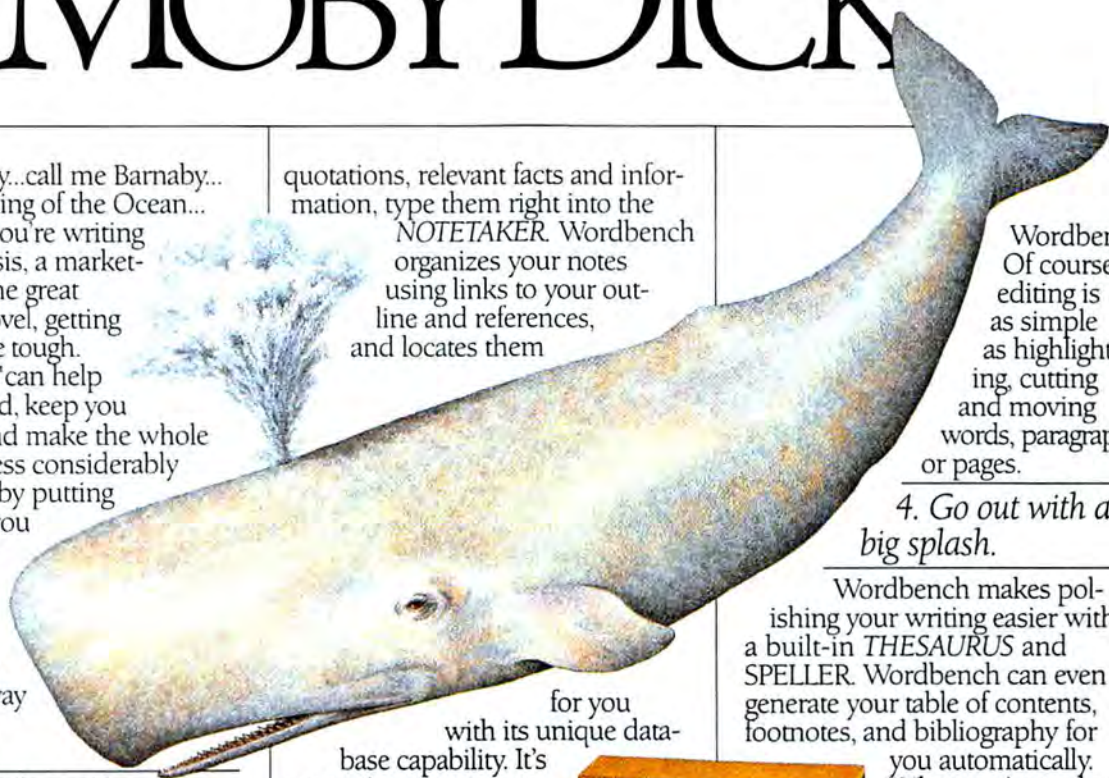
If you loathe a blank page, Wordbench furnishes the first known cure: the **BRAINSTORMER**. It's a set of creative exercises proven to help you through writer's block.

## 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

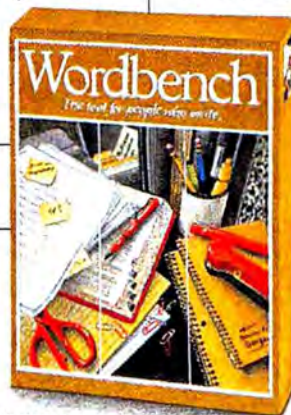
computer software is sold. Call it Wordbench.

## 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.)





# omniPAGE

Customer Profile

## Rick Smolan

**Age:** Withheld upon request.

**Profession:** World class photographer, entrepreneur and inspirational force behind the now famous *Day in the Life of Australia*; *Day in the Life of the Soviet Union*; *Day in the Life of America*—you get the picture.

**Hobbies:** When he's not taking photos in exotic places like Bangkok, Nairobi or Cairo, Rick enjoys kicking back, relaxing, and possibly doing some serious scanning of articles related to one of his favorite subjects—Levitation as practiced by Tibetan monks.

### His Page Recognition Software:

**OmniPage**, of course. Why else would we have him in our ad? According to Rick: "Coordinating 100 photographers in the Soviet Union for a one day photo shoot is no easy task for a small group like ours—despite what you hear about glasnost. Especially when you have to put an entire book together in a matter of weeks. When we're on assignment each photographer turns in notes—about a given shot—in whatever language he or she speaks. You can imagine some of the type styles that we have to deal with. When do you guys think you'll be able to handle the Cyrillic alphabet?"

**Favorite Quote:** Jonathan Seybold summed it up best: "OmniPage is the first good reason to buy a scanner."

**Things Disliked Most:** "Scanner software that over promises. Being able to scan any font in almost any column format really makes a difference. I wish that our photographers had the time to submit captions that are 99.9% accurate, or even half as reliable as OmniPage."

**Favorite Scan:** "I'm developing a library of some of my favorite photography articles—serious professional stuff—and putting it into files that I can get to and use. That's my idea of a meaningful scan."

**Future of Page Recognition:** "The idea of making computers compatible with paper is long overdue. People like myself who are on the move need products like this to save time. Everyone could stand a few less key strokes. I also see some real possibilities for OmniPage in the area of desktop publishing. Being able to scan specific sections from general publications, even typed notes, provides a real benefit to anyone who has to quickly turn around a publication. Do you guys think OmniPage will ever be able to read my handwriting? Our staff would love that."

### omniPAGE

OmniPage lets you scan text from almost any file format, in computer, 2. The most advanced page recognition software available to MS-DOS and Macintosh users. 3. Also able to scan any page format, including multiple text and columns of text and graphics. 4. A modern tool with European cultural roots especially applicable for Desktop Publishing applications. 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. 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. 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. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000. 1001. 1002. 1003. 1004. 1005. 1006. 1007. 1008. 1009. 1010. 1011. 1012. 1013. 1014. 1015. 1016. 1017. 1018. 1019. 1020. 1021. 1022. 1023. 1024. 1025. 1026. 1027. 1028. 1029. 1030. 1031. 1032. 1033. 1034. 1035. 1036. 1037. 1038. 1039. 1040. 1041. 1042. 1043. 1044. 1045. 1046. 1047. 1048. 1049. 1050. 1051. 1052. 1053. 1054. 1055. 1056. 1057. 1058. 1059. 1060. 1061. 1062. 1063. 1064. 1065. 1066. 1067. 1068. 1069. 1070. 1071. 1072. 1073. 1074. 1075. 1076. 1077. 1078. 1079. 1080. 1081. 1082. 1083. 1084. 1085. 1086. 1087. 1088. 1089. 1090. 1091. 1092. 1093. 1094. 1095. 1096. 1097. 1098. 1099. 1100. 1101. 1102. 1103. 1104. 1105. 1106. 1107. 1108. 1109. 1110. 1111. 1112. 1113. 1114. 1115. 1116. 1117. 1118. 1119. 1120. 1121. 1122. 1123. 1124. 1125. 1126. 1127. 1128. 1129. 1130. 1131. 1132. 1133. 1134. 1135. 1136. 1137. 1138. 1139. 1140. 1141. 1142. 1143. 1144. 1145. 1146. 1147. 1148. 1149. 1150. 1151. 1152. 1153. 1154. 1155. 1156. 1157. 1158. 1159. 1160. 1161. 1162. 1163. 1164. 1165. 1166. 1167. 1168. 1169. 1170. 1171. 1172. 1173. 1174. 1175. 1176. 1177. 1178. 1179. 1180. 1181. 1182. 1183. 1184. 1185. 1186. 1187. 1188. 1189. 1190. 1191. 1192. 1193. 1194. 1195. 1196. 1197. 1198. 1199. 1200. 1201. 1202. 1203. 1204. 1205. 1206. 1207. 1208. 1209. 1210. 1211. 1212. 1213. 1214. 1215. 1216. 1217. 1218. 1219. 1220. 1221. 1222. 1223. 1224. 1225. 1226. 1227. 1228. 1229. 1230. 1231. 1232. 1233. 1234. 1235. 1236. 1237. 1238. 1239. 1240. 1241. 1242. 1243. 1244. 1245. 1246. 1247. 1248. 1249. 1250. 1251. 1252. 1253. 1254. 1255. 1256. 1257. 1258. 1259. 1260. 1261. 1262. 1263. 1264. 1265. 1266. 1267. 1268. 1269. 1270. 1271. 1272. 1273. 1274. 1275. 1276. 1277. 1278. 1279. 1280. 1281. 1282. 1283. 1284. 1285. 1286. 1287. 1288. 1289. 1290. 1291. 1292. 1293. 1294. 1295. 1296. 1297. 1298. 1299. 1300. 1301. 1302. 1303. 1304. 1305. 1306. 1307. 1308. 1309. 1310. 1311. 1312. 1313. 1314. 1315. 1316. 1317. 1318. 1319. 1320. 1321. 1322. 1323. 1324. 1325. 1326. 1327. 1328. 1329. 1330. 1331. 1332. 1333. 1334. 1335. 1336. 1337. 1338. 1339. 1340. 1341. 1342. 1343. 1344. 1345. 1346. 1347. 1348. 1349. 1350. 1351. 1352. 1353. 1354. 1355. 1356. 1357. 1358. 1359. 1360. 1361. 1362. 1363. 1364. 1365. 1366. 1367. 1368. 1369. 1370. 1371. 1372. 1373. 1374. 1375. 1376. 1377. 1378. 1379. 1380. 1381. 1382. 1383. 1384. 1385. 1386. 1387. 1388. 1389. 1390. 1391. 1392. 1393. 1394. 1395. 1396. 1397. 1398. 1399. 1400. 1401. 1402. 1403. 1404. 1405. 1406. 1407. 1408. 1409. 1410. 1411. 1412. 1413. 1414. 1415. 1416. 1417. 1418. 1419. 1420. 1421. 1422. 1423. 1424. 1425. 1426. 1427. 1428. 1429. 1430. 1431. 1432. 1433. 1434. 1435. 1436. 1437. 1438. 1439. 1440. 1441. 1442. 1443. 1444. 1445. 1446. 1447. 1448. 1449. 1450. 1451. 1452. 1453. 1454. 1455. 1456. 1457. 1458. 1459. 1460. 1461. 1462. 1463. 1464. 1465. 1466. 1467. 1468. 1469. 1470. 1471. 1472. 1473. 1474. 1475. 1476. 1477. 1478. 1479. 1480. 1481. 1482. 1483. 1484. 1485. 1486. 1487. 1488. 1489. 1490. 1491. 1492. 1493. 1494. 1495. 1496. 1497. 1498. 1499. 1500. 1501. 1502. 1503. 1504. 1505. 1506. 1507. 1508. 1509. 1510. 1511. 1512. 1513. 1514. 1515. 1516. 1517. 1518. 1519. 1520. 1521. 1522. 1523. 1524. 1525. 1526. 1527. 1528. 1529. 1530. 1531. 1532. 1533. 1534. 1535. 1536. 1537. 1538. 1539. 1540. 1541. 1542. 1543. 1544. 1545. 1546. 1547. 1548. 1549. 1550. 1551. 1552. 1553. 1554. 1555. 1556. 1557. 1558. 1559. 1560. 1561. 1562. 1563. 1564. 1565. 1566. 1567. 1568. 1569. 1570. 1571. 1572. 1573. 1574. 1575. 1576. 1577. 1578. 1579. 1580. 1581. 1582. 1583. 1584. 1585. 1586. 1587. 1588. 1589. 1590. 1591. 1592. 1593. 1594. 1595. 1596. 1597. 1598. 1599. 1600. 1601. 1602. 1603. 1604. 1605. 1606. 1607. 1608. 1609. 1610. 1611. 1612. 1613. 1614. 1615. 1616. 1617. 1618. 1619. 1620. 1621. 1622. 1623. 1624. 1625. 1626. 1627. 1628. 1629. 1630. 1631. 1632. 1633. 1634. 1635. 1636. 1637. 1638. 1639. 1640. 1641. 1642. 1643. 1644. 1645. 1646. 1647. 1648. 1649. 1650. 1651. 1652. 1653. 1654. 1655. 1656. 1657. 1658. 1659. 1660. 1661. 1662. 1663. 1664. 1665. 1666. 1667. 1668. 1669. 1670. 1671. 1672. 1673. 1674. 1675. 1676. 1677. 1678. 1679. 1680. 1681. 1682. 1683. 1684. 1685. 1686. 1687. 1688. 1689. 1690. 1691. 1692. 1693. 1694. 1695. 1696. 1697. 1698. 1699. 1700. 1701. 1702. 1703. 1704. 1705. 1706. 1707. 1708. 1709. 1710. 1711. 1712. 1713. 1714. 1715. 1716. 1717. 1718. 1719. 1720. 1721. 1722. 1723. 1724. 1725. 1726. 1727. 1728. 1729. 1730. 1731. 1732. 1733. 1734. 1735. 1736. 1737. 1738. 1739. 1740. 1741. 1742. 1743. 1744. 1745. 1746. 1747. 1748. 1749. 1750. 1751. 1752. 1753. 1754. 1755. 1756. 1757. 1758. 1759. 1760. 1761. 1762. 1763. 1764. 1765. 1766. 1767. 1768. 1769. 1770. 1771. 1772. 1773. 1774. 1775. 1776. 1777. 1778. 1779. 1780. 1781. 1782. 1783. 1784. 1785. 1786. 1787. 1788. 1789. 1790. 1791. 1792. 1793. 1794. 1795. 1796. 1797. 1798. 1799. 1800. 1801. 1802. 1803. 1804. 1805. 1806. 1807. 1808. 1809. 1810. 1811. 1812. 1813. 1814. 1815. 1816. 1817. 1818. 1819. 1820. 1821. 1822. 1823. 1824. 1825. 1826. 1827. 1828. 1829. 1830. 1831. 1832. 1833. 1834. 1835. 1836. 1837. 1838. 1839. 1840. 1841. 1842. 1843. 1844. 1845. 1846. 1847. 1848. 1849. 1850. 1851. 1852. 1853. 1854. 1855. 1856. 1857. 1858. 1859. 1860. 1861. 1862. 1863. 1864. 1865. 1866. 1867. 1868. 1869. 1870. 1871. 1872. 1873. 1874. 1875. 1876. 1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885. 1886. 1887. 1888. 1889. 1890. 1891. 1892. 1893. 1894. 1895. 1896. 1897. 1898. 1899. 1900. 1901. 1902. 1903. 1904. 1905. 1906. 1907. 1908. 1909. 1910. 1911. 1912. 1913. 1914. 1915. 1916. 1917. 1918. 1919. 1920. 1921. 1922. 1923. 1924. 1925. 1926. 1927. 1928. 1929. 1930. 1931. 1932. 1933. 1934. 1935. 1936. 1937. 1938. 1939. 1940. 1941. 1942. 1943. 1944. 1945. 1946. 1947. 1948. 1949. 1950. 1951. 1952. 1953. 1954. 1955. 1956. 1957. 1958. 1959. 1960. 1961. 1962. 1963. 1964. 1965. 1966. 1967. 1968. 1969. 1970. 1971. 1972. 1973. 1974. 1975. 1976. 1977. 1978. 1979. 1980. 1981. 1982. 1983. 1984. 1985. 1986. 1987. 1988. 1989. 1990. 1991. 1992. 1993. 1994. 1995. 1996. 1997. 1998. 1999. 2000. 2001. 2002. 2003. 2004. 2005. 2006. 2007. 2008. 2009. 2010. 2011. 2012. 2013. 2014. 2015. 2016. 2017. 2018. 2019. 2020. 2021. 2022. 2023. 2024. 2025. 2026. 2027. 2028. 2029. 2030. 2031. 2032. 2033. 2034. 2035. 2036. 2037. 2038. 2039. 2040. 2041. 2042. 2043. 2044. 2045. 2046. 2047. 2048. 2049. 2050. 2051. 2052. 2053. 2054. 2055. 2056. 2057. 2058. 2059. 2060. 2061. 2062. 2063. 2064. 2065. 2066. 2067. 2068. 2069. 2070. 2071. 2072. 2073. 2074.



# A simple explanation of our new VGA Plus 16™ card.

For the price of this...



you get this.



© 1988 Paradise Systems, Inc.

Now you can get high performance VGA and still stay afloat financially.

The new Paradise VGA Plus 16 card is the latest addition to our growing family of VGA products. Its 16-bit bus and BIOS rushes information to your screen up to 400% faster than IBM's Display Adapter. And its exclusive AutoSense™ feature guarantees trouble-free high performance.

You also get 256 brilliant on-screen colors with 640 x 400\* resolution. Or 16 colors in 800 x 600 resolution, for even crisper detail.

Plus you get complete hardware and software compatibility, including downward

compatibility with all pre-VGA standards. And the Paradise VGA Plus 16 card comes complete with a long list of software drivers to support all your favorite programs.

In simple terms, it's the best high performance value going. At only \$499 retail.

For more information on any member of the Paradise VGA family — VGA Plus 16, VGA Plus™ or VGA Professional™ — please call Paradise at (415) 960-3360. Or call the dealer nearest you.

**PARADISE™**  
Western Digital Imaging

Western Digital Imaging/Paradise, 800 E. Middlefield, Mountain View, CA 94043



\*640 x 400 mode works with PS/2 and MultiSync monitors. VGA Plus 16, AutoSense, VGA Plus and VGA Professional are trademarks of Paradise Systems, Inc. \*IBM is a registered trademark of International Business Machines Corp.

Circle 297 on reader service card



screen exactly matches the printed page in text appearance (there is no greeking) and dimensions. However, on an EGA/VGA monitor, you can see only half the actual page; on the 8514/A and the 8507, you get about four-fifths. Since *Interleaf* doesn't provide a way to reduce page scale, you can't preview a full page as you can in *PageMaker* and *Ventura*.

Entering text is like using a word processor, with one difference: Paragraphs, illustrations, tables, headers, and other objects in a document are linked to style sheets. You can create a document template merely by cutting and pasting components into a fresh document, then saving it. *Interleaf*'s word processor lacks an undo command and macros, and it suffers from skimpy search and replace and awkward tab functions. On the plus side, you can cut and paste between documents very quickly, and hyphenation and mouse support are excellent.

Manipulating graphics in *Interleaf* is amazingly easy. You create graphics on the fly by opening a *frame* wherever you want in the document. A frame can be as small as a single letter or as large as the current page size. You can anchor a frame to an existing text component, place the graphic at the top or bottom of a page, or straddle it across multiple columns. Making global changes to graphics is easy, and *Interleaf* has graphics tools that approach those of a good CAD program. Some of the more advanced include 3-D isometric scaling, rotation, and a fully definable grid.

Compared with both *PageMaker* and *Ventura*, *Interleaf* is surprisingly weak on data exchange. Despite a built-in charting package, it accepts spreadsheet files only as data, and can't import .PIC files. Supported word processing formats include DCA, *Microsoft Word 4.0*, *WordStar 3.x*, *MultiMate*, and files from the Wang TTY, WPS, PC, and Xerox 860 dedicated word processors. A filter for *WordPerfect* may soon be added to the list.

*Interleaf* isn't perfect, but it's easy to learn, fast, and very sophisticated at manipulating graphics. Because of its cost, power, icon interface, and large-scale document handling, *Interleaf* is best suited to a LAN work group doing heavy-duty one-stop publishing. Mortals with lesser needs should stick to *PageMaker* or *Ventura*. —Alan Southerton

## WHERE TO BUY

### IBM Interleaf Publisher

IBM

900 King St.

Rye Brook, NY 10573

800/IBM-7257 ext. 58 (for dealer information)

**List price:** \$2495

**Requirements:** 80386-based system; 4MB RAM (6MB recommended); hard disk (40MB recommended); 1.44MB disk drive; EGA, VGA, or IBM 8514/A monitor and adapter; DOS 3.30 or later version

Not copy protected

**Technical support:** 90 days free, toll-free number, M–F 9–5; extended service \$200/year (includes toll-free number)

**Other support services:** free quarterly IBM newsletter; three-day IBM training in Boulder, Colorado, \$656

**For more information, circle 721 on reader service card.**

## Framework III

### Integrated package



**PROS:** Strong word processor and spreadsheet, outstanding interactive outline function, supports EMS 4.0 expanded memory

**CONS:** Data base limited to available RAM, weak spelling checker and graphics

**W**ith *Framework III*, Ashton-Tate has further enhanced a time-honored favorite. The package's spreadsheet calculates faster than its predecessor's, the data base is easier to use than ever, and best of all, a built-in E-mail facility has been added. File management and printing are improved, and for the first time Ashton-Tate shows off the whole program in EGA color.

There is still some room to grow, of course. The spelling checker is less than state-of-the-art, for example, and the import/export function could support more file formats. But overall, *Framework III* is more comfortable to use than either of its major competitors, The Software Group's *Enable* or Lotus's *Symphony* (see *The Software Shelf*, PCW, September 1988).

Once you get past a complex installation and learn a few odd function key commands, *Framework III* is remarkably easy to master. The package's basic structure is un-









Thanks to Framework's structure of nested "frames," a user can quickly gather an outline, a text document, a worksheet, and a data base within a single file.

changed from earlier versions: A series of nested files—or "frames"—compose an integrated whole. To produce a multipart report, for example, you open an outline frame to organize the work, then append subframes containing the text and any related worksheets, data bases, and graphs. As before, the pull-down menu commands are common to all the application modules, but mouse support now makes file handling a point-and-shoot option.

Within *Framework*, file translation has never been an issue: A file from any module can be used by any other. The list of foreign formats supported now includes *MultiMate* 3.7, *WordPerfect* 4.2, *WordStar* 4.0, and *SYLK* 3.0. In addition, Ashton-Tate customer service will provide a free utility to convert *Symphony* files into *Framework III*.

*Framework III*'s word processor has gained in speed, and you can now edit text in the cut and paste buffer. Automatic footnoting has been added, and it's so well integrated that a search and replace command scans the footnotes as well as text. Finally, the macro feature that automatically substitutes a piece of text when you type an abbreviation is much more convenient to use.

Changes to the spreadsheet module are few but significant. Recalculation is a good deal faster than in *Framework II*—although *Framework III* trailed *Symphony 2.0* in NSTL tests—and the program now supports EMS 4.0. Almost as important, you no longer need to calculate or sort an entire work-

sheet to update a range. Less impressive are *Framework III*'s graphs, which remain a pale shadow of the 3-D graphs possible in *Enable*.

In *Framework III*'s data base—as in the spreadsheet—cell formats can be set for specified or named ranges. Once the date, time, logical, formula, and character or numeric formats are assigned, you just type in the data. Other pluses include unlimited sort keys and the ability to lock multiple files. As before, *Framework III*'s data base unfortunately is limited by available RAM.

A solid part of the package, telecommunications could still use a little more fine-tuning. Files can be received in the background, for example, but sending them ties up the program. And customizing the canned log-on scripts is a chore. In any case, most of the big communications news concerns *Framework III*'s built-in electronic mail capability. By running Action Technologies' \$99 *MHS Mail* (the acronym stands for *Message Handling Service*) with *Framework III*'s integrated E-mail facility, users can now dial into Novell's *Netware* and NETBIOS-compatible LANs from the outside, by modem. Once they are recognized as authorized users, they can do anything a true LAN member can: send and receive mail, queue messages, and use addressee nicknames and group lists. At press time, a five-user \$995 LAN version of *Framework III* was to have shipped October 31.

The biggest addition to *Framework III* is the E-mail facility, but nearly every module has been improved and the whole package made faster. Where *Symphony* and *Enable* users have to slog through menu systems that are complex or obtuse—or both—*Framework III* users can call up applications as quickly as they do files and transfer data between them instantly. With this upgrade, Ashton-Tate has continued to improve an already excellent integrated package.

—Stephen A. Blumenthal

#### WHERE TO BUY

##### Framework III

Ashton-Tate  
20101 Hamilton Ave.  
Torrance, CA 90502-1319  
800/437-4329, 213/329-8000,  
213/538-6169 (BBS)



# ...with the incredible HeadStart III.™



At Vendex we design every computer as a complete system. We integrate peripherals usually offered only as options and include an unprecedented package of 14 name brand programs worth thousands of dollars FREE!...All you have to do is add the electricity and you're immediately productive.

**Incredibly convenient.** The HeadStart III has two internal drives: a 1.2 megabyte, 5.25-inch and a 1.44 megabyte 3.5-inch, both standard. So you don't have to

choose between the two, you use either, depending on your software.

**Incredible performance.** At the heart of the HeadStart III is a 12MHz 80286 processor with one megabyte of standard RAM, with the hard drive system delivering 32 megabytes of storage operating at 28 milliseconds with astonishing 1 to 1 interleave. Plus, true 16 bit built-in VGA Graphics is component matched for high speed and clarity.

**Plus, incredible expandability and support.** The HeadStart III is designed for your future as well as your present applications, with four expansion slots for networking and for the diverse peripherals already becoming available. With the HeadStart III, you're OS/2 ready right now. You can add two full megabytes of RAM, without

having to buy any additional boards.

In addition, our PC Coach hotline is available to registered owners with questions about hardware, software or service.

To obtain more information about the HeadStart III and our full line of advanced computer systems, or to find the name of the nearest dealer call toll free **1-800-882-1888.**

You'll see, it really is incredible.

## SPECIFICATIONS

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

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

HEADSTART ADVANCED OPERATING ENVIRONMENT is a trademark of Vendex Technologies, Inc. IBM is a trademark of International Business Machines Corp. MS-DOS 3.3 and G.W. BASIC are trademarks of Microsoft, Inc. FRAMEWORK II is a trademark of Ashton-Tate. 3-D GRAPHICS is a trademark of Perspective. FLOPPY DRIVER is a trademark of Concept Technology. X-TREE is a trademark of Eurytech Systems Inc. SPLASH! is a trademark of Spinnaker Software Corporation. COMPUTER-EASE is a trademark of Atkinson Technologies. CHESSMASTER 2000, MAVIS BEACON, TEACHES TYPING and TWIST & SHOUT are trademarks of Software Toolworks, Inc. HOW TO USE YOUR PC is a trademark of American Training International. BOOKMARK is a trademark of Intelisoft International. PUBLISH-IT is a trademark of Timeworks, Inc. © 1988 Vendex Technologies, Inc. All Rights Reserved. VENDEX TECHNOLOGIES, INC. 40 Cutter Hill Road, Suite 470, Great Neck, New York 11021

# VENDEX HEADSTART™ III

Built to be compatible with you.™

Circle 10 on reader service card



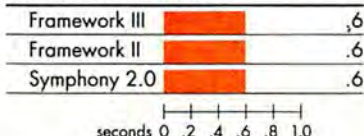
## NSTL TEST REPORT

## Framework III: Neck and Neck With Symphony

Framework III leads Symphony in word processing and communications speed but trails in spreadsheet operations.

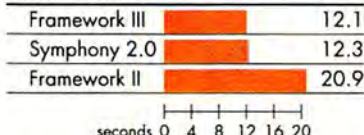
## Data base

## Search for a record

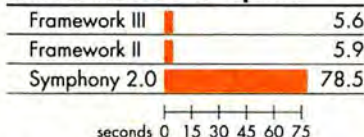


## Word processor

## Print a file



## Global search and replace



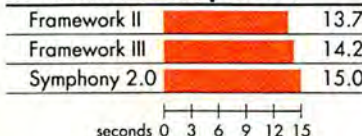
All tests were performed on a 12-MHz Compaq Deskpro 286 with 1.15MB of RAM and a 20MB hard disk. A disk cache consisting of 256K of extended memory was used for all tests except the spreadsheet tests. A 10-MHz 80287 coprocessor was used for the EMS spreadsheet tests only, and a 2MB Intel AboveBoard was used for all EMS tests.

## Search for a record

Records in a 200-record file were selected one at a time. Note: A 200-record file was used because of the high-end integrated packages' data base limitations.

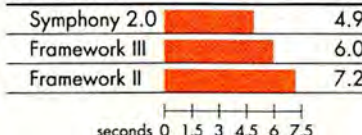
## Communications

## Transmit file with protocol

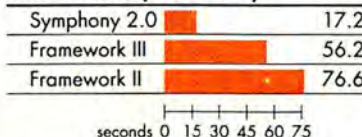


## Spreadsheet

## Recalculate



## Recalculate (with EMS)



## Print a file

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

## Global search and replace

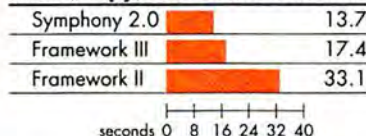
With the cursor positioned at the beginning of the text file, the program was instructed to automatically replace all 238 instances of aaaa with AAAA.

## Transmit file with protocol

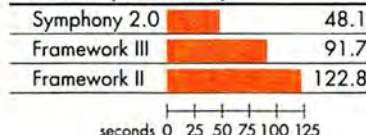
Using the XMODEM CRC protocol, a 10K text file was transmitted at 9600 bps to an identically configured Compaq Deskpro 286/12 running the software being tested. The Deskpros were directly connected by a null modem.

## Spreadsheet (continued)

## Insert, copy, and delete columns



## Insert, copy, and delete columns (with EMS)



## Recalculate

With the cursor positioned at cell B18, a new value was entered and the spreadsheet recalculated. Recalculation was set to automatic. The test was executed again using EMS and a coprocessor.

## Insert, copy, and delete columns

This test measures the time required to insert blank columns (P1..AD1), copy other columns into the new columns (AE1..AR204 to P1..AD1), then delete the copied columns. Each step was timed separately; then the times were added. The test was executed again using EMS and a coprocessor.

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

**List price:** \$695, upgrade from Framework II \$175

**Requirements:** 640K, two disk drives (hard disk recommended), DOS 2.10 or later version  
Not copy protected

**Technical support:** 90 days free, no toll-free number, M-F 6-4:30; extended support \$50-\$150 per year

**Other support services:** user BBS; training materials and on-site training available

**For more information, circle 722 on reader service card.**

## Flight Simulator 3.0

## Flight simulator

**PROS:** Superb simulation, multiple views, panning, windowing, formation flying, instruction mode

**CONS:** Clunky menu system, doesn't always recognize joysticks, can't change screen colors, some bugs



# PCWORLD Profile

## TOPS tells why PC WORLD works for them.

"PC WORLD is a critical part of our marketing mix. We put a strong advertising emphasis on PC WORLD because we're convinced that the magazine reaches an important part of our market, especially the department manager for the workgroup and the power user."

### On reaching readers ready to buy.

"We're pretty hot on the book. I think the best thing I can say about our involvement with PC WORLD is that it's a magazine that reaches a marketplace which is ready and waiting to adopt a solution like TOPS."

### On readers who manage the buying process.

"I think people who read PC WORLD want an information source that helps them manage the buying process. PC WORLD covers a lot of ground — making critical computing issues accessible to people who make purchase decisions that could affect their company's short-term health and long-term viability."

### On reaching readers who make decisions.

"We need the people who are directly affected by and interested in solutions TOPS provides. But often they are just part of the decision-making process. We also need to reach the business buyers and PC coordinators — people who need to understand what solutions are available in the marketplace and often determine what is actually purchased. PC WORLD delivers them for us."



*Rich Shapero, VP and General Manager, TOPS division, Sun Microsystems, speaks on the value of PC WORLD as an integral part of their success. The TOPS division specializes in developing and marketing networking products for IBM-PC's, Apple Macintoshes and Sun Workstations.*

### On TOPS and why PC WORLD is important to them.

"In the past twelve months, some amazing things have happened at TOPS. We've shipped more than 400,000 TOPS network nodes. We think we're seeing the emergence of a

new product category for the micro-computer industry—the plug-and-go LAN. My favorite statistic is that TOPS nodes now rival monthly Ethernet board volumes. We've gone to PC WORLD to continue to tell the TOPS story — the growing consumer acceptance of a network solution that makes sense. PC WORLD works for us."

# PCWORLD works.





**Flight Simulator 3.0's multiple views let you land the plane while watching from the cockpit and the control tower at the same time.**

**F**light Simulator used to be the game to play: Boot up a PC, and you were at the controls of a fully equipped Cessna 182 poised for takeoff. Thrills and spills were minimal, but mastering takeoffs, landings, navigation, and instrument flight was challenge enough for millions of users. Over time, though, more innovative programs like *Chuck Yeager's Advanced Flight Simulator* took center stage.

With version 3.0, *Flight Simulator* edges back into the spotlight, but it won't win a standing ovation. SubLogic, the program's designer, has built in an impressive array of features, but the update is hampered by a clumsy menu system and some irritating bugs.

On the plus side, *Flight Simulator 3.0* is positively cinematic. Like Microsoft's *Jet*, it shows myriad views from the cockpit, and if you select the chase plane view, the program adroitly zooms and pans to keep the airplane in frame. You can even carve up the screen and simultaneously observe the airplane in flight, trace its course on a map, and watch it from the control tower.

In version 3.0, SubLogic has spruced up the scenery and added 118 airports; on VGA setups, images are vibrantly rendered as near-solid 3-D objects. The company also sells a number of detailed scenery disks covering the United States, Tokyo, and other locales. Moreover, *Flight Simulator's* designers have clearly studied *Advanced Flight Simulator*. You can now dynamically change views, aircraft, and flight conditions; replay

a session; tap an on-line instruction mode; chase an ace through various obstacle courses; and try out other aircraft—including a crop duster, a World War I biplane, or a "Gates" Learjet 25G.

Unlike its competitors, *Flight Simulator* permits total control over almost every flight factor, from wind to engine reliability. On-line weather reports scroll across the screen, and if you want to fly with a human (instead of the program), dial up a friend with a modem and fly wing to wing.

Unfortunately, *Flight Simulator's* pull-down menu interface can be maddening, and operations from installing a joystick to sizing a window are awkward. The manual's haziness on how some important features work doesn't help much. There are bugs to watch out for, too. Zoom and the <Esc> key don't always register, joysticks work fitfully, overlapping windows can blank each other out, and the replay mode will sometimes send your plane on a Buster Keaton-like flight through a hanger.

Nevertheless, if you're anxious for the next step in flight simulation, pick up version 3.0. You'll have to pay full price (Microsoft doesn't offer 2.0 owners an upgrade), but at least the program is no longer copy protected. Just read the manual carefully—and keep those wings level. —Robert Luhn

#### WHERE TO BUY

##### Flight Simulator 3.0

Microsoft Corp.  
16011 N.E. 36th Way  
Box 97017  
Redmond, WA 98073-9717  
206/882-8080

**List price:** \$49.95, no upgrade policy

**Requirements:** 256K, graphics adapter, DOS 2.00 or later version  
Not copy protected

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

**Other support services:** CompuServe forum (GO MSAPP), quarterly newsletter on Microsoft products  
**For more information, circle 723 on reader service card.**

##### Scenery disks

SubLogic Corp.  
501 Kenyon Rd.  
Champaign, IL 61820  
800/637-4983, 217/359-8482

**List price:** six Western United States



*Introducing...*

# MIRROR III

## Full Spectrum Data Communications

**From the occasional user to the experienced professional, today's PC communications software needs to cover the full spectrum.**

Pre-programmed access to most popular dial-up information services • "Learn" mode to create your own log-on sequences • Dialing Directory • Installation and System Diagnostics • Comprehensive "HELP" system • 100% Crosstalk® XVI compatibility.

Background mode: Start a file transfer and switch to running another program while MIRROR III handles the transfer behind the scene.

Ultra High-Speed modem support (19,200 bps), or direct connect (up to 115,200 bps).

Host system connectivity with terminal emulations including: DEC VT 100/220 series, IBM 3101 (with block mode), Televideo 925 and Wyse-50.

File transfer protocols: XMODEM, YMODEM, KERMIT, Crosstalk, Hayes, CompuServe-B and ACT CommPressor™ (the latest in data compression).

**PRISM:** Introducing the most powerful data communications programming language. PRISM provides: Form/Menu generation; real, integer, string, and array variables; File I/O and the ability to integrate MIRROR III with foreground applications. A script file protection/compression utility is also provided.

**Put the power of "Full Spectrum Data Communications" to work for you.  
Order MIRROR III Today!**

**To order, Call: 1-800-634-8670  
60-Day Money-back Guarantee**

**\$99.95**



VISA/MasterCard/COD. \$5.00 for Shipping and Handling (\$8.00 for COD orders). Florida residents add 6% sales tax.

MIRROR III is for use on IBM and 100% compatibles (including the IBM PS/2) running MS-DOS 2.0 or higher.

Crosstalk is a registered trademark of DCA, Inc./CommPressor™ is a trademark of ACT, Inc.

DISTRIBUTING CORP.

327 Office Plaza Drive  
Tallahassee, Florida 32301  
Telephone: (904) 878-8564  
Telex: 6714280 KLON





You can play over 64,000 variations of Mah Jongg's beautiful game board without seeing the same one twice.

disks \$19.95 each, \$99.95 for the set; disks for the San Francisco Bay Area, the Great Lakes, and Tokyo \$24.95 each. For more information, circle 724 on reader service card.

## Mah Jongg 2.5

**PROS:** Gorgeous board and tiles, challenging and addictive play

**CONS:** EGA only

To judge by the number of people who are downloading *Mah Jongg* from bulletin boards, Nels Anderson's elegant shareware game is delivering a lot of brain-soothing entertainment. Three millennia after its invention, Mah Jongg is still played widely in China, primarily in a gambling version that resembles rummy. Anderson, a programmer in Framingham, Massachusetts, chose to digitize a solitaire variation in which 144 hand-some tiles are stacked in random patterns and removed two at a time until none remain.

The game's rules are simple, but clearing a tough *Mah Jongg* board calls for careful strategy, and it's this challenge that makes the game so addicting—you're constantly learning new subtleties of play. The boards are numbered, and you may choose a board or let the PC pick one from the 64,000 available. The README file contains a sample list of "winnable" boards.

Using the keyboard, you remove tiles by specifying their location by row and column, then pressing <Enter>. With a mouse, which makes play much easier, you simply click on tiles to select them. The tiles are marked by number and suit (dragons, dots, winds, bamboo, flowers, characters, and seasons), and pairs must match exactly, except for flowers and seasons. A counter keeps track of the number of tiles left.

Anderson has added a few modern conveniences that might not have pleased the ancient mandarins. Ask for help, and the computer shows you the next available pair of matching tiles. You can save and restore games and restart the same board. For competitive spice, you can play timed games, and in Tournament Mode, *Mah Jongg* records the scores of competitors who play the same board.

Surprisingly, this relaxing, noise-free game will lure even kids away from more exciting forms of computer madness. *Mah Jongg* puts a premium on relaxation and interiorization of the mind. It's an aesthetically delightful respite from the muscle-spasmed hyperventilation triggered by combat choppers and screaming F-15s. —George Beinhorn

### WHERE TO BUY

#### Mah Jongg 2.5

Nels Anderson  
92 Bishop Dr.  
Framingham, MA 01701

**List price:** \$8 contribution

**Requirements:** 128K, DOS 2.00 or later version, EGA adapter (Microsoft-compatible mouse recommended)  
Not copy protected

**Technical support:** BBS,  
617/875-3618, 617/449-7322

**Other support services:** none  
For more information, circle 725 on reader service card.

## Test Drive

**PROS:** Realistic simulation of high-performance driving

**CONS:** Keyboard control awkward, minimal documentation

Do you cruise by the local Porsche or Ferrari dealership and experience a feeling akin



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

## The Tandy 5000 MC



Our most  
powerful 386™  
based computer  
...made in America.

The all-new Tandy 5000 MC Professional System is pure performance, from the Intel® 80386 processor operating at 20 MHz to the high-speed memory with cache controller that provides RAM-fast access to your data.

With the 5000 MC, you have the high-performance platform needed to take full advantage of industry-standard MS-DOS® applications, powerful new MS® OS/2 programs or multiuser SCO® XENIX® software.

Operating at 20 MHz, the 5000 MC cuts through the big jobs like database management, large spreadsheets and sophisticated graphics. The system architecture also provides a radical increase in data-transfer rates when the Tandy 5000 MC is configured within a 3Com® workgroup or multiuser environment. And its IBM® Micro Channel™ compatible architecture allows multiple processors to use the same bus.

The Tandy 5000 MC is the new alternative in personal computing.

**Send me a 1989  
RSC-20 computer catalog.**

Mail to: Radio Shack, Dept. 89-A-726  
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 Intel Corp. IBM/Reg. TM and Micro Channel/TM IBM Corp. MS, MS-DOS and XENIX/Reg. TM Microsoft Corp. SCO/Reg. TM The Santa Cruz Operation. 3Com/Reg. TM 3Com Corp.

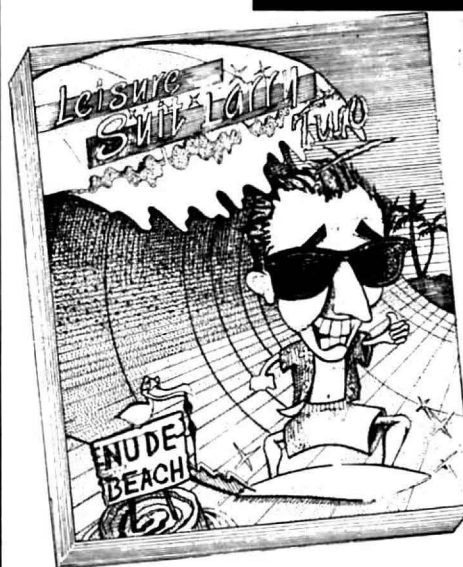
**Radio Shack®**  
**COMPUTER CENTERS**

A DIVISION OF TANDY CORPORATION

**Circle 212 on reader service card**



# Introducing the Newest Software Games — For Your PC



## Help Larry "Get Lucky"

For all of you who helped Larry get "Lucky" in *Leisure Suit Larry's* original PC game, you're in for a real surprise with his new worldwide adventure. For those who have not met Larry — hang on!

We meet Larry in L.A., dumped by his latest fling. Of course, Larry is nobody's fool. He takes his last \$1 bill and plays the state lottery. Luck is with Larry — he wins and is invited to participate in the "Big Spin". Larry wins millions and is immediately a very popular "Dude".

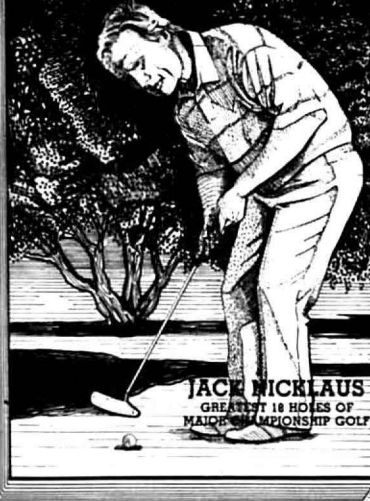
But wait! Behind all this fun and frivolity lies a ballyhoo of espionage and intrigue. With KGB agents, Hairy Krishnas, and dozens of "available" women on his tail, Larry's good fortune could vanish quicker than his hairline!!

Dance, party, and chase the Babes — that's Larry's motto!! But with all the swinging times you'll have, *Leisure Suit Larry II* is also a very challenging adventure game that will test your street smarts to the fullest. Larry is not exactly the most polished Playboy around. After all, who else but Larry would wear tennis shoes with his polyester suit, cut his hair so short that you see his "whitewalls", or tell the girls that his new colored contacts are the "real thing".

With outrageous 3-D graphics, the incredible life-like animated characters bring the world of *Leisure Suit Larry II* to life in a way you never thought possible. They walk, talk, dance, flirt — even ignore some of your best pick-up lines ("What's your sign, babe?", "Haven't we met before?") just like in real life.

Order *Leisure Suit Larry II* today and enjoy hours of adult entertainment at your next party.

■ *Leisure Suit Larry II* LL#99 \$49.95



## Golf with the Pro Jack Nicklaus

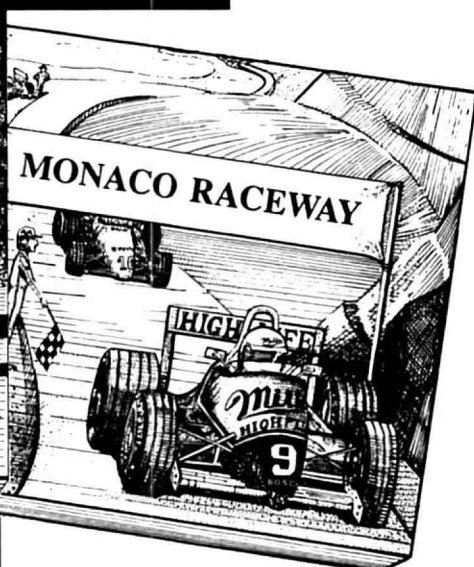
Now tee-off on the most challenging and famous 18 holes of championship golf — with the "Golden Bear" himself, Jack Nicklaus. Play the breathtaking 8th hole at Pebble Beach and discover why the second shot of this Par 4 is Jack's "favorite shot in all of golf". Go head-to-head with the Golden Bear on "the most dangerous short hole in golf" — the 12th at Augusta National. And play 16 other holes personally selected by Jack Nicklaus from such famous courses as Oakmont, Riviera, St. Andrews, and more ... Or play on 2 additional courses designed by Jack himself.

Play against a computerized Jack Nicklaus who possesses skills patterned directly after his own game. Or select from nine other different computerized players all with varied skill levels. Random playing conditions such as pin placement and wind speed/direction makes every round a unique challenge. Authentic graphics feature life-like rolling hills, water hazards, and doglegs. You'll feel as though you're on the course at St. Andrews itself. Select stroke or skins play. Beginner and expert levels allow player to select individual skill. Automatic range finder lets you instantly check club distance. The power meter lets you adjust backswing, downswing, and moment of impact. Overhead view of each hole displays distance to the pin, hazards, pin placement and par. A computerized scoreboard maintains vital statistics — longest drive, closest to the pin, # of fairways hit, putts taken, birdies and eagles. It even records the seven best rounds of all time for each course.

Practice distance and accuracy with any club on your private driving range. Or work on your short game on the putting green.

Order the new *Jack Nicklaus Golf* game today and play the most famous golf courses tonight — on your PC.

■ *Jack Nicklaus Golf* JN#84 \$49.95



## Master the Grand Prix Circuit

Introducing *Grand Prix Circuit*® — the first Formula One racing simulator for your PC.

You've trained long and hard for this opportunity and now it's your chance to make all that hard work pay off. Hit warp speed in the powerful V12, 3.5 litre Ferrari. Put the pedal to the floor in your screaming V8, 3.5 litre Williams. Or experience the ultimate power and performance of a 900 horsepower racing machine — the McLaren. Race all three of these high performance Formula One racing cars on the most famous Grand Prix circuits in the world. Shift through the gears and hug the corners of glamorous Monaco. Blast down the straight-aways of Germany. Snarl through the tunnels of Japan, or select from 13 other courses.

You'll be competing against over 15 other cars all with world class drivers, each with his own individual driving characteristics — and ego. *Grand Prix Circuit* is so realistic you'll almost feel the G-force of being pinned to your seat. The lifelike animation, realistic racing sound, and authentic graphics allow you to experience the raw power of each racing machine. Special inset screens show your location, lap number, current position, and race time.

Order *Grand Prix Circuit* today and a magnum of champagne for the winning driver tonight.

■ *Grand Prix Circuit* GP#18 \$44.95

For additional savings, order all three programs.

■ Set of all three NP#29 \$134.95

Order toll-free 24 hrs. a day

**800-443-0100 ext. 690**

**RYANS®**

**B Y ♦ M A I L**

23010 Lake Forest Dr., Suite D321  
Laguna Hills, CA 92653

Products shown require CGA, VGA, EGA or Hercules graphics card. Available for IBM PC (or compatible) only. For quickest delivery credit card holders may call our toll-free number, 800-443-0100, ext. 690, (24 hours a day). Or mail your check or money order to the address below. Please include \$4.95 for Shipping/Insurance on any single unit and \$9.95 for the set of three. Please mention product code when ordering. CA residents add 6% sales tax. If not 100% satisfied, return your order within 30 days for a no-questions credit. You must be satisfied!



# DO THE TWIST!

Introducing Artline.  
The Graphics Illustrator That Manipulates Type Down To The Letter.

a

DO THE  
TWIST!  
DO THE  
TWIST!  
DO THE  
TWIST!



Twist it! Turn it! Anyway you want it. With Artline, you can produce high-quality text effects and original graphics you never thought possible. All on your PC!

Choose a typeface, draw free-hand, trace an image. Then take your graphic design even further. Scale it, rotate it, color it, pattern it, mirror it, copy it...well, you get the picture.

You can partner Artline with GEM<sup>®</sup>

Desktop Publisher<sup>™</sup>, Xerox<sup>®</sup> Ventura Publisher<sup>®</sup> and Aldus<sup>®</sup> PageMaker<sup>®</sup> for logos, headlines and illustrations. And it'll work with almost any printer.

Artline. The ideal design tool for the most innovative, high-quality text and graphics. It's revolutionary. In every sense of the word.

For more information, contact your nearest dealer or call (800) 443-4200.

All artwork shown was created using Artline.

GEM Artline *By CCP*

From  DIGITAL RESEARCH<sup>®</sup>



GEM, Digital Research and the Digital Research logo are registered trademarks and GEM Artline and GEM Desktop Publisher are trademarks of Digital Research Inc. Other product names are registered trademarks of their respective owners. Copyright © 1988, Digital Research Inc. All rights reserved.

Circle 266 on reader service card





When you see a cop's flashing lights in the mirror, *Test Drive* gives you a choice: Pull over, or make a run for it.

to lust? If you do—but don't have much cash in your adult-toy fund—there's a slightly cheaper way to get relief. Accolade's *Test Drive* will let you burn electronic rubber in five of the world's most explosive driving machines—the Lamborghini Countach, the Lotus Turbo Esprit, the Ferrari Testarossa, the Porsche 911 Turbo, and the Chevrolet Corvette. And it won't cost you a dime for gas.

Take the Lamborghini Countach, for example. A steal at \$130,000, it hits a top speed of 173 miles an hour and can go from 0 to 100 in a brain-melting 12 seconds. Strap yourself into its *Test Drive* twin, and you find yourself peering out over the dashboard complete with a working tachometer and speedometer and even a radar detector. In a nice touch, the rearview mirror reflects road signs and other cars as you pass them. It also tells you when you've got a Smokey on your tail. Trying to outrun the cops may be the best part of the game.

Tap the keyboard—or a joystick fire button—to shift gears and get the car rolling. You shift again, and the engine starts to whine and the tach goes red. Directly ahead lies a two-lane slab of pavement snaking between a cliff on the right and a sheer drop to the left. Your mission is to reach the top of the mountain—over potholes and water slicks, past poky sedans and careening 18-wheelers. Shift gears again, and the car's doing 100 mph before you even hit the first curve. Uh-oh—here comes a truck...or a familiar set of flashing red lights. Playing

*Test Drive* doesn't feel like driving a real car. So why does it leave your palms sweaty and your heart pounding?

Accolade has done a good job of re-creating each car's personality, but the game has some annoying flaws. It's slow to get started, and the long introductory sequence features a gratingly obnoxious soundtrack. (Fortunately, you can quiet the din with a key-stroke.) Pressing the wrong key can abort the game or freeze up the controls. Although *Test Drive*'s 16-color EGA mode is excellent, the 4-color CGA and monochrome modes are only fair. Documentation is pitiful—a flimsy six-page manual that doesn't even tell you how to skip the opening sequence (hit the <Space> bar). And once you've mastered the road's turns and traffic, there's nowhere to go but faster. An alternative course would be a welcome addition.

Overall, though, *Test Drive* is a gas. It lets you climb behind the wheel of a dangerously powerful car and drive like a lunatic—in total safety. After a few hours with *Test Drive* you can saunter through an Italian car dealership, stroll over to the showroom model, and casually say, "Oh yeah, the Testarossa. Does it still top out at 140 on the corners?"

—Daniel Tynan

#### WHERE TO BUY

##### Test Drive

Accolade, Inc.  
550 S. Winchester Blvd. #200  
San Jose, CA 95128  
800/245-7744, 408/296-8400

**List price:** \$39.95

**Requirements:** 256K, DOS 2.11 or later version (joystick recommended)  
Copy protected  
Warranty: 90 days free replacement of defective media

**Technical support:** no toll-free number, M-F 8-5

**Other support services:** none  
For more information, circle 726 on reader service card.

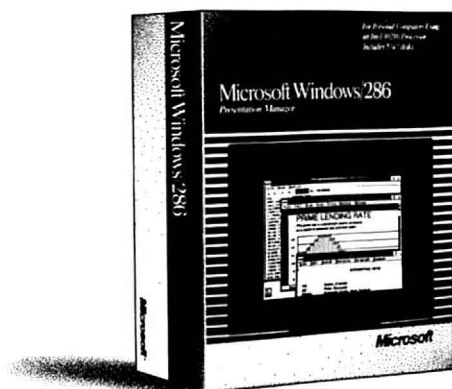
## Apollo 18: Mission to the Moon

**PROS:** Great graphics, challenging operation sequences and flight maneuvers

**CONS:** Can't save games



# An offer even window-shoppers can't pass up.



## Get the new Microsoft® Windows/286 for just \$63.

It's not everyday that you find business software like Windows/286 at a price like this. Unless, that is, you're shopping at Software Spectrum.

Just as tempting as the price are all the productivity enhancements made possible by Windows/286. The program lets you run several applications on your AT at once. Switching between them is faster and easier than ever. So is moving text and graphics from one program to another.

Windows/286 runs hundreds of Windows and DOS applications. And it's drop-down menus, dialog boxes and icons make all your software easier to use. Choose mouse or keyboard control. Either way, you'll be one step ahead of the game. Because the Windows

interface looks and works like the presentation manager for OS/2.

By taking up less memory, Windows/286 runs much faster than before. It also leaves more room for your program and networking software. Windows/286 even supports expanded and extended RAM.

Finally, Windows/286 comes with several handy desktop functions already built-in. Including an appointment calendar, calculator and a Write program that PC Week says "alone could justify the purchase."

Software Spectrum offers you all of this and a few more things in short supply these days. Like courteous service, knowledgeable salespeople and same-day shipping on most titles. You don't even have to wander out in the cold. Just call us at \*1-800-624-0503 for more information or to open a corporate account.

**SOFTWARE  
SPECTRUM**

10420 Miller Road, Dallas, Texas 75238, (800) 624-0503 or (214) 439-0400. \*In the Midwest, call 1-800-445-6454 or (312) 696-5700.

Microsoft is a registered trademark of Microsoft Corporation.





Bringing Apollo 18 to a smooth touchdown on the moon involves careful control over the Lunar Module's rocket thrusters.

**M**ost of us remember exactly where we were at the moment in July 1969 when Apollo 11's Neil Armstrong took his giant leap for mankind. Now, in *Apollo 18: Mission to the Moon*, you can take one small step closer to experiencing the excitement—and frustration—of the real thing.

Based on actual mission film footage, *Apollo 18*'s terrific graphics create an impressive simulation of space flight (especially in the high-resolution EGA version). You play two roles: Mission Control flight director during lift-off, then crew commander in space. Your mission: to recover portions of the *Surveyor III* photographic probe stationed on the moon since 1967, and to repair three satellites. To complete the entire mission, you must successfully perform eight sub-missions that include lift-off, Lunar Module docking, a moon landing, and a moon walk.

You begin at the control panel in Houston at T minus 15 and holding. Flight manual in hand, you switch to the Telemetry screen—your link to the Command Module's computer—for a final check of all systems, and then initiate the launch. Like most of the program's operations, lift-off involves using a joystick or tapping the cursor keys and <Space> bar to manipulate the controls, in this case to fire the rockets and then jettison the spent stages of the mighty Saturn rocket. You'll find the first few sub-missions tricky, but you'll soon get the hang of it. The real hair-pulling begins with sub-mission 4, the lunar landing.

After transferring yourself and your crew to the Lunar Module, you must negotiate a narrow descent trajectory by firing the rocket clusters. Land too hard or stray too far, and the landing is aborted. You get three tries; if you fail all three, Mission Control lets you practice the operation once more in a simulator before booting you straight to the Earth reentry sequences, at which point you start all over again.

This is when the game's one big drawback becomes maddeningly apparent: There's no way to save your place. After you've attempted to land on the moon for the umpteenth time, you'll yearn for a save feature in a bad way. But once you make it through the lunar sub-missions, splash down, and dry yourself off, you get to add your name to the Astronauts' Hall of Fame. Neil Armstrong, move over. —Sally Zahner

#### WHERE TO BUY

##### **Apollo 18: Mission to the Moon**

Accolade, Inc.  
550 S. Winchester Blvd. #200  
San Jose, CA 95128  
800/245-7744, 408/296-8400

**List price:** \$39.95, high-resolution version upgrade \$5

**Requirements:** 256K, graphics adapter, DOS 2.11 or later version  
Copy protected

**Technical support:** unlimited, no toll-free number, M-F 8-5

**Other support services:** none  
For more information, circle 727 on reader service card.

*Richard Landry is the editor in chief of PC World. Alan Southerton is a senior technical writer at Progress Software, in Bedford, Massachusetts. Stephen A. Blumenthal is a corporate/government relations attorney in Sacramento, California, and a contributing editor for PC World. Robert Luhn is a senior editor for PC World who recently flew his first solo. George Beinhorn is a freelance writer in Nevada City, California. Daniel Tynan and Sally Zahner are copy editors for PC World; Dan's last car was a 1955 Chevy Bel Air. ●*



# The Brain Breakthrough

Announcing: the software package that expands your thinking capacity

In as little as one hour, you can improve your memory—begin to think more clearly—retrieve information superfast—and make intelligent decisions more rapidly than ever before. That's the promise that we are making—when you accept this challenge: Try the Tornado software package for just 45 days. After then, if you don't say "this is the most important software ever created for your computer..." you'll get a full cash refund. And the price? Just \$99.95.

## By James Lewis

Are you ready to discover one of the most exciting software developments in years?

It's called Tornado—but the name hardly explains what it can do for you.

Tornado is like having a 'photographic memory' that gives you perfect recall of 25,000 items of information. And the result is not access to mere facts; you actually boost your thinking power because you have more "conscious" information.



Tornado—the RANDOM information processor. A software breakthrough that can change the way you work and think.

Tornado lets you organize information in new ways—so you can be far more creative, inventive, and productive.

Tornado helps you "memorize" up to 25,000 bits of random facts: letters... orders... notes... plans... anything you wish.

Tornado is even better than a personal secretary. You can ask for information and get the answer—faster than a secretary could walk into your office! And you can file information without even deciding on a name for the file folder—because there are none!

Tornado is amazingly easy to learn. You can actually get started in just 15 minutes.

## ■ A Totally New Concept

How does Tornado work? Not by megabytes of

software code... not by complex programming languages... but by a new principle that is so close to the way you work and think—and so remarkably efficient—that its effect can be astounding.

Tornado mimics three important principles of your brain:

- 1) In Tornado, you recall information by the contents of the information you are looking for—instead of a file name or key field. (The high-tech term is "content addressable memory," but don't worry, it's super easy to use.)
- 2) Just as your brain keeps perspective on what's important, so does Tornado—through a simple effective system called a push-down stack.
- 3) Your brain relates and associates information. And so does Tornado through a unique superfast search-and-display method.

The result: you can finally use your computer in a way that is truly integrated with your work and your life.

## ■ Countless Uses

Tornado is one of the most versatile—and most friendly—software packages ever created. Some people use it for random notes. Other people use it for scheduling... brainstorming... decision-making... free-form reference information... unstructured databases... and much more. "The applications are endless," writes Richard Rothchild. "It is the best written, best documented, most thought out program I own."

## ■ Truly Easy To Use

Best of all, Tornado is simple to learn. InfoWorld reports that you can get started in just 15 minutes. You can be an expert in as little as one hour.

## ■ Try it for 45 days. No risk.

We are so certain that Tornado will become your favorite program that it is offered with this no-risk guarantee:

Try Tornado for 45 days. Use it. Enjoy it. See how it expands the enjoyment and utility of your computer—far beyond your expectations. After 45 days, if you do not agree that this is the greatest software in your library, simply return it for a full cash refund, no questions asked.

**Specifications:** FEATURES: free-form & predefined windows, scrolling within window, import & export to files & screens, cut & paste, auto word wrap, time & date stamp, move & join & dup windows, mono or selectable color, definable Hot-key or non-resident, unloadable, LAN support, context help, extended ASCII, smart fully adjustable windows, parallel text processing, progressive resolution and "and-or-not" like searching without keywords, and more. COMPATIBILITY: IBM-PC/XT/AT/PS2 and compatibles; mono, CGA, 80 col EGA, and Hercules displays; 60K minimum RAM. CAPACITY: Up to 500 windows and 50K per pile - 50 piles. Not copy protected.

"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

Could any offer be more fair?

Hurry. This no-risk offer may be discontinued.

We urge you to act at once. This special no-risk offer may be cancelled without notice.

To take advantage of this no-risk 45 day FREE TRIAL, send coupon below—the original or a photocopy—at once. You'll be glad you did.

To order call:

**(800) 342-5930**

Technical questions & NJ: (201) 342-6518  
Fax: (201) 342-0370

**MICRO LOGIC CORP.**

Dept. T182, 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

☐ 5 1/4" disk ☐ 3 1/2" 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.



# 1.800.07



## DISCOUNT MICRO PRODUCTS 88 4.77/10MHz

# \$750

### STANDARD FEATURES:

- One 360K 5.25" Floppy Drive
- Intel 8088 Processor
- 640K Dram Included!
- Switchable 4.77/10MHz Motherboard
- Case
- Mono Graphics Adapter
- CGA Adapter
- Floppy Controller
- 150 Watt Power Supply
- 1 Serial Port
- 1 Parallel Port
- 101 Enhanced Keyboard
- Amber Monochrome Monitor
- Hardware Reset, Turbo Speed Switches
- Supports Intel 8087 Co-Processor
- 8 Expansion Slots
- Audio Speaker
- One Year Limited Warranty on Parts and Labor
- Two Year Extended Warranty Plan Available — Call For Details

### Enhance Your System With A Hard Drive Upgrade!

#### DISCOUNT MICRO 88

#### HARD DRIVE OPTIONS:

30MB Hard Drive System	\$1,020
<b>NEW! NEW!</b>	
Discount Micro 88 40MB, 65 MS Drive System	\$1,048
60 MB, 65 MS Hard Drive System	\$1,096
40 MB, 40MS Hard Drive System	\$1,127
40 MB, 28 MS Hard Drive System	\$1,210



## DISCOUNT MICRO PRODUCTS 286 6/12 MHTz WITH ZERO WAIT STATE

# \$1193

### OUR BASIC SYSTEM FEATURES:

- Intel 80286 Processor
- 512K Dram Included!
- Switchable 6/12 MHTz, with Zero Wait State. Motherboard accommodates up to 4MB Onboard Ram
- Amber Monochrome Monitor
- Hard Drive and Floppy Drive Controller
- One 1.2 MB High Density Floppy Drive
- High Quality 200 Watt Power Supply
- Enhanced 101 Key Keyboard
- Hercules Compatible Monochrome Adapter Card
- 1 Parallel Port
- 1 Serial Port
- Clock Calendar with Battery Back-up
- Supports Intel 80287 Co-Processor
- Full Size or Desk-Saver Case
- One Year Limited Warranty on Parts and Labor
- Two Year Extended Warranty Plan Available — Call For Details

#### DISCOUNT MICRO 286

#### HARD DRIVE OPTIONS:

40 MB, 40 MS Hard Drive System	\$1,521
60 MB, 65 MS Hard Drive System	\$1,531
40 MB, 28 MS Hard Drive System	\$1,603
70 MB, 29 MS Hard Drive System	\$1,768
286/386 Standard EGA Configuration Add:	\$395.

# AFFORDABILITY • COMPATIBILITY



# 27.8646



**DISCOUNT MICRO PRODUCTS 386**  
20 MHz WITH  
ZERO WAIT  
STATE **\$2352**

#### OUR STANDARD FEATURES:

- Intel 386 Processor
- 1 MB Ram Included!
- 16/20 MHz w/Zero Wait State. Motherboard accommodates up to 4MB Onboard Ram
- 200 Watt Power Supply
- Enhanced 101 Key Keyboard
- Full Size Case with Hard Drive, Power and Turbo LED's
- One 1.2MB High Density Floppy Drive
- Amber Monochrome Monitor
- 1 Parallel Port
- 1 Serial Port
- Hercules Compatible Monochrome Adapter Card
- Hard Drive and Floppy Drive Controller
- One Year Limited Warranty on Parts and Labor
- Two Year Extended Warranty Plan Available — Call For Details

#### DISCOUNT MICRO 386

##### HARD DRIVE OPTIONS:

40 MB, 40 MS Hard Drive System	\$2,680
40 MB, 28 MS Hard Drive System	\$2,762
70 MB, 29 MS Hard Drive System	\$2,927
286/386 Multisync II EGA Configuration Add: \$685.	

## • AVAILABILITY

Order any Discount Micro Computer System now, and receive ALPHA WORKS — An Integrated Spreadsheet, Database, Word Processor, Software Package, FREE!

Regularly a \$199 value now yours FREE with your first Discount Micro Products System purchase!

ALPHA WORKS is your Complete Database, Word Processor, and Spreadsheet Package, integrating 6 Productivity Applications in one program. No Experience Necessary! Compatible with Lotus 1-2-3® and dBase® Files!

**CALL TODAY FOR DETAILS!**

#### COMPONENTS:

Every Discount Micro System is packed with the quality name brand components that you expect — Fujitsu, Genoa, Paradise, NEC, Magnavox, Miniscribe, Seagate, and Western Digital to name a few.

#### SERVICE, WARRANTY & SUPPORT:

We want you to be comfortable with each and every component you buy from Discount Micro Products. Needless to say, all Discount Micro Products systems and components come with a Limited One Full Year Warranty. But did you know that you can upgrade this Warranty on any component or system to two full years at a low cost? And there is no sliding scale on our coverage either. Just another full year of warranty protection for a small cost. Call your sales representative today for details!

#### TERMS:

We accept MasterCard, VISA, certified checks, money orders, COD shipments and personal checks (please allow 15 days to clear). Please note that all prices are subject to change without notice and that all returns must be freight prepaid by customer and must be accompanied by a valid Return Merchandise number obtained from our technical support department. Michigan residents please add 4% sales tax. Discount Micro Products is open from 9:00 AM to 9:00 PM EST Monday to Friday, and 10:00 AM to 5 PM Saturdays. Prices reflect 3% cash discount. 286 and 386 Systems shown with Multisync II monitors.

## DISCOUNT

## MICRO

## PRODUCTS INC.

34360 GLENDALE AVE., LIVONIA, MI 48150  
Circle 249 on reader service card



**IBM'S MICRO CHANNEL-BASED  
PS/2s HAVE RESHAPED THE  
PERSONAL COMPUTER INDUSTRY  
AND SPARKED ENDLESS DEBATE.  
HOW DO EARLY CONVERTS  
LIKE THE RIDE ON THE NEW BUS?**

It's been twenty months since IBM shook up the PC industry by introducing the Personal System/2 line, whose high-end models incorporate the standard-busting Micro Channel Architecture (MCA). While this

new architecture departs radically from the bus development lines the PC first took in 1981, IBM's ads claim that MCA-equipped PS/2s running multitasking OS/2 constitute "the future of personal computing." So far, more than a million and a half users have bought into that vision.

Needless to say, IBM's competitors take a different view of the product. MCA is "the PC equivalent of New Coke," scoffs Mike Swavely, Compaq's vice president of sales and marketing. Swavely claims that to date,

# WHO LIKES THE PS/2?

IBM hasn't demonstrated a single benefit that MCA provides over industry-standard AT buses.

In September, after seven years of merely reacting to the standards that IBM set for the industry and after approximately six months of avowals that they are "working" on MCA clones, compatibles vendors finally got up the courage to openly display their disdain for the new bus. Compaq and eight other major CPU vendors have offered a multi-processor bus specification, called Extended Industry Standard Architecture, that will compete directly with the Micro Channel (see *Industry Outlook* in this issue). All told, approximately 100 CPU and peripherals manufacturers have announced support for the non-IBM alternative; their implementations are anticipated sometime in late 1989.

However, customers have the final vote, so what do buyers of PS/2 machines say? In short, they report that the key word in IBM's ads is *future*.

*Marina Hirsch*



Even the most faithful IBM customers have trouble finding sufficient added value in the MCA-based machines to justify the confusion and inconvenience the redrawn architecture creates. Yet the IBM name on the box turns out to be as compelling as any feature the IBM clones can muster. Especially in large corporations, many managers seem willing to buy the new designs based on nothing more than faith that, sooner or later, IBM will deliver. Others, in true Blue shops, simply have no choice.

**HURRY  
UP  
AND WAIT**

"I would be hard-pressed to say that today we can perceive the benefit of the MCA," says Trav Waltrip, vice president for data processing at The Travelers Companies, a giant insurance and financial services firm headquartered in Hartford, Connecticut. Nevertheless, Travelers has standardized on PS/2s. If MCA has an identifiable benefit, says Waltrip, it's in the bus's interrupt handling, which he considers a far better error-prevention system than classic PCs provide. He adds, though, that the increase in speed isn't noticeable.

Travelers' future plans call for replacing its workers' dumb terminals with PCs linked to mainframes and to each other via IBM's LU 6.2 protocol, which supports peer-to-peer cooperative processing under the Sys-

tems Network Architecture (SNA) umbrella. Travelers believes that MCA-capable PS/2s running OS/2 are the best way to make that ambitious plan succeed. "There's no question about MCA being an upcoming standard," says Waltrip.

System buyers, who must base hundreds of thousands of dollars in purchases on what they *guess* the PC standard will be for the next two years, historically have considered the IBM label a safe choice. Some view IBM not only as a safe choice but also a better one. Eric Boutwell, applications manager for the San Francisco Unified School District, sees MCA with its "bus-master" capabilities as a far better platform for moving toward true distributed processing than an AT bus. While the AT bus accepts multiple processors, Boutwell doubts that they can handshake with each other as well as MCA, or function truly simultaneously.

Brian Livingston begs to differ. A former PS/2 user with the Union Bank of Switzerland Securities, now a connectivity specialist with General Electric Consulting Services in New York, Livingston claims that "MCA is primarily a way for IBM to market patented technology." Other busmaster architectures, such as that found in AST Research's machines, can do whatever the MCA can do, he maintains, and do it just as well, at least for now. Moreover, says Livingston, the AST bus remains compatible with existing PC add-on boards, and its technology is also freely



*Brian Livingston*

There are no tangible benefits: MCA is primarily a marketing ploy.



*Leslie Fiering*

Without busmastering devices to take advantage of MCA's multitasking capabilities, the architecture is "more of a pain than a plus."





*Trav Waltrip*

"I would be hard-pressed to say that today we can perceive the benefit of the MCA."



*David Hasiba*

"We're in a trap...purchasing PS/2s because that's what's available [from IBM]."

available to developers of coprocessor boards.

Close, but no cigar, responds Boutwell. You can trust third parties like Novell to make specialized intelligent boards for PS/2s, he says, because the market already is so large. But will Novell make a special board just for AST? Maybe. And then again, maybe not.

These concerns are somewhat irrelevant today, since boards and applications that allow for multiprocessing simply don't exist, suggests Leslie Fiering, a systems vice president of advanced technology with New York City's Bankers Trust Company. Until such equipment becomes available and the promise of busmasters is realized, says Fiering, MCA will be "a bit more of a pain than a plus."

#### AN INCOMPATIBLE ULTIMATUM

Brian Livingston's former employer, the Union Bank of Switzerland Securities, decided not to buy PS/2s for any of its operations worldwide not only because "there were no tangible benefits," but also because of incompatibilities with its installed base of machines. The company had designed its own communications boards for the AT bus, and that investment couldn't be transferred, says Livingston. MCA boards themselves must be smaller, with more exacting manufacturing tolerances, and they cost more to make than AT boards.

David Hasiba, manager of micro acquisition and maintenance support at Merrill Lynch and Company in New York City, just wants his AT back. Merrill Lynch purchased PS/2s, says Hasiba,

primarily because it wanted IBM products only and the company's supplier had run out of IBM ATs shortly after IBM abandoned the old machines. "We're in the same trap as so many others," he sighs. "We're purchasing PS/2s because that's what's available."

MCA does not offer substantive advantages over the standard on classic PC designs, reasons Hasiba, and unlike its counterpart, it suffers from problems with incompatible boards and drives. Merrill Lynch found that boards installed in PS/2s worked only as long as users didn't mix boards from different vendors. And for every PS/2 the company purchased, it also had to buy an external 5¼-inch drive to read old files created on AT bus machines.

Additionally, because IBM's external drive reads only the old 360K format, users who were relying on an AT's 1.2MB floppy drives were stuck, says Hasiba. Merrill Lynch eventually switched to a third-party product that could read both formats.

But IBM dealers counter that there's no gain without pain. Compatibility is a moving target, says Mark Cuban, president of Micro Solutions, an IBM dealership in Dallas. "What's compatible today is incompatible tomorrow." Switching from 5¼ to 3½-inch disks is an annoyance, he allows, but then, so was the changeover from 8-inch disks several years ago. And 3½-inch drives offer higher density and greater reliability.

Logistics aren't the only deterrent to widespread adoption of MCA, according to Rick Sharp, applications supervisor for PCs



at Hughes Aircraft in El Segundo, California. As recently as two years ago, Hughes was primarily an IBM shop, but Sharp says that's no longer the case. The reason: "There are so many good machines in competition that have a good price/performance ratio." Sharp counsels Hughes employees to weigh PS/2 pluses (the MCA's upside potential and the greater capacity and reliability of 3½-inch disks) against the minuses (media and board incompatibilities).

#### MAINTAINING AN ADVANTAGE?

Like many other purchasers, Sharp appreciates

the quality construction in PS/2s, noting, "We like the design approach that will reduce maintenance." Even detractors admit the PS/2 is "built like a tank."

PS/2 users can save an average of \$300 per year on maintenance costs, claims Chet Heath, a senior engineer at IBM's Entry Systems Division and the chief architect of MCA. Service contracts on the Model 50 cost less than half those on ATs, adds Micro Solutions' Cuban. His dealership is experiencing less than a 3 percent failure rate on PS/2s, versus about 6 percent on ATs.

Another much-publicized MCA benefit is lower radio frequency interference (RFI), thanks to a design in which every fourth pin is grounded. Reduced RFI and electromagnetic interference (EMI) result in greater reliability, affirms Leslie Fiering. "These are not sexy features that a user can see, but they mean you don't lose data," she emphasizes.

Faster processors will make the standard AT bus obsolete, de-

clares Cuban, because the RFI will exceed Federal Communications Commission standards.

"Put a TV next to a 10-MHz AT clone and then next to an IBM Model 50—you'll see which one gives you better reception."

But competitors like Swavely assert that RFI isn't a problem until processors exceed 30 MHz, and some users agree. "We don't watch much TV in the office," remarks one Fortune 500 customer. "When we do have interference with other small appliances, we just open up the machine and use foil to block the radio frequency emissions. That grounds it just fine."

Even more controversial is OS/2, which IBM touts as the natural complement to PS/2. Says one auto manufacturing executive, "The question to ask is, Will OS/2 ever be an operating system for the masses? And the answer is, Not in your lifetime." OS/2 requires a substantial amount of hardware. By the time IBM's Systems Application Architecture and distributed applications become a reality, he says, we'll be looking at yet another generation of hardware.

Future versions of OS/2 will be able to exploit MCA features, says Brian Livingston. But given the doubling and tripling of memory chip prices early this year, Livingston sees only a dim likelihood that OS/2 will gain a majority share even of new installations any time soon.

And, of course, competing vendors already offer OS/2 and claim their AT-bus machines show no performance hits.

#### IF EITHER BUS GETS YOU THERE

Not all users see the architecture debate as critical.

For Peter Miller, a Boston business consultant, the PS/2 Model 60 is just a 286 machine by another name. Everything he does on his Model 60 at work, he says, he can do on his AT at home (provided he remembers to bring along the right size disk). Miller remains true Blue regardless. "I knew there wasn't much available that took advantage of MCA when I bought the machine. But when add-in boards are available for my PS/2 Model 60, all I'll have to do is dust it off."

It's clear IBM's MCA has stirred strong emotions among users, who seem to be divided between those who are disappointed with today's scarcity of benefits and those willing to wait for IBM to build on its new platform. Roughly half of the 3 million-plus PS/2 sales are of Models 50 and above, which means that one and a half million MCA systems are already in place. There's no question that MCA is a viable industry standard.

Many users, particularly those in large corporations, also are anxious not to miss out on innovative technology, however elusive its promise. But their reaction to PS/2s can best be summed up by one PS/2 user who requested anonymity: "There are faster machines out there, and I'm not doing anything beyond what I do with standard bus systems."

So why is he sitting in front of a PS/2? "Simple. My boss told me to." ●

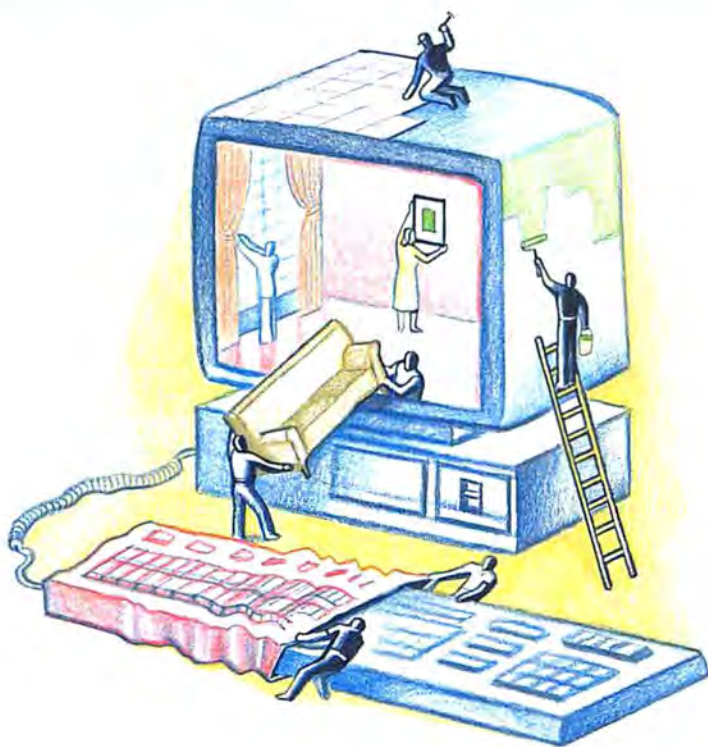
*Marina Hirsch is a frequent contributor to PC World.*



## Everything You Need to Upgrade Your PS/2

Micro Channel machines are here to stay, and they're ready for upgrades. Take your PS/2 Models 50 through 80 to the limit with some of these essential hardware enhancements.

Scott  
Spanbauer



The dispute sparked by the debut of IBM's PS/2 line has lasted longer than anyone imagined. Opinion on Micro Channel Architecture—IBM's proprietary bus architecture for the Models 50, 50 Z, 60, 70, and 80—ranges from adulation to acrimony. Although MCA detractors have yet to prove the bus a hoax, hardware and software that demonstrate its vaunted multi-processor capabilities exist only as prototypes. One thing is sure, however: A PS/2 is easier to upgrade than a PC or an AT. MCA boards can automatically configure themselves to work with existing adapters, eliminating the DIP-switch dance; installing a hard disk, floppy disk, or tape drive is often as simple as opening the case and plugging the drive into a waiting connector.

Despite the uncertainty surrounding the MCA, PS/2s are selling well, spawning a big market for MCA-compatible memory, modem, I/O, and connectivity boards, as well as for PS/2-specific hard disk drives, floppy drives, and tape drives. This Buyers' Guide provides a comprehensive listing of such products for Models 50 through 80 and supplies the feature and price information you'll need to find the right device for your system.

Users typically upgrade system memory first, but currently inflated RAM chip prices make memory boards a risky investment. Buy now, and you may kick yourself later when prices plummet. To simplify your decision, this guide lists prices for boards configured with the minimum amount of installable memory and with 4MB. Chances are you'll get a better deal on RAM chips through mail-

order distributors—just be sure to get the speed and type of chip your board requires.

Whatever your needs, shop smart and choose a board that's right for your system. For example, only the 80386-based Models 70 and 80 can use 32-bit RAM boards. And if your software supports EMS 4.0, make sure the RAM board you buy does, too.

Since any external modem can easily be attached to a PS/2, this guide focuses on MCA-compatible internal modems. Although internal modems soak up system power and lack status lights, they don't consume desk space or serial ports. Better still, most modems for the PS/2 eschew DIP switches and jumpers—configuration is accomplished solely via software.



## MEMORY BOARDS

Manufacturer	Products	PS/2 models supported	Expanded memory specification supported <sup>1</sup>	Memory chip speed (ns)	Data path	Minimum/Maximum configuration (MB)	Number of ports included (serial/parallel)	List price (with minimum memory)	List price (with 4MB)	Reader service number
Advanced Microcomputer Systems	50/60-Megamem 2000	50, 50Z, 60, 70	EMS 4.0	120	16	0/2		\$350	n/a	608
	50/60-Megamem 8000	50, 50Z, 60, 70	EMS 4.0	120	16	0/8		\$350	\$1950	608
	Memory 32	50, 50Z, 60, 70	EMS 4.0	80	32	0/8		\$399	\$2319	608
	Memory 32 w/ I/O	50, 50Z, 60, 70	EMS 4.0	80	32	0/8		\$499	\$2419	608
AST Research	Advantage/2	50, 50Z, 60	EMS 4.0	80	16	0.5/8	2/0 or 1/1 <sup>2</sup>	\$795	\$1995	609
	Advantage/2-386	70, 80	EMS 4.0	80	32	1/8	2/0 or 1/1 <sup>2</sup>	\$1395	\$4995	609
	Rampage/2-286	50, 50Z, 60	EEMS	80	16	0.5/2		\$995	n/a	609
	RampagePlus MC	50, 50Z, 60	EMS 4.0	80	16	0.5/8	2/0 or 1/1 <sup>2</sup>	\$895	\$4585	609
Boca Research	BocaRam 50/60	50, 50Z, 60	EMS 3.2	120	16	0/4		\$295	\$1695	610
	BocaRam MCA 50Z	50, 50Z, 60	EMS 4.0	100	16	0/2		\$245	\$995 <sup>3</sup>	610
Chrislin Industries	CI-SYS2-56	50, 60	EMS 4.0	100	16	2/8	2/1 <sup>4</sup>	\$1580	\$3125	611
CMS Enhancements	MC-8000	50, 60	EMS 4.0	120	16	0/8		\$359	n/a	612
Cumulus	CuRAM 80	80	EMS 4.0	100	32	0/8	1/1 <sup>5</sup>	\$695	\$3495	613
	CuRAM 16+	50, 50Z, 60	EMS 4.0	120	16	0/12	1/1 <sup>5</sup>	\$495	\$3095	613
Diamond Flower Electronic Instruments Co.	RAMbank-II	50, 60	EMS 3.2	120	16	0/4		\$249	\$1399	614
Everex Systems	RAM II 2000	50, 60	EMS 4.0	120	16	0/2		\$399	n/a	615
	RAM II 4000	50, 60	EMS 4.0	120	16	0/4		\$499	n/a	615
IBM	PS/2 2MB-8MB 80386	70, 80	EMS 3.2	85	32	2/16		\$1695	\$3095	616
	Memory Expansion Option									
	PS/2 80386 Memory Expansion Option	70, 80	EMS 3.2	80	32	2/6		\$1695	\$3095	616
	PS/2 80286 Memory Expansion Option	50, 50Z, 60	EMS 3.2	120	16	0.5/2		\$630	n/a	616
IDEAssociates	IDEA Supermax/MC	50, 60	EMS 3.2	120	16	0/8	2/0	\$545	\$3145	617
	IDEAmax/MC	50, 60	EMS 3.2	120	16	0/12		\$395	\$2995	617
Intel	AboveBoard 2 Plus	50, 50Z, 60	EMS 4.0	120	16	0/8		\$495	n/a	618
Monolithic Systems	JustRAM/MC8	50, 60	EMS 4.0	100	16	0/8		\$595	\$3461	605
Orchid Technology	RamQuest Extra	50, 50Z, 60, 70, 80	EMS 4.0	120	16	0/8	2/0	\$599	n/a	619
	RamQuest II	50, 50Z, 60	EMS 4.0	120	16	1/1		\$849	n/a	619
Profit Systems	Elite 16/2	50, 50Z, 60, 70, 80	EMS 4.0	150	16	0.5/16		\$595	\$2395	620
	Elite 16/2+386 Hypercache	70, 80	EMS 4.0	150	32	1/16		\$1095	\$2395	620
Quadram	Quadboard PS/Q	50, 60	EMS 4.0	120	16	0/4	1/1	\$595	\$2595	621
	QuadMEG PS/Q	50, 60	EMS 4.0	120	16	0/4		\$395	\$1995	621
SMT	Acuram-8	50, 60		100	16	0/8		\$475	n/a	622
STB Systems	RapidRAM 2	50, 60	EMS 4.0	100	16	0/2	2	\$399	n/a	623
	RapidRAM 2/8	50, 60	EMS 4.0	100	16	2/8 <sup>6</sup>		\$1495	\$2795	623
Tecmar	MicroRAM	50, 50Z, 60, 70, 80	EMS 4.0	100	16	0/2		\$350	n/a	624
	MicroRAM AD	50, 50Z, 60, 70, 80	EMS 4.0	100	16	0/8		\$445	n/a	624
	MicroRAM M80	70, 80	EMS 4.0	80	32	0/8		\$675	n/a	624

<sup>1</sup> All the listed boards can be configured as extended memory.

<sup>2</sup> Available on optional \$345 daughterboard.

<sup>3</sup> Configured at 2MB.

<sup>4</sup> Available on optional \$225 daughterboard; includes game port.

<sup>5</sup> Available on optional \$179 daughterboard; optional \$495 daughterboard modem also available.

<sup>6</sup> With optional 0MB-6MB daughterboard.



## INTERNAL MODEMS

Manufacturer	Product	Maximum bps rate	Software included	Built-in error correction	Hayes compatible	List price	Reader service number
Acer Technologies	Acer Modem 2424/MC	2400	Bitcom	MNP Class 4	yes	\$439	625
Advanced Microcomputer Systems	XPRESS 12	1200	Bitcom or ProComm Bitcom or ProComm		yes	\$123	608
	XPRESS 24	2400			yes	\$179	608
Anchor Automation	Anchor 1200PS	1200	Anchor-Talk Anchor-Talk		yes	\$269	626
	Anchor 2400PS	2400			yes	\$349	626
CMS Enhancements	MC 2400	2400			yes <sup>1</sup>	\$299	612
Computer Peripherals	Hook-Up PS/24	2400	CPI		yes	\$449	628
Cumulus	CuModem 2400	2400	ProComm		yes	\$495	613
Everex Systems	Evercom II 24	2400	Bitcom	MNP Class 4	yes	\$299	615
	Evercom II 24+	2400	Bitcom		yes	\$299	615
Gammalink Synchronous Communications	Gammacomm	9600	Gammacomm		no	\$1595	634
GVC-Chenel	PS-12	1200	Bitcom		yes	\$239	629
	PS-24	2400	Bitcom		yes	\$339	629
Hayes Microcomputer	Smartmodem 2400P	2400		LADD	yes	\$549	630
Hycom/Sharp	HC-4811	4800	ProComm		yes	\$399	631
Intel	2400B Modem 2	2400			yes	\$445	618
Microgate	SyncLink 24/2	2400	terminal emulation		no	\$695	632
	SyncLink 48/2	4800	terminal emulation		no	\$1195	632
MultiTech Systems	MultiModem 224 ES	2400	ProComm 2.42	MNP Class 5	yes	\$549	633
	MultiModem 224 PS	2400	ProComm 2.42		yes	\$499	633
Telenetics	TC921PS-12	2400		MNP Class 5	yes	\$445	635
	TC921PS-24	4800		MNP Class 5	yes	\$545	635
	TC921PS-96	9600		MNP Class 5	yes	\$1345	635
Universal Data Systems	Sync-Up 2/V.22bis	2400			yes	\$575	672
USRobotics	Courier 2400/PS	2400	HyperAccess	MNP Class 5	yes	\$699	636
Ven-Tel	MCM-24	2400	Crosstalk XVI		yes	\$549	637
	MCM-24/NS	2400			yes	\$449	637
	MCM-24E	2400	Crosstalk XVI	MNP Class 5, X.PC	yes	\$649	637
	MCM-24E/NS	2400		MNP Class 5, X.PC	yes	\$549	637

<sup>1</sup> At 2400 bps.

Connectivity products for the PS/2 currently come in three flavors: network adapters and gateways, terminal emulation boards that connect your PS/2 with mainframes and minicomputers, and multiuser serial adapters that let your computer host other terminals or PCs. All of these boards require special operating system software; some call for substantial user expertise.

Serial and parallel adapters supplement

those built into the PS/2's system board and can be an inexpensive way to expand your machine's ability to use modems, printers, and other peripherals. Before you buy, however, make sure the ports you need aren't already included on expansion boards you're planning to purchase.

Internal and external hard disks and tape drives for the PS/2 come in a rainbow of formats, sizes, and controller interfaces. Depending on the drive, an additional controller for the Micro

Channel may be required. Most PS/2s come with a hard disk and may have a device bay and controller connection for a second drive. QIC-40 format internal tape drives slide into any PS/2 floppy drive bay and run off the existing floppy controller. All other tape drives require a separate controller card.

Finally, the PS/2's 3½-inch floppy drives may improve on 5¼-inch fare, but software manufacturers have been slow to board the microfloppy band-

wagon. One solution: Buy a 5¼-inch external floppy drive (with the requisite MCA adapter). However, if you only need to read 5¼-inch floppies occasionally, save money and link your computer to a neighboring PC with *Lap-Link*, *The Brooklyn Bridge*, or a similar file transfer program. ●

*Scott Spanbauer is an assistant editor for PC World. Eric Grant, Shannon Linville, and Jack Cutter contributed to this guide.*



## FOR MORE INFORMATION

**Acer Technologies**  
401 Charcot Ave.  
San Jose, CA 95131  
408/922-0333

**Advanced Micro-  
computer System**  
1321 N.W. 65th Pl.  
Fort Lauderdale, FL  
33309  
800/972-3733,  
305/975-9515

**Alloy Computer  
Products**  
100 Pennsylvania Ave.  
Framingham, MA  
01701  
508/875-6100

**Anchor  
Automation**  
20675 Bahama St.  
Chatsworth, CA 91311  
818/998-6100

**Archive Corp.**  
1650 Sunflower Ave.  
Costa Mesa, CA  
92625  
800/237-4929

**Arnet Corp.**  
618 Grassmere Park  
Dr. #6  
Nashville, TN 37211  
800/366-8844

**AST Research**  
2121 Alton Ave.  
Irvine, CA 92714  
714/863-1333

**Axon**  
9025 Wilshire Blvd.  
Beverly Hills, CA 90211  
800/422-2966,  
213/271-5448

**Boca Research,  
Inc.**  
6401 Congress Ave.  
Boca Raton, FL 33487  
407/997-6227

**Chrislin Industries**  
31332 Via Colinas  
#106  
Westlake Village, CA  
91362  
800/468-0736,  
818/991-2254

**CMS  
Enhancements**  
1372 Valencia  
Tustin, CA 92680  
714/259-9555

**Computer Periph-  
erals, Inc.**  
667 Rancho Conejo  
Blvd.  
Newbury Park, CA  
91321  
800/854-7600,  
805/499-5751

**Computone  
Systems**  
1100 Northmeadow  
Pkwy.  
Roswell, GA 30076  
404/475-2725

**Core Int'l**  
7171 N. Federal Hwy.  
Boca Raton, FL 33431  
305/997-6055

**Corvus Systems**  
160 Great Oaks Blvd.  
San Jose, CA 95119  
800/4CORVUS

**Cumulus Corp.**  
23500 Mercantile Rd.  
Cleveland, OH 44122  
216/464-2211

**Delkin Devices  
U.S.A.**  
1940 Garnet Ave.  
San Diego, CA 92109  
619/273-8086

**Diamond Flower  
Electric Instru-  
ments Co.**  
2544 Port St.  
West Sacramento, CA  
95691  
916/373-1234

**Digiboard Inc.**  
6751 Oxford St.  
St. Louis Park, MN  
55426  
612/922-8055

**Digital Communi-  
cations Assoc.**  
1000 Alderman Dr.  
Alpharetta, GA  
30201-4199  
404/442-4000

## SERIAL/PARALLEL INTERFACE ADAPTERS

Manufacturer	Product	Serial ports <sup>1</sup>	Parallel ports	List price	Reader service number
Advanced Microcomputer Systems	IOSIX-1	4	2	\$185	608
	IOSIX-2	4	0	\$162	608
	IOSIX-3	2	1	\$95	608
	IOSIX-4	2	0	\$91	608
	IOSIX-5	1	1	\$70	608
	IOSIX-6	1	2	\$125	608
	IOSIX-7	0	2	\$82	608
	IOSIX-8	0	1	\$50	608
Boca Research	Boca.MCA Parallel	0	1	\$110	610
	Boca.MCA Serial/Parallel	2	1	\$210	610
Cumulus	CuPORT-P	0	1	\$149	613
	CuPORT-FSP	2	1	\$249	613
Emulex	DCP-186/MC	4	1	\$1595	638
IBM	Realtime Interface Coprocessor Multiport with				
	4-Port RS-232C interface	4	0	\$1271	616
	8-Port RS-232C interface	8	0	\$1349	616
	8-Port interface	8 <sup>2</sup>	0	\$1376	616
	Dual Asynchronous Adapter	2	0	\$225	616
IDEAssociates	IDEAmini/MC	2	0	\$210	617
Neotech	CM/4 4 Channel Serial Adapter	4	0	\$495	639
	PP/1 Printer Adapter	0	1	\$99	639
	SPC/1 Combination Adapter	1	1	\$149	639
	SP/1 Communication Adapter	1	0	\$129	639
	SSP/2	2	0	\$249	639
Opto 22	AC32 Dual Asynchronous Communications Adapter	2 <sup>3</sup>	0	\$350	640
	AC33 Industrial I/O	1	4	\$350	640
	AC34 Single Channel Industrial Asynchronous Adapter	1 <sup>5</sup>	0	\$350	640
Qua Tech	DS-1000	2	0	\$235	673
	DS-2000	2 <sup>6</sup>	0	\$395	673
	DS-3000	2 <sup>7</sup>	0	\$395	673
	PXB-7200	0	3 <sup>8</sup>	\$295	673
	QS-1000	4	0	\$450	673
	SP-1000	0	1	\$145	673
	SP-1050	1	0	\$195	673
	MXI-1000	0	0	\$445	673
Quadram	QuadPort PS/Q	2	0	\$295	621
STB Systems	Serial 2	2	0	\$239	623
	Serial/Parallel 2	1	1	\$259	623
Tecmar	Plus 2 Module	2	0	\$200	624
	S/P Module	1	1	\$200	624

<sup>1</sup>RS-232C, unless otherwise noted.

<sup>2</sup>Four RS-232C and four RS-422 ports.

<sup>3</sup>Two RS-422/485 ports.

<sup>4</sup>One (FAMUX) bus.

<sup>5</sup>Option of one RS-422 or one RS-485 port.

<sup>6</sup>Two RS-422A ports.

<sup>7</sup>Two RS-485 ports.

<sup>8</sup>Three D-375 ports.



## NETWORK ADAPTERS

Manufacturer	Product	Network compatibility	Throughput speed	Software included	List price	Reader service number
Acer Technologies	Acer 5270/MC	Ethernet	10Mbps	Acer Ethernet Driver	\$495	625
Axon	Model F200M	NetBIOS, IBM PC-LAN, Novell	1.8Mbps	Axon LAN networking software	\$499	659
	Model S100	NetBIOS	110Kbps	Axon LAN serial network software	\$125	659
	Model E-1000	Ethernet	10Mbps	Axon LAN networking software	\$399	659
Corvus Systems	Omninet/1 MC	Vines, NetBIOS, Novell, PC/NOS	1Mbps	diagnostics	\$329	660
DNA Networks	DNA Networks	NetBIOS, Novell	2.5Mbps		\$695	661
Gateway Communications	G/Ethernet LAN	Ethernet, Novell	10Mbps		\$525	662
IMC Networks	PCnic II Workstation	PC Network, Ethernet	10Mbps	diagnostics and drivers	\$495	663
	PCnic II Workstation/ Fileserver	PC Network, Ethernet	10Mbps	diagnostics and drivers	\$520	663
Invisible Software	Model 200/A	NetBIOS, IBM PC-LAN, Novell	1.8Mbps	NET/30	\$399	664
LANmaster Division/Vestra Subco	PS/2 Arcnet	Lifenet, Novell, Vines	2.5Mbps	Arcnet drivers	\$495	665
	PS/2 Ethernet	Ethernet, Novell, NFS, TCP/IP	10Mbps	Ethernet drivers and some utilities	\$499	665
Localnet Communications	D-Link (DE-001/2)	Ethernet	10Mbps	NetBIOS and Novell drivers	\$495	666
	D-Link (DN-001/2)	NetBIOS, IBM PC-LAN, Novell	1Mbps		\$369	666
MICOM-Interlan	NI9210	Ethernet	424Kbps		\$495	667
Networkh	vLAN +	Novell	74Kbps	drivers	\$545	668
	vNET	Novell	105Kbps	drivers	\$595	668
Proteon	p1800 ProNet-10	Token-Ring	4Mbps	diagnostics and driver	\$695	669
	p1840 ProNet-4	Token-Ring	4Mbps	diagnostics and driver	\$795	669
Racore Computer Products	LANPac II/MC 8106	Novell	16Mbps	drivers	\$395	670
	LANPac 802.5/MC	Token-Ring, Novell	4Mbps	drivers	\$640	670
Western Digital	EtherCard Plus/A	Ethernet, Novell, NetBIOS	10Mbps	"Super Disk" drivers for NetBIOS, TCP/IP, Novell Network	\$499	671
	StarCard Plus/A	Starlan, Ethernet, Novell, Netware, NetBIOS	1Mbps	"Super Disk" drivers for NetBIOS, TCP/IP, Novell Network	\$424	671

## MULTIUSER SERIAL ADAPTERS

Manufacturer	Product	Ports (number, type)	Software included	List price	Reader service number
Alloy Computer Products	PC-Slave/16N	2 RS-232C		\$995 <sup>1</sup>	601
	Plus 4/PS	2 RS-232C		\$4995 <sup>1</sup>	601
	Slave/286	2 RS-232C		\$1395 <sup>1</sup>	601
Arnet	Multiport/2	8 RS-232C	multiuser operating system drivers	\$995	602
Computone Systems	Intelliport PSB	8 RS-232C	diagnostics	\$1295	603
DigiBoard <sup>2</sup>	DigiChannel 4	4 RS-232C	DOS and UNIX drivers	\$469	604
	DigiChannel 8	8 RS-232C	DOS and UNIX drivers	\$695	604
	DigiChannel 16	16 RS-232C	DOS and UNIX drivers	\$1295	604
	DigiChannel 4 I	4 RS-232C	DOS and UNIX drivers	\$1119	604
	DigiChannel 4 I+	4 RS-232C <sup>3</sup>	DOS and UNIX drivers	\$1169	604
	DigiChannel 8 I	8 RS-232C	DOS and UNIX drivers	\$1319	604
	DigiChannel 8 I+	8 RS-232C <sup>3</sup>	DOS and UNIX drivers	\$1369	604
Monolithic Systems	Connect/MC4	4 RS-232C	UNIX and Xenix drivers	\$996	605
	Connect/MC8	8 RS-232C	UNIX and Xenix drivers	\$1297	605
	Connect/MC16	16 RS-232C	UNIX and Xenix drivers	\$1695	605
Stargate Technologies	MP2	2 <sup>4</sup>	DOS drivers	\$349	606
	Plus4 MC	4 RS-232C <sup>2</sup>	DOS and UNIX drivers	\$570	606
	Plus8 MC	8 RS-232C <sup>2</sup>	DOS and UNIX drivers	\$670	606
Stritek	12-PAK	12 RS-232C	DOS and Xenix drivers	\$1295	607

<sup>1</sup>Additional 4-PC (\$1195) or 12-PC (\$1695) expansion bus available.  
<sup>2</sup>RS-122 or fiber optic options available.

<sup>3</sup>Includes one synchronous RS-232C, -422, or -485 port.  
<sup>4</sup>Software configurable as RS-232C, -422, or -485.



**DNA Networks**  
81 Great Valley Pkwy.  
#800  
Malvern, PA  
19355-1309  
800/999-DNA2

**Dolphin Systems**  
1701 E. Edinger Bldg.  
G  
Santa Ana, CA 92705  
714/558-3220

**Emerald Systems Corp.**  
4757 Morena Blvd.  
San Diego, CA 92117  
619/270-1994

**Emulex Corp.**  
3545 Harbor Blvd.  
Costa Mesa, CA  
92626  
800/EMULEX3,  
714/662-5600

**Everex Systems**  
48431 Milmont Dr.  
Fremont, CA 94538  
800/821-0806,  
800/821-0807  
California

**Gammalink Synchronous Communications**  
2452 Embarcadero  
Way  
Palo Alto, CA 94303  
415/856-7421

**Gateway Communications**  
2941 Alton Ave.  
Irvine, CA 92714  
800/367-6555,  
714/553-1555

**Genoa Systems**  
75 E. Trimble Rd.  
San Jose, CA 95131  
408/432-9090

**GVC-Chenel Corp.**  
41 Bergenline Ave.  
Westwood, NJ 07675  
201/664-5888

**Hayes Microcomputer**  
P.O. Box 105203  
Atlanta, GA 30348  
404/441-1617

**Hycom/Sharp**  
16841 Armstrong Ave.  
Irvine, CA 92714  
714/261-6224

**IBM**  
Local authorized  
dealer hot line:  
800/IBM-2468

## TERMINAL EMULATION ADAPTERS AND GATEWAYS

Manufacturer	Product	Type of device	List price	Reader service number
Advanced Microcomputer Systems	MPCC1	3270 emulation	\$249	608
AST Research	AST-5251/12A	remote 5250 emulation	\$790	609
	AST-5250 Gateway Option	NetBIOS-5250 gateway	\$995	609
	AST-5250/A Cluster Option	5251/11A and 5251/12 cluster	\$995	609
	AST-3270/SNA II	remote 3270 emulation	\$895	609
	AST-3270/SNA IIA	remote 3270 emulation	\$895	609
	AST-3270/CoaxII-CUT	local 3270 emulation	\$895	609
	AST-3270/CoaxIIA-CUT	local 3270 emulation	\$895	609
Digital Communications Associates	IRMLAN DFT Gateway MCA	NetBIOS-3270 gateway	\$1195	657
	IRMA2 communications adapter	3270 emulation	\$1195	657
IBM	Display Station Emulation Adapter/A	5250 emulation	\$995	616
	System 36/38 Workstation Emulation Adapter/A	S/36/38 workstation emulation	\$885	616
	3270 Connection	3270 emulation	\$623	616
IDEAssociates	IDEAcomm 3278/DFT/MC	local 3278 DFT emulation	\$995	617
	IDEAcomm 5251/Gateway/MC	local 5251 NetBIOS gateway	\$895	617
	IDEAcomm 5251/MC	local 5251 emulation	\$895	617
	IDEAcomm 5250/Remote/MC	remote 5250 emulation	\$795	617
	IDEAcomm 5250/Remote Gateway/MC	remote 5250 NetBIOS gateway	\$1775	617
	IDEAcomm 3278/MC	local 3278 emulation	\$995	617
	IDEAcomm 3270/SNA/MC	remote 3270 emulation	\$995	617
	IDEAcomm 5251/Remote Share/MC	remote 5250 emulation	\$1395	617
	IDEAcomm 5250/Plus/MC	local 5251 emulation	\$1095	617
	IDEAcomm 5251/Share/MC	local 5251 emulation	\$1495	617
Microgate	SyncLink	3270 emulation	\$695	632
MultiTech	MultiCom327PS	3270 emulation	\$749	633
Quadram	MainLink II	3270 emulation	\$495	621
Techland	BlueLynx 3270 Gateway	NetBIOS-3270 gateway	\$1995	658
BlueLynx	BlueLynx 3270 Remote	remote 3270 emulation	\$895	658
	BlueLynx 5250 Cluster	remote 5250 cluster	\$1995	658
	BlueLynx 5250 Gateway	NetBIOS-5250 gateway	\$1995	658
	BlueLynx 5250-12	remote 5250 emulation	\$795	658
	BlueLynx 5250-11	local 5250 emulation	\$895	658
	BlueLynx 5250-11 Cluster	local 5250 asynch cluster	\$1995	658
	BlueLynx 5250-11 Gateway	NetBIOS-5251 gateway	\$1995	658
	BlueLynx COAXSYS	local 3278/3279 emulation	\$895	658
	BlueLynx DFT-3270	3270 distributed function terminal	\$1095	658

**IDEAssociates**  
29 Dunham Rd.  
Billerica, MA 01821  
508/663-6878

**IMC Networks Corp.**  
1342 Bell Ave. #3E  
Tustin, CA 92680  
714/259-1020

**Intel Corp.**  
5200 N.E. Elam Young  
Pkwy.  
Portland, OR 97124  
800/538-3373

**Invisible Software**  
481 47th Ave.  
San Francisco, CA  
94121  
415/221-0916

**Iomega Corp.**  
1821 W. 4000 S  
Roy, UT 84067  
801/778-1000

**Irwin Magnetic Systems**  
1201 Commonwealth  
Blvd.  
Ann Arbor, MI 48105  
313/930-9000

**LANmaster Division/Vestra Subco**  
1401 N. 14th St.  
Tempe, TX 76501  
817/771-2124

**Laserdrive Ltd.**  
1101 Space Park Dr.  
Santa Clara, CA  
95054  
408/970-3600

**Localnet Communications**  
3303 Harbor Blvd.,  
Ste. E-8

Costa Mesa, CA  
92626  
714/549-7942

**Maynard Electronics**  
460 E. Semoran Blvd.  
Casselberry, FL 32707  
800/821-8782,  
800/423-3007 Florida

**MICOM-Interlan**  
155 Swanson Rd.  
Boxborough, MA  
01719  
508/263-9929



## EXTERNAL HARD DISKS

Manufacturer	Product	Models supported	Formatted capacity	Interface type	Interface board	Access time	List price	Reader service number
Core Int'l	Optima 40E	50, 60, 80	42.8MB	ST-506	n/a	24ms	\$1095	642
	Optima 44E (3½-inch)	50, 60, 80	44MB	ST-506	n/a	26ms	\$1095	642
	Optima 70E	50, 60, 80	71.8MB	ST-506	n/a	26ms	\$1690	642
	ATplus 43E	50, 60, 80	43MB	ST-506	n/a	26ms	\$1495	642
	ATplus 44E (3½-inch)	50, 60, 80	44MB	ST-506	n/a	24ms	\$1395	642
	ATplus 72E	50, 60, 80	72.4MB	ST-506	n/a	26ms	\$2190	642
	HC40FE	50, 60, 80	40MB	ESDI	n/a	10ms	\$3090	642
	HC90E	50, 60, 80	90MB	ESDI	n/a	16ms	\$2595	642
	HC150E	50, 60, 80	150MB	ESDI	n/a	16ms	\$3890	642
	HC310E	50, 60, 80	310MB	ESDI	n/a	17ms	\$5890	642
	HC380E	50, 60, 80	380MB	ESDI	n/a	16ms	\$6890	642
	LAN150	50, 60, 80	163MB	ESDI	included	16ms	\$3999	642
	LAN150/2	50, 60, 80	326MB	ESDI	included	16ms	\$7199	642
	LAN150/D	50, 60, 80	326MB	ESDI	included	16ms	\$7699	642
	LAN310	50, 60, 80	320MB	ESDI	included	16ms	\$5799	642
	LAN310/2	50, 60, 80	640MB	ESDI	included	16ms	\$10,299	642
	LAN310/D	50, 60, 80	640MB	ESDI	included	16ms	\$11,299	642
	LAN380	50, 60, 80	394MB	ESDI	included	16ms	\$6699	642
Priam Technology	ED45-PS021	50	44.2MB	ST-412	n/a	28ms	\$1750	646
	ED62-PS021	50	61.9MB	ST-412	n/a	28ms	\$1820	646
	ED130-PS021	50	132.7MB	ST-412	n/a	20ms	\$3590	646
Storage Dimensions	SpeedStor PS-155E	50, 60, 80	155MB	SCSI	included	17ms	\$3950	648
	SpeedStor PS-300E	50, 60, 80	298MB	SCSI	included	17ms	\$5525	648
	LANStor LAN2-285SPS	60, 80	286MB	SCSI	included	17ms	\$6625	648
	LANStor LAN2-570SPS	60, 80	572MB	SCSI	included	17ms	\$11,350	648
	LANStor LAN4-285SPS	60, 80	286MB	SCSI	included	17ms	\$7595	648
	LANStor LAN4-570SPS	60, 80	572MB	SCSI	included	17ms	\$12,375	648
	LANStor LAN4-855SPS	60, 80	858MB	SCSI	included	17ms	\$17,095	648
	LANStor LAN4-1140SPS	60, 80	1144MB	SCSI	included	17ms	\$21,982	648

## 5¼-INCH EXTERNAL FLOPPY DRIVES

Manufacturer	Product	Models supported	Maximum formatted capacity	List price	Reader service number
CMS Enhancements	EF 360/U	50, 50Z, 60, 70, 80	360K	\$365	612
	EF 12/36	50, 50Z, 60, 70, 80	1.2MB	\$375	612
Cumulus	Stepping Stone 5.25/360	50, 50Z, 60, 70, 80	360K	\$345	613
	Stepping Stone 5.25/1.2	50, 50Z, 60, 70, 80	1.2MB	\$395	613
Delkin Devices U.S.A.	525 Extra	50, 50Z, 60, 70, 80	360K	\$329	650
Dolphin Systems	Matchmate 360	50, 50Z, 60, 70, 80	360K	\$349	651
	Matchmate 1200	50, 50Z, 60, 70, 80	1.2MB	\$399	651
IBM	PS/2 5¼-Inch External Disk Drive	50, 50Z, 60, 70, 80	360K	\$475	616
Neotech	Neotech 5¼-Inch Disk Drive	50, 50Z, 60, 70, 80	1.2MB	\$299	639
Pacific Rim Systems	PRS-2-360	50, 50Z, 60, 70, 80	360K	\$300	641
	PRS-2	50, 50Z, 60, 70, 80	1.2MB	\$350	641
Procom Technology	PXF360	50, 50Z, 60, 70, 80	360K	\$355	647
	PXF1200	50, 50Z, 60, 70, 80	1.2MB	\$395	647
SMT	XD-360	50, 50Z, 60, 70, 80	360K	\$325	622
Sysgen	Bridge File 360	50, 50Z, 60, 70, 80	360K	\$325	649
	PSF360 w/ adapter	50, 50Z, 60, 70, 80	360K	\$295	649
	Bridge File 5¼	50, 50Z, 60, 70, 80	1.2MB	\$325	649
	Bridge File 3.5 <sup>1</sup>	50, 50Z, 60, 70, 80	1.44MB	\$325	649

<sup>1</sup> 3½-form factor.



## INTERNAL HARD DISKS

Manufacturer	Product	Models supported	Formatted capacity	Interface type	Interface board	Access time	List price	Reader service number
CMS Enhancements	H50M50-R	50	50MB	ST-506	n/a	31ms	\$1195	612
	F65M60-K	60, 80	65MB	ST-506	n/a	28ms	\$1295	612
	F70ESDI-T	60, 80	70MB	ESDI	n/a	33ms	\$1995	612
	F115ESDI	60, 80	115MB	ESDI	n/a	30ms	\$2295	612
	F120M60-X	60, 80	120MB	ST-506	n/a	28ms	\$3095	612
Core Int'l	Optima 40	50, 60, 80	42.8MB	ST-506	n/a	24ms	\$895	642
	Optima 44 (3½-inch)	50, 60, 80	44MB	ST-506	n/a	26ms	\$995	642
	Optima 70	50, 60, 80	71.8MB	ST-506	n/a	26ms	\$1295	642
	ATplus 43	50, 60, 80	43MB	ST-506	n/a	26ms	\$1295	642
	ATplus 44 (3½-inch)	50, 60, 80	44MB	ST-506	n/a	24ms	\$1295	642
	ATplus 72	50, 60, 80	72.4MB	ST-506	n/a	26ms	\$1795	642
	HC40F	50, 60, 80	40MB	ESDI	n/a	10ms	\$2695	642
	HC90	50, 60, 80	90MB	ESDI	n/a	16ms	\$2395	642
	HC150	50, 60, 80	150MB	ESDI	n/a	16ms	\$3495	642
	HC310	50, 60, 80	310MB	ESDI	n/a	17ms	\$5495	642
	HC380	50, 60, 80	380MB	ESDI	n/a	16ms	\$6495	642
IBM	314MB Fixed Disk Drive	60, 80	314MB	ESDI	n/a	23ms	\$6805	616
	115MB Fixed Disk Drive	60, 80	115MB	ESDI	n/a	28ms	\$3660	616
	70MB Fixed Disk Drive	60, 80	70MB	ESDI	n/a	20ms	\$2505	616
	60MB Fixed Disk Drive	50, 50Z	60MB	ESDI	n/a	30ms	\$1695	616
	44MB Fixed Disk Drive	60, 80	44MB	ST-506	n/a	40ms	\$1460	616
Iomega	Bernoulli Box II B120i-MC	60, 80	20MB	SCSI	\$399	40ms	\$1100	643
	Bernoulli Box II B120iu-MC	60, 80	20MB	SCSI	n/a	40ms	\$900	643
Micropolis	1333A	60, 80	44MB	ST-506	included	28ms	\$995	644
	1335	60, 80	71MB	ST-506	included	28ms	\$1080	644
	1353A	60, 80	92MB	ESDI	included	23ms	\$1725	644
	1354A	60, 80	128MB	ESDI	included	23ms	\$1810	644
	1355	60, 80	147MB	ESDI	included	23ms	\$1910	644
	1558-15	60, 80	331MB	ESDI	included	18ms	\$3080	644
Plus Development	Passport 20	50, 50Z, 60, 70, 80	21.4MB	proprietary	\$399	28ms	\$595	645
	Passport 40	50, 50Z, 60, 70, 80	42.6MB	proprietary	\$399	28ms	\$795	645
Priam Technology	ID62-PS041	60, 80	61.9MB	ST-506	n/a	28ms	\$1220	646
	ID130-PS041	60, 80	132.7MB	ST-506	n/a	20ms	\$2860	646
	ID330-PS071	60, 80	330.2MB	ESDI	n/a	20ms	\$4540	646
Procom Technology	PhD5045	50	45MB	ST-506	n/a	28ms	\$1195	647
	PhD145E	60, 80	145MB	ESDI	n/a	18ms	\$2495	647
	PhD330E	60, 80	330MB	ESDI	n/a	18ms	\$4295	647
Storage Dimensions	SpeedStor PS133	60, 80	133MB	ST-412	n/a	28ms	\$2735	648
	SpeedStor PS150	60, 80	148MB	ESDI	n/a	14ms	\$2675	648
	SpeedStor PS330	60, 80	330MB	ESDI	n/a	16ms	\$4095	648
	LANStor LAN115PS	60, 80	115MB	ST-412	n/a	26ms	\$2725	648
	LANStor LAN150EPS	60, 80	148MB	ESDI	n/a	14ms	\$2995	648
	LANStor LAN150SPS	60, 80	149MB	SCSI	included	17ms	\$3395	648
	LANStor LAN285EPS	60, 80	285MB	ESDI	n/a	16ms	\$4725	648
	LANStor LAN285SPS	60, 80	286MB	SCSI	included	17ms	\$5495	648

**Micro Design Int'l**  
1235-D Commerce Rd.  
Morrow, GA 30260  
404/968-6658

**Microgate Corp.**  
9501 Capital of Texas  
Hwy. #105  
Austin, TX 78759  
800/444-1982

**Micropolis Corp.**  
21211 Nordhoff St.  
Chatsworth, CA 91311  
818/709-3300

**Monolithic Systems**  
84 Inverness  
Circle E  
Englewood, CO 80112  
303/790-7400

**Mountain Computer**  
240 Hacienda Ave.  
Campbell, CA 95008  
408/379-4300

**MultiTech Systems**  
82 Second Ave. SE  
New Brighton, MN  
55112  
800/328-9717

**Neotech**  
30295 Solon  
Industrial Pkwy.  
Solon, OH 44139  
800/552-1552

**Networth Inc.**  
1801 Ridgepoint Dr.  
#107  
Irving, TX 75063  
214/869-1331

**Opto 22**  
15461 Springdale St.  
Huntington Beach, CA  
92649  
800/854-8851,  
714/891-5861

**Orchid Technology**  
45365 Northport  
Loop W  
Fremont, CA 94538  
415/683-0300

**Pacific Rim Systems**  
2570 Barrington Ct.  
Hayward, CA 94545  
415/782-1013

**Plus Development Corp.**  
1778 McCarthy Blvd.  
Milpitas, CA 95035  
800/826-8022,  
408/434-6900

**Priam Technology**  
20 W. Montague  
Expwy.  
San Jose, CA 95134  
408/434-9300

**Procom Technology**  
3100 Airway Dr. #128  
Costa Mesa, CA  
92626  
714/549-9449

**Profit Systems, Inc.**  
30150 Telegraph Rd.  
Birmingham, MI 48010  
313/647-5010



## INTERNAL TAPE DRIVES

Manufacturer	Product	Models supported	Formatted capacity	Format/media	Interface board	List price	Reader service number
Alloy Computer Products	Tape System/2	50, 60, 80	40MB	QIC-40/DC2000	n/a	\$595	601
Archive	Archive VP 60i	50, 60, 80	60MB	QIC-02/DC600A	\$299	\$995	652
	Archive VP 150i	50, 60, 80	150MB	QIC-02/DC600XTD	\$299	\$1395	652
	Archive XL 3550	50	40MB	QIC-40/DC2000	n/a	\$499	652
	Archive XL 3560	60, 80	40MB	QIC-40/DC2000	n/a	\$499	652
CMS Enhancements	T40/2	50, 60, 80	40MB	QIC-40/DC2000	n/a	\$695	612
Core Int'l	CT40i	50, 60, 80	40MB	QIC-40/DC2000	included	\$695	642
	CT60/100i	50, 60, 80	60/100MB	QIC-02/DC600XTD, DC1000XTD	included	\$1295	642
	CT150/250i	50, 60, 80	150/250MB	QIC-02/DC600XTD, DC1000XTD	included	\$1995	642
Dolphin Systems	Matchmate 40MB-I	50, 60, 80	40MB	QIC-40/DC2000	included	\$590	651
Everex Systems	Excel II 125i	60, 80	125MB	QIC-120/DC600A	included	\$1795	615
	Excel II 60i	60, 80	60MB	QIC-120/DC600A	included	\$1495	615
Genoa Systems	Galaxy 3150-60T/MC	50, 60, 80	60MB	QIC-24/CT600H	\$179	\$995	653
	Galaxy 3160/MC	50, 60, 80	60MB	QIC-24/DC600	\$179	\$1095	653
	Galaxy 31150/MC	50, 60, 80	150MB	QIC-24/DC600	\$179	\$1395	653
Irwin Magnetic Systems	225	50, 50Z, 60, 70, 80	20MB	Proprietary/DC1000	\$50	\$499	656
	220	50, 50Z, 60, 70, 80	20MB	Proprietary/DC2000	\$50	\$499	656
	245	50, 50Z, 60, 70, 80	40MB	Proprietary/DC2000	\$50	\$649	656
	265	50, 50Z, 60, 70, 80	64MB	Proprietary/DC2000	\$50	\$849	656
Maynard Electronics	MaynStream 150	50, 70	150MB	QIC-02/Data Cass	included	\$1895	627
Mountain Computer	Series 4000	50, 60, 80	40MB	QIC-40/DC2000	n/a	\$595	654
	Series 6000	50, 60, 80	60MB	QIC-40/DC600A	n/a	\$1495	654
	Series 7000/150	50, 60, 80	150MB	QIC-150/DC600AXTD	included	\$1795	654
Sysgen	Reliant 200 INT	50, 60, 80	60MB	QIC-24/cassette	\$250	\$700	649
	Reliant 300 INT(60)	50, 60, 80	60MB	QIC-24/DC600	\$250	\$800	649
	Reliant 300 INT(125)	50, 60, 80	125MB	QIC-24/DC600	\$250	\$1100	649
	Reliant 500 INT	50, 60, 80	72MB	QIC-24/DC2000	\$250	\$800	649
Tecmar	QT-150i/PS	50, 50Z, 60, 70, 80	150MB	QIC-02/DC600	\$299	\$2195	624
	QT-125i/PS	50, 50Z, 60, 70, 80	125MB	QIC-02/DC600	\$299	\$1995	624
	QT-90i/PS	50, 50Z, 60, 70, 80	90MB	QIC-02/DC600	\$299	\$1695	624
	QT-60i/PS	50, 50Z, 60, 70, 80	60MB	QIC-02/DC600	\$299	\$1395	624
	QT-40i/PS	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	n/a	\$595	624

**Proteon Inc.**  
Two Technology Dr.  
Westborough, MA  
01581  
508/898-2800

**Qua Tech Inc.**  
478 E. Exchange St.  
Akron, OH 44304  
216/434-3154

**Quadram**  
One Quad Way  
Norcross, GA 30093  
404/923-6666

**Racore Computer Products**  
170 Knowles Dr.  
Los Gatos, CA 95030  
408/374-8290

**SMT**  
1080 Linda Vista Dr.  
San Marcos, CA  
92069  
619/744-3590

**Stargate Technologies Inc.**  
29300 Aurora Rd.,  
Bentley Park S  
Solon, OH 44139  
800/782-7428

**STB Systems**  
1651 N. Glenville Dr.  
#210  
Richardson, TX 75081  
214/234-8750

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

**Stritek Inc.**  
8705 Freeway Dr.  
Macedonia, OH  
44056  
216/468-3380

**Sysgen Inc.**  
556 Gibraltar Dr.  
Milpitas, CA 95035  
408/263-4411

**Techland BlueLynx**  
112 Main St.  
Newmarket, NH  
03857  
800/TECHLAND,  
603/659-6035

**Tecmar Inc.**  
6225 Cochran Rd.  
Solon, OH 44139  
216/349-1009

**Telenetics Corp.**  
5109 E. La Palma Ave.  
Anaheim, CA 92807  
714/779-2766

**Universal Data Systems**  
5000 Bradford Dr.  
Huntsville, AL  
35805-1953  
205/721-8000

**USRobotics**  
800 McCormick Blvd.  
Skokie, IL 60076  
312/982-5010

**Ven-Tel, Inc.**  
2121 Zanker Rd.  
San Jose, CA  
95131-2177  
408/436-7400

**Western Digital Corp.**  
2445 McCabe Way  
Irvine, CA 92714  
800/847-6181



## EXTERNAL TAPE DRIVES

Manufacturer	Product	Models supported	Formatted capacity	Format/media	Interface board	List price	Reader service number
Alloy Computer Products	Retriever/120	50, 50Z, 60, 70, 80	120MB	DC600XTD	n/a	\$1295	601
Archive	Archive VP 60e Archive VP 150e	50, 50Z, 60, 70, 80	60MB	QIC-02/DC600A	\$299	\$1295	652
		50, 50Z, 60, 70, 80	150MB	QIC-02/DC600XTD	\$299	\$1795	652
Core Int'l	CT40E	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	included	\$895	642
	CT60/100E		60/100MB	QIC-02/DC600XTD, DC1000XTD	included	\$1595	642
	CTC150/250E	50, 50Z, 60, 70, 80	150/250MB	QIC-02/DC600XTD, DC1000XTD	included	\$2295	642
Delkin Devices U.S.A.	40 Extra	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	included	\$699	650
Dolphin Systems	Matchmate Tape	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	included	\$649	651
Emerald Systems	Rapidrecover 1/8	50, 50Z, 60, 70, 80	60MB	SCSI/Cass	included	\$1295	655
	Rapidrecover 1/4-60	50, 50Z, 60, 70, 80	60MB	SCSI/DC600A	included	\$1795	655
	Rapidrecover 1/4-150	50, 50Z, 60, 70, 80	150MB	SCSI/DC600XTD	included	\$2395	655
	VAST	50, 50Z, 60, 70, 80	2.2GB	Helical Scan/8mm cartridge	included	\$6995	655
Everex Systems	Excel II 125	50, 50Z, 60, 70, 80	125MB	QIC-120/DC600A	included	\$1895	615
	Excel II 60	50, 50Z, 60, 70, 80	60MB	QIC-24/DC600A	included	\$1595	615
	Excel II 60T	50, 50Z, 60, 70, 80	60MB	QIC-24/CT600H	included	\$1395	615
Genoa Systems	Galaxy 3250-60TZ/MC	50, 50Z, 60, 70, 80	60MB	QIC-24/CT600H	\$179	\$1245	653
	Galaxy 3260Z/MC	50, 50Z, 60, 70, 80	60MB	QIC-24/DC600	\$179	\$1345	653
	Galaxy 32150Z/MC	50, 50Z, 60, 70, 80	150MB	QIC-24/DC600	\$179	\$1745	653
IBM	6157 Streaming Tape Drive	50, 50Z, 60, 70, 80	60MB	QIC-02/DC600	\$366	\$1880	616
Irwin Magnetic Systems	725	50, 50Z, 60, 70, 80	20MB	Proprietary/DC1000	\$100	\$649	656
	720	50, 50Z, 60, 70, 80	20MB	Proprietary/DC2000	\$100	\$649	656
	745	50, 50Z, 60, 70, 80	40MB	Proprietary/DC2000	\$100	\$849	656
	765	50, 50Z, 60, 70, 80	64MB	Proprietary/DC2000	\$100	\$1049	656
Mountain Computer	Series 4000	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	n/a	\$899	654
	Series 6000	50, 50Z, 60, 70, 80	60MB	QIC-40/DC600A	n/a	\$1895	654
	Series 7000/150	50, 50Z, 60, 70, 80	150MB	QIC-150/DC600AXTD	included	\$2395	654
	Series 7000/300	50, 50Z, 60, 70, 80	300MB	QIC-150/DC600AXTD	included	\$3495	654
Procom Technology	PT-150	50, 50Z, 60, 70, 80	150MB	SCSI Host adapter	included	\$2195	647
	PT-125	50, 50Z, 60, 70, 80	125MB	SCSI Host adapter	included	\$2060	647
	PT-60	50, 50Z, 60, 70, 80	60MB	SCSI Host adapter	included	\$1595	647
	PT-40	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	n/a	\$750	647
Sysgen	Reliant 200 EXT	50, 50Z, 60, 70, 80	60MB	QIC-24/cassette	\$250	\$900	649
	Reliant 300 EXT(60)	50, 50Z, 60, 70, 80	60MB	QIC-24/DC600	\$250	\$800	649
	Reliant 300 EXT(125)	50, 50Z, 60, 70, 80	125MB	QIC-24/DC600	\$250	\$1100	649
	Reliant 500 EXT	50, 50Z, 60, 70, 80	72MB	QIC-24/DC2000	\$250	\$800	649
	Bridgetape	50, 50Z, 60, 70, 80	42MB	Proprietary/DC2000	\$250	\$695	649
	Smartimage Plus	50, 50Z, 60, 70, 80	60MB	QIC-24/cassette	\$250	\$795	649
	QIC-File60 Plus	50, 50Z, 60, 70, 80	60MB	QIC-24/DC600A	\$250	\$995	649
Tecmar	QT-150e	50, 50Z, 60, 70, 80	150MB	QIC-02/DC600	\$299	\$2495	624
	QT-125e	50, 50Z, 60, 70, 80	125MB	QIC-02/DC600	\$299	\$2295	624
	QT-90e	50, 50Z, 60, 70, 80	90MB	QIC-02/DC600	\$299	\$1895	624
	QT-60e	50, 50Z, 60, 70, 80	60MB	QIC-02/DC600	\$299	\$1495	624
	QT-40e	50, 50Z, 60, 70, 80	40MB	QIC-40/DC2000	n/a	\$795	624



# 20-MHz 80386 Systems

Clone makers are turning the 20-MHz 80386 PC into a commodity item. Here's how to shop for a reliable, high-powered system that will move enough MIPS to keep anyone happy.

*Eric Knorr*

The time to buy a 20-MHz 80386 PC is now. Intel is producing 20-MHz chips at full tilt, and manufacturers are snapping them up, building boxes around them, and competing hard for your PC dollar. As the 60 systems listed in this Buyers' Guide demonstrate, the result is an array of features and prices to meet almost any high-performance need.

Though it's safe to call any 20-MHz 80386 PC *fast*, the variation among these units in terms of performance, price, quality, and expansion capability is probably greater than with any other class of PC. The tables on the following pages, which list the systems' basic features, should help you reduce your prospective buys to a handful of likely candidates.

## Spotting High Performance

Benchmarks are the only way to tell for sure which machines will do your computing chores fastest—and even then, only if the tests employ the applications you normally use (see "Surprise Values at 20 MHz" in this issue). Nonetheless, if your main concern is speed, knowing which features are common to the fastest machines can aid in your product selection.

## Memory Architectures

A 20-MHz CPU is so fast that conventional dynamic RAM chips can't keep up with it. PC designers have devised a number of schemes that work around this problem, the four most popular being memory interleaving, paged memory, static-column RAM, and memory caching.

Of the four methods, memory caching stands out. Memory caching uses a small cache of very fast static RAM—fast enough to handle full-speed CPU memory access—as a



PAUL MEISEL



buffer between main memory and the CPU. This technique is currently the only practical way for a 20-MHz PC to deliver zero-wait-state operation. Other methods average between one-half and one-and-a-half wait states, depending on the scheme and how well it has been implemented. (A wait state is a wasted CPU memory write cycle; a single wait state cuts memory access speed by about 25 percent, two cut it by 50 percent, and so on.) The main drawback to memory caching is that it usually means a more expensive machine. If you want top performance, though, it can't be beat.

#### Mass Storage

To take advantage of 20-MHz speed, you need a disk drive that won't hobble your system. Look for four key features: large capacity, low average access time, disk caching software, and (if you can afford it) an ESDI or SCSI interface.

More and more people are deciding that a 40MB hard disk is the optimum size for a single-user workstation running common business applications. On the other hand, those who see themselves becoming OS/2 users will probably find 40MB the absolute minimum. If you

plan on using a system as a network server, figure at least 5MB per user, not counting what's required for shared server-based applications.

Average access time is an imprecise measure of drive performance, but it's a necessary evil for roughly judging drive speed unless you plan on running your own benchmarks. As a rule of thumb, don't buy a hard disk for a 20-MHz PC with an average access time greater than 40 milliseconds (ms); under 20ms is preferable.

Disk caching software is a must. It's a cheap, effective way to speed mass storage throughput, although it works best when you access the same data frequently (as with most data management applications). Disk caching software comes with most 20-MHz PCs, but because it's cheap, it's no tragedy if the system you want doesn't include it.

Next to deciding on capacity, the most significant mass storage choice you'll make concerns the kind of drive you want: an ST506 (standard AT style), an ESDI, or a SCSI. Most vendors of 20-MHz systems now offer ESDI drives, which deliver twice the throughput of ST506 units. SCSI drives are still hard to procure from system vendors, but they can provide even better performance than



ESDI drives, along with the ability to chain multiple drives to a single SCSI interface board. The downside to both ESDI and SCSI drives is that they're expensive and usually unavailable in sizes under 80MB.

#### When You Need Room to Grow

Many new 80386 workstations have small footprints and a number of features built into the motherboard. Nonetheless, most of the 20-MHz 80386 PCs listed here are still AT-size boxes with substantial capacity for boards and devices. Under-the-desk towers offer the ultimate in elbowroom and are generally intended as network servers.

#### Fast Memory

The most important expansion capability of any fast system is the amount of RAM the system can access in 32-bit chunks, at or near full CPU speed. If your fast 32-bit RAM expansion is limited, you'll probably have to install a



Manufacturer Product	List price	Built into motherboard					Numeric coprocessor supported		
		Ports: Parallel/Serial Keyboard disk drive, 101-key controller, VGA and 40MB hard disk and (includes 2MB RAM)	Floppy disk	Hard disk	Video adapter	Mouse/gamma port	Type/Speed	Waitak. 1167	Uses same socket
<b>Acer Technologies</b> Acer 1100/20	\$7470 (EGA, 70MB hard disk)		0/0	N	N	N	80387/20	Y	Y
<b>Advanced Logic Research</b> ALR 386/220 Model 401	\$3990 (1MB RAM, EGA, monochrome monitor)		0/0	N	N	N	80387/20	N	n/a
FlexCache 20386 DT	\$4490 (1MB RAM, EGA, monochrome monitor)		0/0	N	N	N	80387/20	N	n/a
FlexCache 20386	\$6490 (1MB RAM, 100MB hard disk, EGA, monochrome monitor)		0/0	N	N	N	80387/20	N	n/a
<b>Advantech</b> VHP 386	\$3695		1/2	N	N	N	80387/16 80387/20	N	n/a
<b>Alphanumeric Int'l</b> ANI 386 <sup>20</sup>	\$4995		1/1	Y	Y	Y	80387/20	Y	Y
<b>AMAX Engineering</b> PC 386 Business System	\$4464		0/0	N	N	N	80287/10 80387/16, 20	N	n/a
PC 386 Tower System	\$4764		0/0	N	N	N	80287/10 80387/16, 20	N	n/a
<b>American Mitac</b> Mitac Paragon 386E	\$5692		1/2	Y	N	N	80387/20	N	n/a
<b>Amstrad</b> PC 2386/65	To be announced		1/1	Y	Y	Y	80387/20	N	n/a
<b>Arche Technologies</b> Arche Rival 386	\$4995 (EGA)		2/2	N	N	Y	80387/20	N	n/a
<b>AST Research</b> AST Premium/386	\$8220		1/2	Y	N	N	80287/8 80387/20	N	n/a
<b>AT&amp;T</b> 6386 WGS	\$8193		1/1	Y	N	N	80387/20	Y	N
6386E WGS	\$9744		1/1	Y	N	N	80387/20	Y	N
<b>C² Micro Systems</b> C² 386	\$3359		0/0	N	N	N	80287/10 80387/16	N	n/a
<b>Cheetah Int'l</b> cAT386	\$3990 (1MB RAM, 62MB hard disk)		0/0	N	N	N	80287/20 80387/20	N	n/a
<b>Club AT</b> Club 320	\$5083		1/2	N	N	N	80387/16, 20	Y	Y
<b>Compaq Computer</b> Deskpro 386/20	\$9596 (60MB hard disk)		0/0	N	N	N	80387/20	Y	Y
<b>Computer Classifieds</b> CCI ST/386	\$3925		1/1	Y	Y	N	80287/20	N	n/a
<b>Computer Expert</b> CEI	\$3537		0/0	N	N	N	80387/20	N	n/a
<b>Cordata</b> CS 5040-2	\$7134		1/2	Y	N	N	80387/20	Y	Y
<b>CSS Laboratories</b> CSS 386A	\$3600 (no hard disk or VGA)		1/1	Y	N	N	80287/10 80387/20	N	n/a
<b>Dell Computer</b> System 310	\$5299		1/2	N	N	N	80387/20	Y	Y
<b>Dyna Computers</b> Dyna 386	\$4272		0/0	N	N	N	80387/20	N	n/a
<b>Everex Systems</b> Step 386/20	\$6350		0/0	N	N	N	80387/20	Y	Y
<b>Fivestar Electronics</b> Fivestar 386	\$3295		1/1	Y	Y	N	80287/20 80387/20	N	n/a
Fivestar FS-386	\$3995		1/1	Y	Y	N	80287/20 80387/20	N	n/a
<b>Fortron</b> 386-20 Racer	\$4350		0/0	N	N	N	80387/20	N	n/a
80386-20 Plus	\$4550		0/0	N	N	N	80387/20	N	n/a
<b>General Technologies</b> General 386	\$4375		1/2	Y	Y	N	80387/16, 20	N	n/a
<b>HEI Computer Systems</b> HEI 386 VFS	\$7040		1/0	N	N	N	80387/20	Y	Y



Memory capacity	Expansion slots							Ergonomic design				Warranty				Reader service number	
	Web status	RAM included	Maximum system RAM	8-bit total/free	8/16-bit total/free	32-bit total/free	Storage device capacity	Hard disk available	120MB or larger setup software	ROM-based	Tilt-and-swivel monitor	Standard desktop	Size configuration	Small footprint	Initial		Extended
	0	2MB	12MB	2/2	5/1	1/0	3/1	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 8am-5pm	860
	2	1MB	2MB	2/1	4/3	2/2	0/2	Y	N	N	Y	N	N	1 year	N	Toll free, M-F 8am-5pm	811
	2	1MB	2MB	2/1	4/3	2/2	0/2	Y	N	N	Y	N	N	1 year	N	Toll free, M-F 8am-5pm	811
	0	1MB	2MB	2/1	4/3	2/2	4/0	Y	N	N	Y	N	N	1 year	Y	Toll free, M-F 8am-5pm	811
	1	1MB	1MB	1/0	5/4	2/1	5/2	Y	Y	Y	Y	Y	N	1 year	Y	Toll free, M-F 10am-5pm	812
	0	1MB	16MB	2/0	4/3	1/1	3/0	Y	N	N	Y	N	N	1 year	Y	Not toll free, M-F 8:30am-5pm	813
	0	1MB	2MB	2/1	5/4	1/1	5/0	Y	Y	Y	Y	N	N	1 year parts, 90 days labor	Y	Not toll free, M-F 8:30am-5:30pm	814
	0	1MB	2MB	2/1	5/4	1/1	5/0	Y	Y	Y	N	Y	N	1 year parts, 90 days labor	Y	Not toll free, M-F 8:30am-5:30pm	814
	0	2MB	8MB	1/1	4/4	0/0	4/0	N	Y	Y	N	N	Y	1 year	Y	Not toll free, M-F 7am-5pm	815
	1/2	4MB	16MB	0/0	5/5	0/0	1/0	N	Y	Y	N	N	Y	1 year parts, 90 days labor	Y	Through dealer	816
	0	2MB	2MB	2/0	4/3	2/1	3/0	Y	Y	Y	N	N	Y	2 years	Y	Not toll free, M-F 7am-5pm	817
	0/2	1MB	1MB	2/2	1/1	3/2	3/1	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 8am-5pm	818
	1	1MB	48MB	2/1	2/1	3/2	3/1	Y	Y	Y	Y	N	N	1 year	Y	Toll free, M-F 8am-5pm	861
	1	2MB	64MB	2/1	4/4	4/3	7/3	Y	Y	Y	N	N	Y	1 year	Y	Toll free, M-F 8am-5pm	861
	0	2MB	8MB	3/1	5/4	0/0	5/1	Y	N	Y	Y	N	N	1 year	N	Not toll free, M-F 8:30am-5pm	820
	1	2MB	10MB	2/1	4/3	2/1	6/0	Y	Y	Y	N	Y	N	1 year	N	Toll free, M-F 9am-5:30pm	821
	0	1MB	1MB	0/0	6/4	2/2	3/0	Y	Y	Y	Y	N	N	1 year parts, 6 months labor	Y	Not toll free, M-F 8am-5pm	822
	0	1MB	1MB	2/2	3/1	1/1	4/0	Y	N	Y	Y	N	N	1 year	Y	Through dealer	823
	0	2MB	8MB	2/1	5/5	1/0	5/0	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 9am-6pm, Sat 11am-3pm	824
	0	1MB	4MB	2/1	5/4	1/0	3/1	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 10am-7pm	825
	0	2MB	16MB	2/1	6/5	0/0	4/0	N	Y	Y	Y	N	N	1 year	Y	Toll free, M-F 7am-5pm	826
	0	1MB	4MB	2/2	5/4	1/1	3/0	N	Y	N	Y	N	N	1 year	N	Not toll free, M-F 7:30am-4pm	827
	0	1MB	8MB	2/1	6/5	1/0	5/0	Y	Y	Y	Y	N	N	1 year	Y	Toll free, M-F 7am-7pm	828
	0	2MB	16MB	4/2	4/3	1/1	2/4	Y	Y	Y	N	N	Y	1 year	Y	Not toll free, M-F 9am-4:30pm	829
	0	1MB	16MB	2/0	6/5	1/1	5/0	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 8am-5pm	863
	0	1MB	4MB	2/1	6/4	0/0	5/0	Y	Y	Y	Y	N	N	1 year	Y	Toll free, M-F 8am-5pm	831
	0	2MB	2MB	4/3	8/5	0/0	6/0	Y	Y	Y	Y	Y	N	1 year	Y	Toll free, M-F 8am-5pm	831
	0	1MB	1MB	2/2	5/4	1/0	5/0	Y	Y	Y	Y	Y	Y	1 year	Y	Toll free, M-F 8:30am-5pm	864
	0	1MB	16MB	1/0	6/4	1/0	3/1	Y	Y	Y	Y	Y	Y	1 year	Y	Toll free, M-F 8:30am-5pm	864
	0	1MB	1MB	1/1	5/4	2/2	5/0	N	N	Y	Y	N	N	1 year	Y	Toll free, M-F 9am-5:30pm	833
	0	1MB	8MB	1/0	6/5	1/1	3/1	Y	Y	Y	Y	Y	N	1 year parts, 90 days labor	Y	Not toll free, M-F 9am-5pm	834



Manufacturer Product	List price	Built into motherboard					Numeric coprocessor supported		
		Ports: Parallel/Serial Keyboard disk drive, 101-key controller, VGA and 40MB hard disk and includes 2MB RAM	Floppy disk	Hard disk	Video adapter	Mouse/game port	Type/Speed	Weitek 1167	Uses same socket
<b>Hewlett-Packard</b> HP Vectra RS/20	\$8735 (100MB hard disk)		0/0	N	N	N	80387/20	Y	Y
<b>Hyundai Electronics America</b> Super 386C	\$4799		1/1	Y	N	N	80387/20	N	n/a
<b>IBM</b> IBM PS/2 80-111	\$9745 (115MB hard disk)		1/1	Y	Y	Y	80387/20	N	n/a
IBM PS/2 80-311	\$12,745 (314MB hard disk)		1/1	Y	Y	Y	80387/20	N	n/a
IBM PS/2 70-121	\$8745 (120MB hard disk)		1/1	Y	Y	Y	80387/20	N	n/a
<b>Intelligent Data Systems</b> PC386S-20	\$6205		0/0	N	N	N	80387/20	Y	Y
<b>Ivy Microcomputer</b> Ivy 386	\$4995		1/1	Y	Y	N	80387/20	N	n/a
<b>Kaypro</b> Kaypro 386E	\$6795		0/0	N	N	N	80387/20	N	n/a
<b>Laser Digital</b> Pacer 386-20	\$4695		0/0	N	N	N	80387/20	N	n/a
<b>Matrix Digital Products</b> Matrix 386	\$3434 (EGA)		0/0	N	N	N	80387/20	N	n/a
<b>Micro 1</b> Micro 1 Tower 386	\$4025 (50MB hard disk)		0/0	Y	Y	N	80387/20	N	n/a
<b>Micro Express</b> ME 386-20	\$4400		0/0	N	N	N	80387/20	N	n/a
Roadrunner Plus	\$3849		0/0	N	N	N	80387/20	N	n/a
Regal II	\$4449 (gas plasma monitor)		0/0	N	N	N	80387/20	N	n/a
<b>Mitsubishi Electronics America</b> MP 386	\$5895 (EGA, 1MB RAM)		1/2	Y	N	N	80287/8 80387/16	N	n/a
<b>NEC</b> PowerMate 386/20	\$7190		1/2	Y	N	N	80287/10 80387/20	N	n/a
<b>Osicom Technologies</b> Osicom Executive 386/20	\$5300		0/0	Y	N	N	80387/20	N	n/a
<b>PC Designs</b> GV 38620	\$4533		1/2	Y	Y	N	80287/10 80387/20	N	n/a
<b>PC Values</b> Value 386/20	\$5194		0/0	N	N	N	80387/20	N	n/a
<b>Proteus Technology</b> Proteus Model 386-20	\$4496		0/0	N	N	N	80387/16-20	N	n/a
<b>QIC Research</b> QIC 386/20	\$3220		1/2	Y	Y	N	80387/20	Y	Y
<b>Seattle Telecom &amp; Data</b> System 386-20	\$4745 (EGA)		0/0	N	N	N	80287/8 80387/20	N	n/a
<b>SEFCO</b> SEFCO Medallion 386	\$4995		0/0	N	N	N	80387/20	Y	Y
<b>Sirex</b> Sirex 386-20	\$3572		2/2	N	N	N	80287/10 80387/16-20	N	n/a
<b>Spear Technology</b> Spear 386D	\$4465		1/2	Y	Y	N	80387/20	Y	Y
<b>Systems Integration Associates</b> SIA 386/20	\$6580 (1MB RAM)		0/0	N	N	N	80387/20	N	n/a
<b>Tandon Computer</b> Tandon 386	\$7097 (1MB RAM)		0/0	N	N	N	80387/20	N	n/a
<b>Tandy</b> Tandy 5000 MC	\$7128 (1.44MB disk drive)		1/1	Y	N	Y	80387/20	Y	Y
Tandy 4000 LX	\$6228 (1.44MB disk drive)		0/0	Y	N	N	80387/20	Y	Y
<b>Tatung Co. of America</b> TCS 8000	\$6590		0/0	N	N	N	80387/20	N	n/a



	Memory capacity			Expansion slots				Ergonomic design						Warranty		Technical support	Reader service number
	Web stores	RAM included	Maximum system RAM	8-bit total/free	8/16-bit total/free	32-bit total/free	Storage device capacity	hard disk available	1200MB or larger setup software	ROM-based	Tilt-and-swivel monitor	Standard desktop	Size configuration	Small footprint	Initial		
	1	1MB	16MB	1/0	6/4	2/0	3/1	Y	Y	Y	N	Y	N	1 year	Y	Toll free, 24 hours	865
	0	1MB	2MB	2/2	5/4	1/1	4/0	Y	Y	Y	N	N	Y	18 months	Y	Toll free, M-F 8am-5pm	836
	1	2MB	4MB	0/0	4/4	3/3	2/2	Y	Y	Y	N	Y	N	1 year	Y	Through dealer	837
	1	2MB	4MB	0/0	4/4	3/3	2/2	Y	Y	Y	N	Y	N	1 year	Y	Through dealer	837
	1	2MB	6MB	0/0	1/1	2/2	3/0	Y	Y	Y	Y	N	N	1 year	Y	Through dealer	837
	0	1MB	8MB	1/0	6/4	1/1	5/0	N	N	N	Y	N	N	1 year	N	Not toll free, M-F 9am-4pm	838
	0	1MB	4MB	2/0	5/2	1/1	4/1	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 8am-5pm	839
	1	1MB	1MB	2/2	6/3	0/0	6/0	Y	Y	Y	Y	N	N	1 year	Y	Toll free, M-F 6am-4:30pm	840
	0	2MB	2MB	2/2	5/3	1/1	5/0	Y	Y	Y	Y	Y	N	1 year	N	Toll free, M-F 9am-6pm	841
	0	1MB	10MB	2/1	5/4	1/0	3/1	Y	Y	Y	Y	N	N	1 year	N	Not toll free, M-F 9am-4pm	842
	0	1MB	1MB	2/0	5/4	1/0	5/0	Y	Y	Y	Y	Y	N	1 year	Y	Not toll free, M-F 8am-5pm	843
	0	1MB	8MB	2/1	5/3	1/0	3/1	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 8:30am-6pm	844
	0	1MB	1MB	3/1	2/1	1/0	2/0	N	Y	Y	Por-table	Por-table	Por-table	1 year	Y	Not toll free, M-F 8:30am-6pm	844
	0	1MB	1MB	2/0	2/1	1/0	2/0	N	Y	Y	Por-table	Por-table	Por-table	1 year	Y	Not toll free, M-F 8:30am-6pm	844
	0	1MB	2MB	2/2	6/6	2/2	5/2	N	N	Y	Y	N	N	1 year	N	Through dealer	845
	0	2MB	2MB	2/2	5/4	1/0	5/0	Y	Y	Y	Y	N	N	1 year	Y	Through dealer	846
	0	1MB	4MB	2/2	5/5	1/1	3/0	Y	Y	Y	Y	N	N	Through dealer	Through dealer	Toll free, M-F 9am-5:30pm	847
	0	1MB	4MB	6/5	2/1	0/0	5/0	Y	Y	Y	Y	N	N	1 year	N	Toll free, M-F 8am-5pm	848
	0	1MB	1MB	2/1	5/3	1/0	3/1	N	N	N	Y	Y	Y	2 years	N	Toll free, M-F 8am-5pm	849
	0	1MB	1MB	3/1	4/3	1/0	5/0	Y	Y	Y	Y	Y	N	15 months	Y	Toll free, M-F 9am-5pm	866
	0	1MB	16MB	0/0	6/0	2/0	5/0	Y	Y	Y	Y	N	N	1 year	N	Toll free, M-F 9am-5pm	851
	0	1MB	8MB	3/1	4/3	1/1	5/0	Y	Y	Y	N	N	Y	1 year	Y	Not toll free, M-F 8am-5pm	852
	0/1	1MB	16MB	2/1	5/4	1/1	6/0	Y	Y	Y	Y	Y	N	1 year	Y	Not toll free, M-F 9am-4pm	853
	0/1	0	4MB	1/0	4/3	2/1	5/2	Y	Y	Y	Y	Y	N	1 year	N	Toll free, M-F 8:30am-6pm	854
	0/1	1MB	1MB	0/0	6/5	2/2	5/0	Y	Y	Y	Y	N	N	1 year	N	Not toll free, M-F 9am-5pm	855
	0	1MB	4MB	2/1	6/5	0/0	5/0	Y	Y	Y	Y	N	N	1 year	Y	Not toll free, M-F 7am-11:30pm	856
	0	1MB	8MB	2/1	6/5	0/0	5/0	N	Y	Y	Y	Y	N	1 year	N	Through dealer	857
	0	2MB	16MB	0/0	3/3	2/2	4/1	Y	N	N	N	N	Y	1 year	Y	Not toll free, M-F 8am-5pm	858
	0	2MB	8MB	2/1	6/6	1/1	3/1	Y	N	N	N	N	Y	1 year	Y	Not toll free, M-F 8am-5pm	858
	0	1MB	16MB	2/1	6/5	0/0	5/0	Y	N	Y	Y	N	N	1 year	Y	Toll free, M-F 8am-5pm	859

<sup>1</sup> Manufacturer's specifications, adjustable according to user needs.





memory board on the expansion bus—and RAM on that board will be accessed at approximately one-third the speed of fast RAM.

Fast RAM is especially important for OS/2 applications. With OS/2, you'll need at least 4MB of RAM to make switching operating systems worthwhile. Once enough OS/2 applications arrive, it's not inconceivable that you'd fill a machine up to OS/2's limit of 16MB (although at today's RAM prices, it would be absurdly expensive). Moreover, one of OS/2's quirks is that once you've installed a memory board on the expansion bus, OS/2 will use that slower RAM *first*, slowing down memory access from the word go.

Most 20-MHz PCs come with 1MB or more of RAM already installed. Beyond this, whether RAM is installed directly on the motherboard or through special 20-MHz, 32-bit slots, 32-bit fast RAM capacities range from a very low 2MB to 16MB and even higher. If you want to use the machine for multitasking or for extended-memory software like *Paradox/386*—or as a server or

multiuser host—go for the full 16MB capacity.

#### Expansion Slots

The number of slots a PC has is no longer an absolute measure of potential functionality. For example, most PS/2 units come with a video adapter, a floppy drive controller, a hard drive controller, a mouse port, and one parallel and one serial port built into the motherboard. On a standard, AT-style 80386 machine, which lacks this integration, these features would take up four or five slots.

At a minimum, an AT-style 80386 PC should have five slots (not counting any special 32-bit memory slots), and at least three of these should be 8/16 bit rather than 8 bit. An ESDI drive controller takes up an 8/16 slot, as do some I/O cards and VGA boards (see "VGA Boards: The Second Generation" in this issue).

Obviously, adding tape backup controllers, network boards, internal modems, fax boards, special printer controllers, and the like to a five-slot AT-style machine will be a tight squeeze. If you're going to buy an AT-bus 80386 PC without integrated features, you're better off finding one with—at least—the original IBM AT's mix of six 8/16-bit and two 8-bit slots.

#### Device Support

Consider space for at least three half-height devices the absolute minimum. Two of these should be externally accessible: one

for a floppy drive and one for a tape backup. If the third half-height bay is designed for 3½-inch drives, keep in mind that you won't find (at least in the short term) any drives larger than 120MB.

Three externally accessible half-height bays (in case you want to add another floppy drive) and one full-height bay (for an extra-large hard disk) are recommended. For a tower unit that you plan to use as a network server, expect to find space for two full-height internal drives.

#### Quality Control

You may not own a white lab coat, but if you're buying a no-name 20-MHz 80386 PC, a quick look under the hood is a good idea. The following spot checks may save you a lot of heartache:

*Look for "80386-20" on the CPU.* Some companies have had trouble procuring 80386-20 chips and have installed 80386-16 chips instead. Although there's some controversy, many experts (including Intel) agree that this substitution decreases reliability. If you see the suspect 16 in a supposedly 20-MHz system—or if there's no suffix at all—play it safe and walk on by.

*Make sure the coprocessor socket is accessible.* A number of 80386 systems hide the 80387 coprocessor socket under welded-in drive cages, power supplies, or other immovable objects. In such cases you must re-

move the motherboard to install a coprocessor—not a fun job.

*Rattle the cage.* The inner chassis, particularly the drive cages, should be solidly built; this goes double for towers, which are more likely to get bumped. Look for bad signs like loose connections, crushed ribbon cables, and more than a couple of patch wires.

*Check the keyboard socket.* Avoid machines with the keyboard socket soldered onto and supported by the motherboard; this setup can crack the board over time, effectively trashing your system.

*Read the fine print on the warranty.* Although many companies now offer a year's on-site service, some imply that it's free when it's not. Also check for details like how close your site must be to the repair center, who pays shipping charges while the warranty is still in effect, availability of phone support, and so on. Nothing enhances a high-performance computing experience like an ironclad warranty agreement. ●

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





## WHERE TO BUY

**Acer Technologies Corp.**  
401 Charcot Ave.  
San Jose, CA 95131  
408/922-0333

**Advanced Logic Research**  
30 Chrysler Ave.  
Irvine, CA 92718  
714/581-6770

**Advantech Corp.**  
261 Cedar Hill St.  
Marlboro, MA 01752  
508/481-6009

**Alphanumeric Int'l**  
1360 E. Firestone,  
Ste. F  
Santa Fe Springs,  
CA 90670  
213/921-8689

**AMAX Engineering Corp.**  
47315 Mission Falls  
Ct.  
Fremont, CA 94539  
415/651-8886

**American Mitac**  
410 E. Plumeria Dr.  
San Jose, CA 95134  
408/432-1160

**Amstrad, Inc.**  
1915 Westridge Dr.  
Irving, TX 75038  
214/518-0668

**Arche Technologies, Inc.**  
48835 Kato Rd.  
Fremont, CA 94539  
415/683-6760

**AST Research, Inc.**  
2120 Alton Ave.  
Irvine, CA  
92714-4922  
714/863-0181

**AT&T**  
4513 Western Ave.  
Lisle, IL 60532  
312/971-6000

**C2 Micro Systems, Inc.**  
1205 Fulton Place

Fremont, CA 94539  
415/683-8888

**Cheetah Int'l**  
1003 W. Cotton St.  
Longview, TX 75604  
800/243-3824

**Club AT**  
3401 W. Warren Ave.  
Fremont, CA 94539  
415/490-2201

**Compaq Computer**  
20555 RM 149  
Houston, TX 77070  
713/955-3682

**Computer Classifieds**  
17830 N.E. 5th Ave.  
Miami, FL 33162  
305/651-5853

**Computer Expert, Inc.**  
1501 Broadway  
#2605  
New York, NY 10036  
212/840-2010

**Cordata**  
1055 W. Victoria St.  
Compton, CA 90220  
213/603-2901

**CSS Laboratories, Inc.**  
1641 McGraw Ave.  
Irvine, CA 92714  
714/852-8161

**Dell Computer Corp.**  
9505 Arboretum  
Blvd.  
Austin, TX  
78759-7299  
512/338-4400

**Dyna Computers, Inc.**  
3081 N. 1st St.  
San Jose, CA 95134  
408/943-0100

**Everex Systems, Inc.**  
48431 Millmont Dr.  
Fremont, CA 94538  
800/356-4283

**Fivestar Electronics**  
12900 Valley Branch  
#400  
Dallas, TX 75234  
214/242-7000

**Fortron Corp.**  
2380 Qume Dr., Ste. F  
San Jose, CA 95131  
408/432-1191

**General Technologies, Inc.**  
619 Bloomfield Ave.  
Bloomfield, NJ  
07003  
201/429-0053

**HEI Computer Systems**  
4655 Ridge Rd. W  
Spencerport, NY  
14559  
716/352-1102

**Hewlett-Packard**  
1820 Embarcadero Rd.  
Palo Alto, CA 94303  
408/720-3882

**Hyundai Electronics America**  
4401 Great America  
Pkwy., 3rd Floor  
Santa Clara, CA  
95054  
408/986-9800

**IBM**  
Old Orchard Rd.  
Armonk, NY 10504  
914/765-1900

**Intelligent Data Systems**  
6319 E. Alondra  
Blvd.  
Paramount, CA  
90723  
213/633-5504

**Ivy Micro-computer**  
15 Ararat St.  
Worcester, MA  
01606  
617/853-6914

**Kaypro**  
533 Stephens Ave.  
Solana Beach, CA  
92075  
619/481-3900

**Laser Digital, Inc.**  
1024 Morse Ave.  
Sunnyvale, CA  
94086  
408/747-1966

**Matrix Digital Products, Inc.**  
6430 Variel Ave. #103  
Woodland Hills, CA  
91367  
818/772-6122

**Micro 1**  
557 Howard St.  
San Francisco, CA  
94105  
415/974-5439

**Micro Express**  
2114 S. Grand Ave.  
Santa Ana, CA  
92705  
714/662-1973

**Mitsubishi Electronics America, Inc.**  
991 Knox St.  
Torrance, CA 90502  
213/515-3993

**NEC**  
1414 Massachusetts  
Ave.  
Boxborough, MA  
01719  
617/264-8000

**Osicom Technologies**  
198 Green Pond Rd.  
Rockaway, NJ 07866  
201/586-2550

**PC Designs**  
2500 N. Hemlock Cir.  
Broken Arrow, OK  
74012  
918/251-5550

**PC Values**  
1004 Magnolia Ave.  
Larkspur, CA 94939  
415/461-0811

**Proteus Technology**  
377 Rte. 17S, Airport  
17 Ctr.  
Hasbrouck Heights,  
NJ 07640  
201/288-8629

**QIC Research, Inc.**  
1961 Concourse Dr.,  
Bldg. CN  
San Jose, CA 95131  
408/432-8880

**Seattle Telecom & Data, Inc.**  
12277 134th Ct. NE  
#205  
Redmond, WA  
98052-2429  
206/820-1873

**SEFCO**  
7037 Laurel Canyon  
Rd.  
N. Hollywood, CA  
91605-5738  
818/888-8880

**Sirex**  
36-38 35th St.  
Long Island City, NY  
11106  
718/392-3307

**Spear Technology**  
710A Landwehr Rd.  
Northbrook, IL  
60062-2310  
312/480-7300

**Systems Integration Assoc.**  
222 E. Pearson Ave.  
#502  
Chicago, IL 60611  
312/440-1275

**Tandon Computer**  
405 Science Dr.  
Moorpark, CA  
93021  
805/523-0340

**Tandy**  
1800 One Tandy  
Center  
Fort Worth, TX  
76102  
817/390-3700

**Tatung Co. of America, Inc.**  
2850 El Presidio St.  
Long Beach, CA  
90810  
213/979-7055





# **SUN 386i**

**PROMISE FOR PROFESSIONALS**

*Michael Goodwin*

**Sun's 386i  
workstation  
promises a turnkey,  
multitasking, network  
solution for offices  
where time is more  
important than money.  
But delivery on  
that promise is  
still somewhere in  
the future.**

**I**n many busy offices, it isn't cost that keeps a high-powered network out—it's time (and billings) lost when professionals must put work aside so someone can install the hardware. Productivity and profits are further sapped while everyone must struggle to master the complex new system.

Sun Microsystems is aiming its brand-new 386i workstation at offices just like these. It is not cheap—you'll have to spend between \$7990 (for a diskless, monochrome, 20-MHz unit) and \$21,990 (for a 25-MHz color system with a 327MB hard drive). But for businesses that can afford to throw money at problems, Sun claims the 386i provides fast and painless installation, virtually automatic networking, extensive on-line help, and extraordinary ease of use—including error messages in plain English.

The 386i sounded so much like a dream machine that *PC World* decided to take it for a quick test drive. Although a number of problems undercut Sun's claims, the machine is still undeniably impressive.

The 386i is an 80386-based system with a built-in 80387 math coprocessor (either 20 MHz or 25 MHz, depending on CPU speed) and support for high-resolution (1152 by 900) displays. It comes in two basic configurations: The Model 150 is a 20-MHz machine with 4MB of 32-bit RAM; the Model 250 is a 25-MHz system with 8MB of 32-bit RAM; both models are expandable (via full-speed memory boards) in 4MB increments to 16MB of memory, and both run the tried-and-tested UNIX multitasking operating system.

The 386i boasts three critical capabilities. Since all system software is preinstalled on the hard disk and high-speed ethernet hardware is built into every machine, setting up a network can be fully automatic. In fact, Sun claims a totally inexperienced user can set up a working network, out of the box, in less than 30 minutes! Second, the graphic icon-based SunView interface insulates the user from the UNIX command line and its alphabet-soup syntax. Perhaps even more important, the system can run most of your favorite DOS applications in separate windows and even multitask them.



### Setting Up Is Not Hard to Do

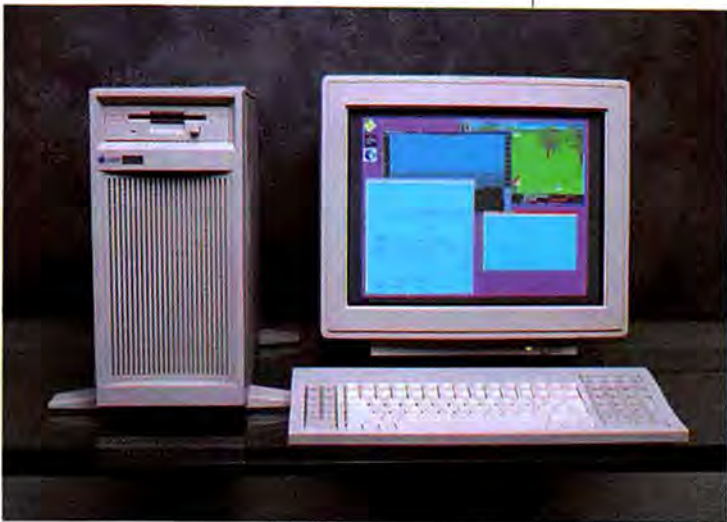
The vertical-standing system unit is smaller than you might expect, given its capabilities. It includes one 3½-inch floppy drive, one 8-bit and three 8/16-bit AT expansion slots, and a three-button Logitech mouse. The 107-key keyboard includes all the standard characters, plus a top row of familiar function keys and a row of special SunView keys such as Help, Find, Undo, and so on. You can choose between three high-res color monitors (14, 16, and 19 inch) and two monochrome displays (15 and 19 inch).

Using the seven-page Quick Start pamphlet, it was possible to set up and connect two 386i's in just 45 minutes; most of that time was spent pulling the hardware out of the boxes. Getting the network running was another story. Theoretically, you set up the first 386i as the network server by following a simple installation menu. Hook up another machine, and it connects and configures itself automatically. Unfortunately, the auto-install system performed a bit like the fully automated airplane in the old joke ("Relax and enjoy your flight, your flight, your flight..."). When the second machine tried to link up to the network, the message 'Automatic System Installation experienced an error because of an unknown failure mode' popped onto the screen.

After several unsuccessful attempts to resolve the problem, I called Sun. A technician informed me that both the Automatic System Installation software and SNAP (the System and Network Administration Program) are being sold in *prerelease* form, and that some bugs (including the one that bit me) are still being chased down; a fully functional release is due in late 1988. Meanwhile, with his help (and some finger-twisting UNIX commands), I reinstalled the software on the second machine from scratch; it then succeeded in making the network connection automatically.

### SunView: UNIX Made Over?

Once the system is up and running, users will find themselves face-to-face with SunView, an attractive, full-color interface with Macintosh-style icons and pop-up menus.



SunView is gorgeous on both the 16- and 19-inch color monitors.

SunView does *not* benefit from the 386i's overly sensitive mouse, which overshoots a desired menu choice at the tiniest fingertip tremble. The three buttons can also be confusing; some functions require a left-button click, others a right-button click, still others a middle-button drag—and you're not always told which button to press.

Still, when SunView works, it succeeds quite nicely in keeping UNIX well concealed. A number of powerful, easy-to-use programs are built in, including a full-featured text editor, a network administration utility, an E-mail system, Sun Organizer (a powerful, icon-oriented disk manager that performs file operations across the network), an analog clock, a utility that schedules automatic system backups, and a hypertext help facility. The interface, from screen colors to window position, can largely be defined by the user.

Files appear on the desktop as icons—text files are pages, executable files are

**The Sun 386i workstation promises instant networking, painless installation, and error messages in plain English.**



gears, and so on. SunView utilities appear as special icons (E-mail is a stamp; the text editor is *ABC's*); when you click them, they explode into tiled, resizable windows. Multitasking is supported, and you can run any number of applications simultaneously in separate windows.

The 386i has two error modes, neither very helpful. One produces chatty messages that read like excuses: 'There seems to be no boot server on the network which can respond to this system. They might be down, or overloaded, or perhaps the problem is with the network itself. Waiting for the problem to go away...'. Otherwise, SunView reverts to its native tongue, UNIX: 'pw\_int polling mode is unsupported.' UNIX error messages aren't explained in the user manual, so if a UNIX guru isn't handy, you'll probably find yourself learning more about this difficult operating system than you wanted to.

Networking under SunView is convenient and efficient, both for users and the administrator. Log-on, via a simple menu, is by name and password. Once you're on the net, peripherals like printers can be shared easily, and you can use files across the network automatically. File and directory security is simple to set up; file and record locking, when required, is handled by application software.

#### Window on DOS

Although some familiar applications (such as *AutoCAD*, *Interleaf Publisher*, and *Word-Perfect 4.2*) are available in UNIX versions, most popular PC spreadsheets, data bases, and word processors are not. To make sure business users aren't cut off from their favorite software, the Sun 386i handily emulates a DOS environment using its Phoenix BIOS and the 80386's virtual mode.

You can open as many DOS windows as you like, either by clicking a listed DOS application or by clicking the DOS icon and loading the program from the prompt. Each window provides 640K of conventional RAM and 8MB of EMS 3.2-compatible expanded RAM. Text can be copied from one DOS window to another and between DOS and

UNIX windows, but graphics cut and paste is possible only between certain UNIX applications. Monochrome and CGA graphics are supported; for EGA and VGA you must install an option board.

Sun's DOS emulation is not without problems. The text's small size makes it hard to read, and though you can resize the window itself, the text remains tiny. Another annoyance: DOS applications load in monochrome mode unless a *MODE CO80* command is first issued at the DOS command line. And although software compatibility (including with most TSRs) generally seems excellent, *Microsoft Windows* won't run, and *SideKick* behaves erratically. Sun promises to exterminate these bugs—and any others reported by users—at no extra cost.

Multitasking with DOS applications works flawlessly, although moving or resizing windows suspends processing temporarily. As with all multitasking systems that rely on the 80386's virtual mode (see "Multitasking Without OS/2," *PCW*, November 1988), only one window can use the COM port at a time; you must reassign access manually whenever another application needs the port.

#### Not Quite Ready for Prime Time

Although the 386i doesn't yet live up to its advertising, it's clearly going to move Sun out of the engineering workstation ghetto and into the broader business marketplace. Once installation is foolproof and text in the DOS window is legible, this system is going to be worth throwing money at. ●

*Michael Goodwin is an associate editor for PC World.*

#### FOR MORE INFORMATION

##### Sun 386i

Sun Microsystems, Inc.  
2550 Garcia Ave.  
Mountain View, CA 94043  
415/960-1300

Reader service no. 800



# Born to run.

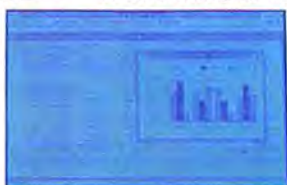
Most computers struggle to develop a talent for music. One was born with it:

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 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.



*The C1 gives you access to thousands of programs for music and business—with a high-resolution 640x400 screen.*

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.

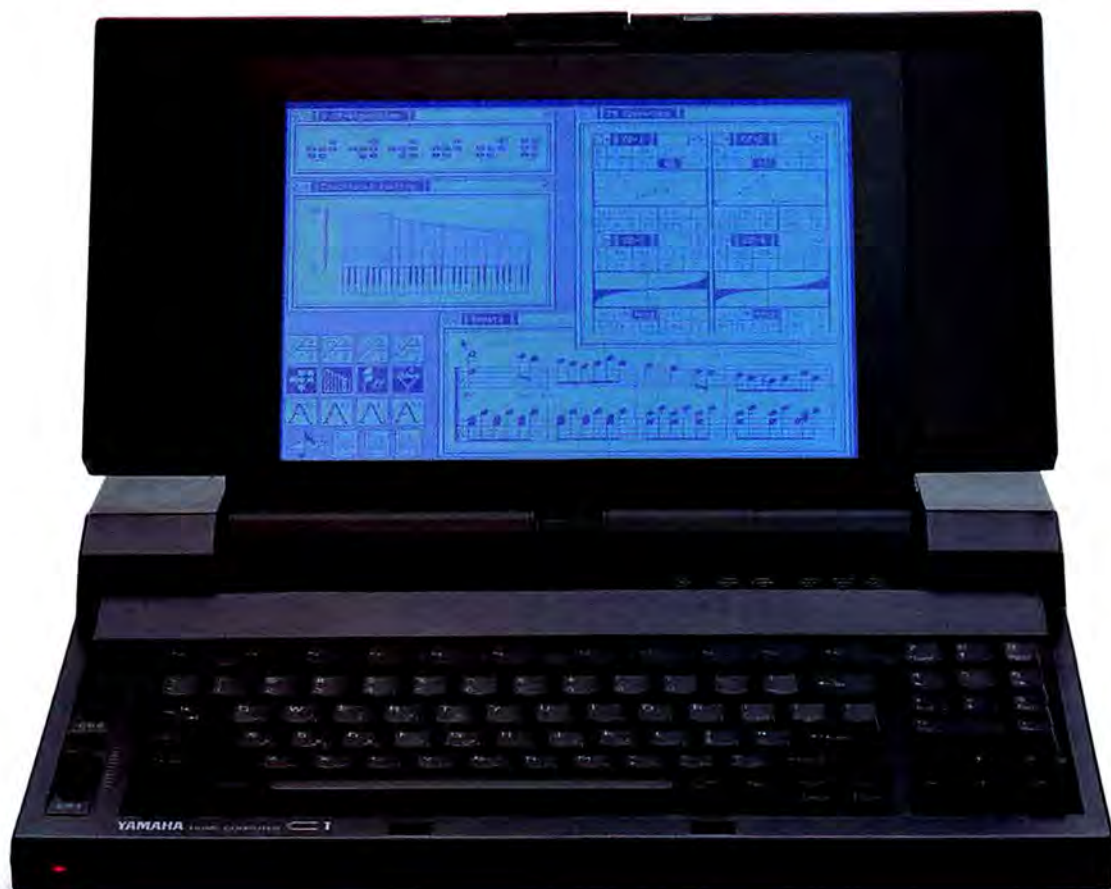
So whether you are sequencing, designing new sounds or simply trying to keep track of your vast wealth, call 800-333-4442 for your nearest authorized Yamaha C1 dealer.

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



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

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**



# Which PC business software and which will give you big

Now you can know **for certain**—with the unique comparative ratings resource

Every single day, a new business software package hits the market. Each claims to be "the best." But who's kidding whom?

How can you be *sure* a program will do all it claims? That it will meet your system requirements? That your people will be able to master it?

Shouldn't there be a place to turn for answers? An authoritative and *objective* resource that helps you make the *right* choices, so you can select *exactly* the programs that fit your needs?

There is. It's called *Software Digest*. It's the *single, most trusted resource* for impartial, systematic evaluations of IBM-compatible PC software.

**"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."**

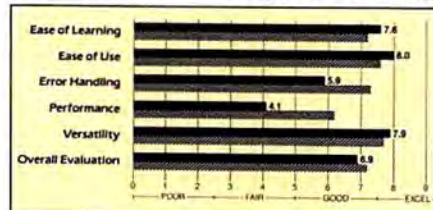
— Richard Landry, Editor, PC World

## The ultimate software reference tool.

*Software Digest* is the *ultimate* reference source.

It's not for everyone. But if you need to go *beyond* the ads and the reviews...if you require a *higher, deeper level of analysis*...if your work calls for *accurate, comprehensive, scientific* evaluations...then this is the place to turn.

*Software Digest* has pioneered an original, exclusive methodology for evaluating



Side-by-side bar charts show how programs score on 5 key test criteria.



Each program is subjected to an exhaustive series of "hands-on" tests by typical computer users at all experience levels.

software. It combines technical testing with practical, "hands-on" sessions involving typical users at all experience levels.

Under these controlled conditions, we scrutinize each program, and compare all of them head-to-head. Each is tested not just once, but *many times*, under strict rules that ensure consistency and objectivity.

A systematic series of tests measures *ease of learning, ease of use, error handling, versatility, performance* and more.

The result is an absolutely unparalleled set of *comparative ratings* for a wide range of IBM-compatible PC software — including every major business application:

✓Spreadsheet programs ✓Databases (multi-user, relational, SQL and file managers)  
✓Word processing (both simplified and advanced) ✓Project management ✓Business graphics ✓Free-form graphics  
✓CAD ✓Communications ✓Accounting  
✓Desktop publishing ✓Integrated programs  
✓Backup systems ✓Local area network software ✓And more

Couldn't the concrete, research-based data supplied *only* by *Software Digest* help you improve your product selection decisions?

## From PC World's official research facility.

*Software Digest* has a firm policy of accepting *no ads*. We are 100% subscriber-supported. 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. We tell the *whole truth* — and let the chips fall where they may.

Last year, *PC World* selected us as their official testing facility.

In a major editorial in the October 1987 issue, *PC World* Chairman David Bunnell commented: "*NSTL has the reputation for undertaking the most comprehensive performance and versatility tests of hardware and software products in our industry... They're going to tell it like it is — not sell it like it is.*"

## Monthly "Buyer's Alert" keeps you on top.

Another important plus: We monitor the fast-changing software marketplace for you on an *ongoing* basis.

Each issue of *Software Digest* includes *Buyer's Alert*. This useful monthly supplement covers program upgrades and enhancements, performance testing updates, previews of new products we're evaluating...and much more.



Each program receives its own detailed two-page report.

Users applaud *Software Digest's* graphic format. Test results are *clear, readable and accessible*. You can see *instantly* how competing programs stack up against each other.

Perhaps most important, *everything you need to know is in one place*. So you don't have to plow through stacks of material searching for answers.

**"Software Digest is the 'Consumer Reports' of software."**

— Richard Concalidi, Dearborn Chemical Co., Lake Zurich, Ill.

*How long would it take you and your staff to match this kind of research and analysis? How much would it cost?*

Imagine the investment in time, money, effort, manpower! To test just *one category* of software for a typical issue of *Software Digest* requires 3,000 man-hours and an expenditure of \$50,000.



**that gives you reliable answers before you buy!**

**PUBLISHED BY NSTL**  
(National Software Testing Laboratories)  
— the official research facility of  
**PC WORLD**



# No Matter How It's Protected, Be Sure You Can Back It Up.

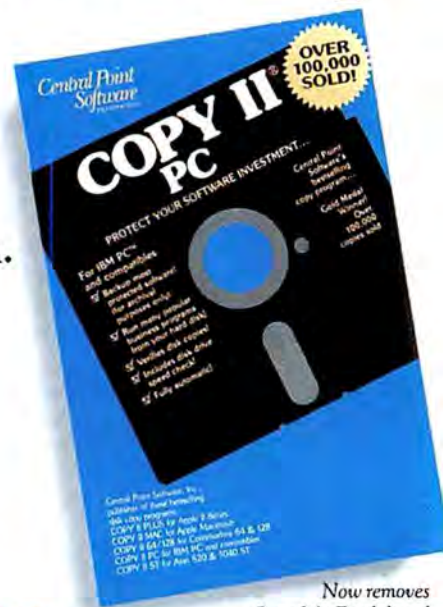
Several products can back up protected software. But only two are tough enough to handle even the trickiest protection schemes.

**Copy II PC**, for just \$39.95, backs up more protected software than any other program. What's more, it can remove copy protection already on your hard disk. *PC Magazine* calls it the "easiest of such programs to use." And now, with our menu-driven Noguard, it's a snap. Copy II PC easily handles Lotus 1-2-3 and over 100 other top-selling programs.

For the ultimate solution, try the **Copy II PC Deluxe Option Board**. For just \$159, it gives you the same advanced technology used by commercial disk duplication firms.

*PC Magazine* reported it "could not find a program this board couldn't handle." It's so powerful, in fact, it even lets you read and write Mac data files in a IBM PS/2 Model 25 or 30, or a PC or AT with a 3.5" internal drive.

No matter how it's protected, be sure you can back it up. For the dealer nearest you, or to order direct, call (503) 690-8090, M-F, 8 a.m. to 5 p.m. (West Coast time).



Now removes  
Superlok, Everlok and  
Prolok copy protections.



## Copy II PC Copy II PC Deluxe Option Board

**Central Point  
Software**  
INCORPORATED

15220 N.W. Greenbrier Pkwy. #200  
Beaverton, Oregon 97006  
(503) 690-8090





## CONSUMER WATCH

### Advice and information for the computer consumer

Think the days of vaporware  
are over? Here's how to protect  
yourself when vendors don't  
deliver.

Anita  
Amirrezvani

In the old days (five years ago), a product like *Ovation* could be announced, discussed, pre-viewed, marketed, and featured in magazines but never released, giving rise to the term *vaporware*. By contrast, most of today's hardware and software actually makes it off the drawing board, but so slowly that *ambleware* is a more fitting term.

The *Consumer Watch* mailbag often contains letters from readers who feel they've been deliberately misled about product availability. Take Craig Sutton, a reader in Dallas who tried to buy a System 100 in July from Dell Computer. "I probably spent 15 minutes talking on the phone with one of their salespeople about the System 100, and he never mentioned that it was not available," writes Sutton. "When I called back to place an order, I was informed that the machine was not yet in production, and that it would be 'substantially more expensive' than advertised."

At first the System 100 was put on hold because it didn't get Federal Communications Commission Class B approval. No orders were taken, according to Dell spokesperson Brian Fawkes, because FCC regulations prohibit order taking for unapproved machines. In August Dell announced that it was canceling the 8088-based system altogether, probably because of unpromising sales forecasts.

Even more difficult for reader Robert van Hulst, a biology pro-

fessor at Bishop's University in Lennoxville, Quebec, was his wait for a 32-bit memory board from Hauppauge Computer Works. Professor van Hulst says advertisements prompted him to order the board in November 1987, but he was told it wasn't available. When he finally ordered it in early 1988, he learned he was number 170 on a waiting list and was told to expect a 5-week wait. In June he still hadn't received the product, and when he called again about the delay, he learned that shipment was still 12 weeks away.

According to Hauppauge vice president Ken Plotkin, two factors led to the delays: a bug in the board that caused OS/2 to crash, and a shortage of RAM. "The bug was fixed in April; then we needed two more months to produce the board," says Plotkin. "Now the backlog has been cleared up."

Of course, when vendors like Hauppauge delay products to fix bugs, they're doing the right thing for consumers. In one of this year's major announcements, Ashton-Tate disclosed its decision to delay *dBASE IV*, reportedly to get rid of buggy code. Under deadline pressure many vendors have just shipped products complete with conspicuous bugs, causing users much more trouble than a long wait.

The first release of a software package is naturally more prone to bugs than a long-established  
(continues)

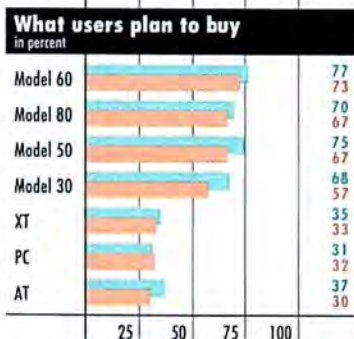
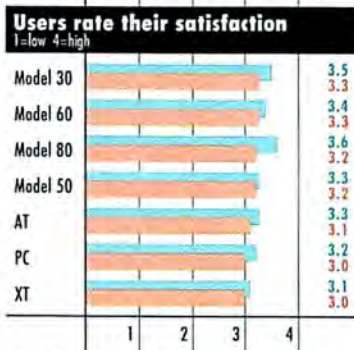
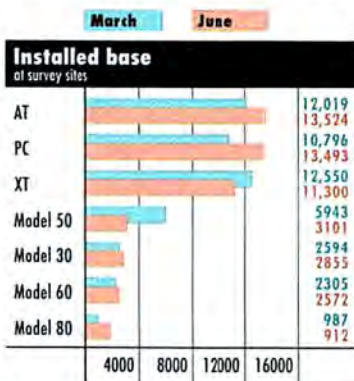


## RATE YOUR SATISFACTION: IBM

The AT, XT, and PC are still the most common IBM computers, according to a survey by International Data Corporation. But now that IBM has ceased production of those models, most survey sites (large organizations with at least 50 PCs) are turning to PS/2s.

A significant majority say they plan to buy Models 50, 60, and 80. Polls taken in March and in June indicate diminishing interest in the less powerful Model 30. And although user satisfaction ratings for all models were fairly high, users polled in June were generally less satisfied than those surveyed earlier this year.

Next month, we look at IBM's competitors.



Source: International Data Corporation. From surveys of about 200 large organizations conducted in March and June.

product. But even upgrades to old favorites can be problematic: *WordPerfect 5.0* and *DOS 4.00* both shipped with problems that had to be fixed in later maintenance updates.

For consumers, delays are worthwhile if they prevent odious chores like costly and time-consuming upgrades. The Microcomputer Managers Association estimates that upgrading 100 packages of a single product might easily take a company an entire year and require 450 hours of work—for product testing, collection of old system disks, new product installation, and training. When Lotus delayed its new release of *1-2-3* to retool core code for multiple environments, it put users on hold—but at least its goal is to shorten the upgrade path.

Certainly there are plenty of good reasons for delays, but the root of the problem is that many vendors announce unrealistic ship dates. As a result, sophisticated PC users are extremely skeptical about ads and announcements. "Personally, I don't put my money on the table until a product has been out for six months and proven to work," says Brian Camenker, executive director of the Boston Computer Society's IBM PC Users' Group.

Under federal law, no specific statute prohibits computer companies from advertising products before they're available. "The Federal Trade Commission Act just says that deceptive practices are unlawful," says Joel Winston, advertising program advisor for the FTC in Washington, D.C. "Deceptive is a matter of interpretation that depends on things

like the wording of the ad and whether reasonable consumers would be misled."

But when products slip way behind schedule, there are ripple effects. Dealers and mail-order companies find themselves advertising products they can't possibly provide. Those that accept back orders face irate customers if delivery dates continue to slip. In the interim, consumers end up without their cash or their goods.

However, consumers who order products by mail (not by phone) are covered by the FTC's mail-order rule, which stipulates that vendors must ship a product within 30 days of receiving the order unless they've clearly specified a different ship date. If vendors can't meet the deadline, they must inform consumers about the delay and offer the opportunity to cancel. Companies are also required to provide a refund within 7 working days (or one credit card billing cycle) of cancellation.

When ordering a product by mail—especially if delays are likely—it's a good idea to put all assumptions about the purchase in writing. In *The Consumer Protection Manual* (Facts on File, New York, 1984), author Andrew Eiler suggests writing a letter that spells out the conditions of the sale—what you're buying, how much it costs, and other essential points.

For example, consumers can specify that "this order may be accepted only by the prompt shipment of conforming goods," meaning that even if a check is enclosed, the purchase agreement doesn't exist until the vendor ships the product or promises to do so by a given date. According to Eiler, consumers (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

4CK99

## ☒ 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

4CK99

## 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

2AN09





**BUSINESS REPLY MAIL**

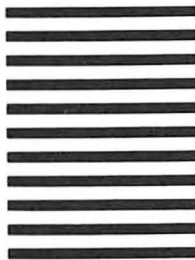
FIRST CLASS PERMIT NO. 1262 BOULDER, CO

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**



NO POSTAGE  
NECESSARY  
IF MAILED IN  
UNITED STATES







# Above & beyond the call.

## Software

### Word Processing/ Desktop Publishing

Byline	\$ 199
Microsoft Word	\$ 219
Multimate Advantage-II	\$ 269
Lotus Manuscript	\$ 339
Office Writer/Speller	\$ 249
Pagemaker 3.0	\$ 549
PFS: Prof Write	\$ 119
Publisher's Type Foundry	\$ 259
Sprint	\$ 129
Ventura Publisher	\$ 519
Word Perfect 5.0	\$ 229
Wordstar Pro 5.0	\$ 259
Wordstar 2000 + 3.0	\$ 229
Xywrite III +	\$ 229

### Database Systems

Clipper	\$ 449
DBase III Plus	\$ 389
Dataease	\$ 389
Data Perfect	\$ 299
Foxbase +	\$ 199
Paradox 2	\$ 429
PFS: Prof File	\$ 149
Q&A	\$ 209
R Base for DOS	\$ 479
Reflex	\$ 99

### Spreadsheets/ Integrated Packages

Javelin +	\$ 169
Lotus 1-2-3	\$ 309
Lotus Agenda	\$ 269
Lotus Hal	\$ 49
Lucid 30	\$ 99
Microsoft Excell	\$ 319
Microsoft Works	\$ 139
Quattro	\$ 129
Smart System	\$ 449
SuperCalc 4	\$ 299
Symphony	\$ 449

### Communications

Carbon Copy +	\$ 119
Crosstalk XVI	\$ 99
Crosstalk MK 4	\$ 125
Procom +	\$ 59
Relay Gold	\$ 149
Smarterm (Persoft)	\$ Call
Smartcom III	\$ 149

### Statistics

SPSS/PC +	\$ 699
Statgraphics 2.6	\$ 479
Systat 4.0	\$ 519

### Desktop Environments

MS Windows 286	\$ 69
Sidekick Plus	\$ 129

## Graphics

Chartmaster	\$ 219
Design CAD	\$ 159
Diagraph	\$ 259
Diagram Master	\$ 199
Freelance Plus	\$ 329
Graph Plus	\$ 259
Micrografx Designer	\$ 449
Harvard Graphics	\$ 279
MS Chart	\$ 269
PC Paintbrush Plus	\$ 89
Picture Perfect	\$ 199
Presentation Pak	\$ 349
Publishers Paintbrush	\$ 159

### Project Management

Harvard Total	\$ 369
Project Manager II	\$ 329
Microsoft Project 4.0	\$ 289
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
Toshiba Lap Tops	\$ Call

### Multifunction Boards

AST Advantage	\$ 329
Premium (512K)	\$ 129
AST 6 Pak Plus (64K)	\$ 189
AST Rampage/2 (0K)	\$ 419
AST Rampage 286	\$ 299
Everex RAM 4000	\$ 1050
Inboard 386AT	\$ 750
Inboard 386 PC	\$ Call
Intel AboveBoard	\$ Call

### Display Boards

ATI EGA Wonder +	\$ 229
Hercules Network	\$ 349
Card Plus W/Tops	\$ 259
Paradise VGA Plus	\$ 259

### Modems

Hayes 1200/1200B	\$ 299
Hayes 2400/2400B	\$ 449
Practical Modem 1200 Int.	\$ 79
US Robotics 2400B	\$ 159
Ventel 2400/2400B	\$ 389
Ventel 2400/2-PS2	\$ 299

### Networking

Arcnet Board—SMC	\$ 149
Novell Adv. Netware 286	\$ 1799
Novell ELS	\$ 389
Tops For DOS	\$ 119

## Emulation Boards

AST 5251-11 +	\$ 629
Irma/2 PCA/MCA	\$ 725

### Monitors

Amdek 410A	\$ 149
NEC MultiSync II	\$ 629
NEC Multisync GS	\$ 199
Princeton HX-12 +	\$ 439
Princeton MAX-12E	\$ 149
Samsung Color	\$ 239
Zenith ZVM 1490	\$ 679

### Printers/Plotters

Dest PC Scan 2020	\$ 1499
Epson FX-286E	\$ 499
Epson FX-1050	\$ 549
Epson LQ1050	\$ 819
HP 7475A	\$ 1499
HP Laserjet II	\$ 1795
LQ-500	\$ 379
NEC 5300	\$ 749
NEC P2200	\$ 369
Okidata 320	\$ 375
Okidata 321	\$ 519
Okidata 393	\$ 1050
Okidata 293E	\$ 675
Panasonic	\$ Call

The Complete Hand Scanner	\$ 169
Toshiba P321SL	\$ 589
Toshiba P341SL	\$ 769
Toshiba P351SX	\$ 1175

### 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
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.

**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 Mastercard—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.



can also specify that the order be canceled if the vendor doesn't accept the terms of the letter.

Of course, writing such a letter doesn't mean you'll get the product when promised, but at least you'll have proof of your agreement and leverage if things go wrong.

Consumer advocates point out that when advertised products aren't available, disreputable companies sometimes use bait-and-switch tactics to get users to buy other products. "Never accept a substitute, and don't make a down payment unless you're sure that the product's coming along," advises Sally Browne, director of consumer affairs for the Electronic Industries Association in Washington, D.C.

If you've ordered a product from a reputable company that keeps putting you on hold, pressure tactics may be in order. You can demand a refund; if the company refuses or fails to give your money back, you have leverage under the Fair Credit Billing Act if you charged the purchase to a credit card. Simply write to the credit card company within 60 days of receiving the bill, request that the charges be removed from your statement due to nondelivery, and include records of your transaction.

Off the record, vendors admit that the customer who complains the loudest usually gets the fastest service. So make a fuss about your order—you could get better results.

## SHOP TALK

### Demo Day

After reformatting a hard disk I found that I needed to recover some files as soon as possible. I went to a local computer store and asked for a copy of *The Nor-*

*ton Utilities Advanced Edition.*

The salesperson showed me a demo package and said that the store didn't stock the program but could order it overnight. He lent me a program disk, marked with orange demo stickers, which I returned two days later when I went in to pick up my order.

When I opened the new package and sat down to work, I noticed telltale rings of adhesive indicating that demo stickers had simply been peeled off. There was no registration card in the box. What can I do about the sale of a demo version as a new package?

*James E. Nugent  
Peoria, Illinois*

**Peter Norton Computing responds:** In a phone interview, marketing spokesperson Elizabeth Cundiff said Norton Computing doesn't condone the sale of demo packages and wants to know about it when it happens. Demo disks are fully operational, says Cundiff, but they don't come with serial numbers or registration cards. "Customers who think they got a demo disk should call us, and we'll issue a registration card, as long as they provide proof of purchase such as a sales receipt," says Cundiff.

Mr. Nugent is now a registered user of *The Norton Utilities Advanced Edition.*

### EGA, RGB, and Alphabet Soup

My company purchased a VIP VGA video adapter board after reading ATI Technologies' advertising and product literature, which clearly mentions that the product provides RGB support.

After installing the board and wasting a great deal of time troubleshooting the product, I called ATI's technical support department and found out that RGB support "was removed at the last minute."

*T. W. Kline  
Nashville, Tennessee*

### ATI Technologies responds:

The customer is referring to the interlace capability of the VIP board, which was discontinued due to the lack of market for this feature. Running interlace EGA on an RGB monitor is, in most cases, not an appropriate solution for upgrading to the EGA standard because of the flickering effect that interlace may generate. Users wishing to run interlaced EGA can use our EGA Wonder board.

In our current ad we still mention that we can run EGA on an RGB monitor. In keeping with the IBM EGA standard, an RGB monitor can be driven by an EGA board at 640 by 200 resolution but not at 640 by 350. Some consumers who are not fully aware of the limitations of IBM EGA believe that EGA is only 640 by 350 and expect this resolution to appear on their RGB monitor.

*Rick Osborne  
Technical Support*

*Editor's note: No one should expect a video adapter to produce 640 by 350 (EGA) resolution on a 640 by 200 (CGA) monitor or, for that matter, resolution of 640 by 480 (VGA) on an EGA monitor. However, consumers who aren't familiar with the relationship between video adapters and monitors could easily get confused by ATI's ad.*

*(continues)*



# WordPerfect 5.0 Users...Choose Sides

WORDPERFECT 5.0 DISPLAYS MULTIPLE

These Characters Are Shown

**Boldface** and underline look fine, but

Does your Italics look like this

Before, you couldn't tell whether

An outline font is good for titles,

It is important to be able to tell

And Small caps and double underline

Redline is designed to

When you want to display different

YOU USED TO HAVE TO GUESS, BUT

FONTS USING HERCULES RAMFONT CARDS

WHILE WRITING AND EDITING.

**what about** all the other possibilities?

*or can you really see italics?*

you had typed subscript or superscript.

only RamFont lets you display outline.

~~strikethrough~~ from underline.

Do NOT HAVE TO BE SO confusing.

help you **see changes**.

character sizes: Ee Ee Ee Ee Ee Ee

NOW YOU CAN SEE WHAT YOU MEAN.

Doc 1 Pg 1 Ln 1" Pos 1"

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

Hercules RamFont and graphics are available only on the Hercules family of video cards: The Hercules Graphics Card Plus, monochrome video with a parallel port. The Hercules Network Card Plus, monochrome video with a TOPS

"FlashCard" compatible network port. And the Hercules InColor Card, featuring the Hercules graphics and RamFont modes in 16 colors.

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

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

Hercules RamFont  
is the perfect gift  
for the 5.0 user  
you know.



## Hercules.

### The RamFont Advantage.

© Copyright 1988 Hercules Computer Technology, Inc., 921 Parker St., Berkeley, CA 94710. Hercules, InColor, and RamFont are trademarks of Hercules Computer Technology, Inc. All other product names are trademarks of their respective owners. Technical Support 415-540-0749, Sales 415-540-0212.

Circle 228 on reader service card



# How two can share 386 power for the price of one:

## Playing Games

Microsoft is world renowned for providing excellent software and support. The hospital I buy software for uses *Excel*, *Project*, and *QuickBASIC*, among others, and we have always been offered fair upgrade policies. Much to my surprise, when *Flight Simulator 3.0* was released, there was no upgrade policy. I called Microsoft and was told that due to the "low" price of \$49.95, no upgrade would be offered. The person I spoke with said that this was not really an upgrade but an entirely different program. Who was he trying to kid? It's still called *Flight Simulator*, and the company isn't planning to sell the old version anymore.

I purchased the program a month and a half before the latest release and can't believe Microsoft wants me to dish out another \$49.95 for EGA graphics and the ability to load the product from a hard disk, which should have been included in the first place.

Ronald L. Bellinger  
Milwaukee, Wisconsin

*Editor's note: In a phone interview, a Microsoft spokesperson said that an upgrade to Flight Simulator is not being offered because the new version is "practically a new product."*

*Even so, vendors should offer a break to people like Mr. Bellinger, who purchase their software in good faith a few weeks or months before the new release.*

## An Expanding Memory

To improve performance of *Windows 2.01*, I decided to buy an EMS 4.0 expanded memory board. On my first attempt, I bought a 3MB board made by  
(continues)

# TELL ME MORE!

FREE information on the products featured or advertised in *PC World* can be requested using the postage-paid Reader Service Card found in this issue.

**PC WORLD**



# 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



**Ask for Peachtree's "Double Bonus Bundle" And Save \$100.**

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.

**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. 3 1/2" media optionally available. Not copy protected.

## 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 13,000 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!

**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 Intelligent Systems Family

4355 Shackleford Road, Dept. PCW, Norcross, Georgia 30093



# 1. Buy this.



Kowei Electronic Corporation, but it turned out not to support the EMS 4.0 specification.

Next I bought an Everex RAM 3000 Deluxe EV159, which was advertised as an EMS 4.0 board. Just to be safe, I questioned the salesperson and even called Everex technical support; both assured me that the RAM 3000 Deluxe supported EMS 4.0. But when I installed the board, it didn't work right with *Windows*. After calling Everex's technical support again, I discovered that even the RAM 3000 is not really an EMS 4.0 board.

Stevan J. White  
Hayward, California

*Editor's note: Everex systems manager Alex Sy said in a phone interview that Mr. White's setup under Windows was incorrect and had been fixed to work with the board. But Mr. White brings up a good point—many boards, including the RAM 3000 Deluxe EV159, don't support all the features of EMS 4.0, even when they're advertised as EMS 4.0 compatible.*

Many of today's memory boards actually support EMS 3.2, an older specification, instead of EMS 4.0, and there's a critical difference. An EMS 3.2 board limits the amount of program code that can be run in expanded memory to 64K or less; so for all practical purposes, only data—not program code—can be shuffled into expanded memory. Unless you have an EMS 4.0 (or EEMS) board, you can't put a program like *Desqview* into expanded memory and take advantage of its multitasking capabilities. Another major difference is that an EMS 3.2 board can address only 8MB

(continues)

## Portrait of the Great American Investor



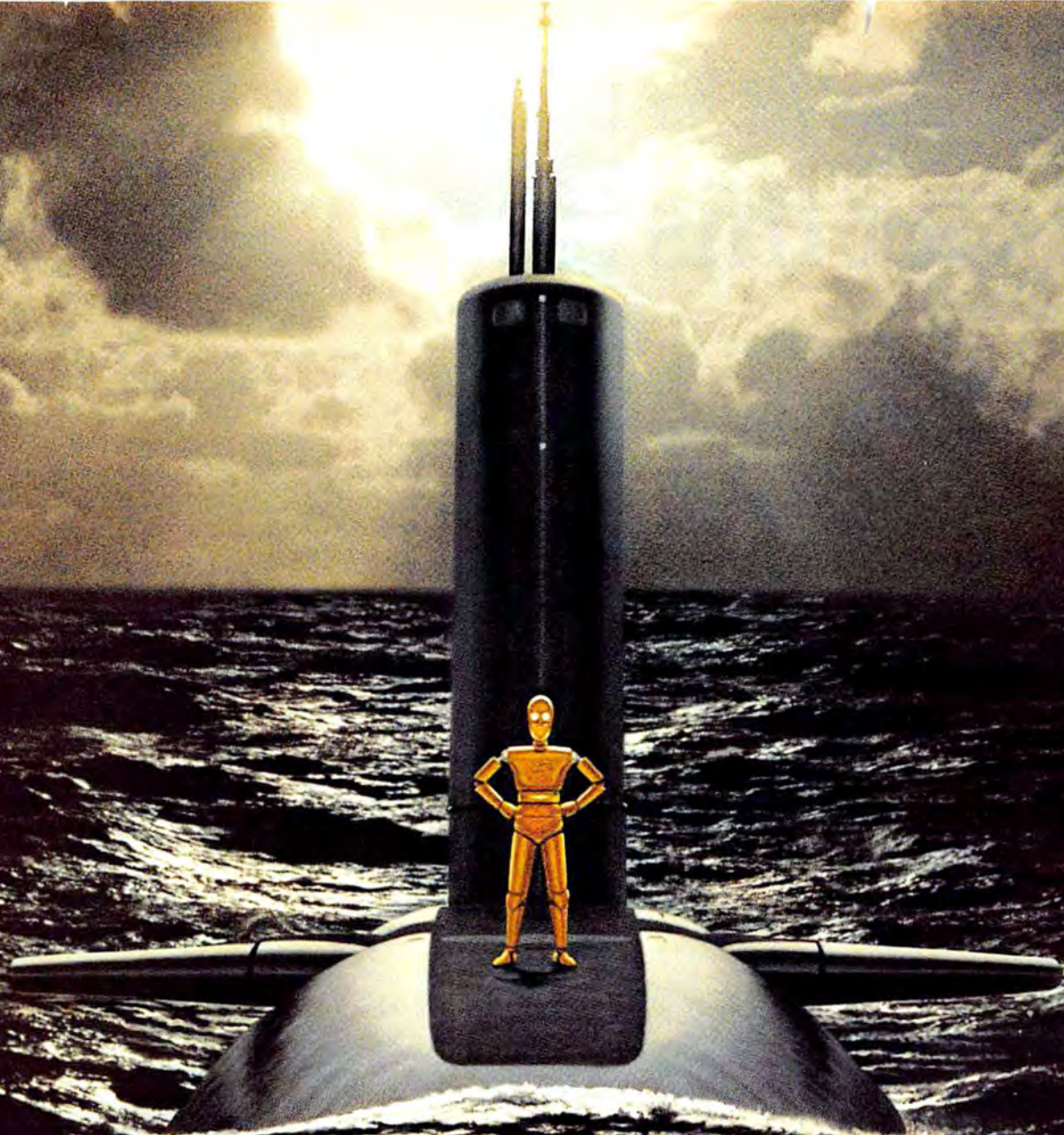
She'll go wherever the story takes her. She invests her time in her work and her money in U.S. Savings Bonds. Bonds now pay competitive rates, like money market accounts. Find out more, call 1-800-US-BONDS.

**U.S. SAVINGS BONDS**  
THE GREAT AMERICAN INVESTMENT

Bonds held less than five years earn a lower rate.



IBM/PC/XT/AT are registered trademarks of International Business Machines Corp. 688 ATTACK SUB is a trademark of Electronic Arts. Maxell Corp. of America, 22-08 Route 208, Fair Lawn, NJ 07410.



Play the game of the decade. Free.

It's a special Maxell edition of 688 Attack Sub, Electronic Arts' brilliant new simulation game for IBM PC/XT/AT and most compatibles. You'll command a crew aboard a fully-equipped top-secret billion dollar sub. Hunt or evade intelligent foes. Thrill to highly realistic 3-D graphics (256 colors in VGA mode). It's irresistible, easy to operate and it's yours on the free 11th disk in specially-marked MD2-D and MD2-HD 10-packs at your Maxell dealer. Don't delay.



Command the con of 688 ATTACK SUB.



**maxell**  
THE GOLD STANDARD



# 2. Get this free.



For a limited time, buy or lease an AT&T 6386 WorkGroup System and we'll give you a terminal and all the extras you need to hook up a second user free.

A free terminal can do more for your business than you might think. When two people share software and data they can solve twice as many problems. And by doubling employee access to software, data, laser printers, and other resources, you can double the usefulness of your investment. Whether your business needs to calculate spreadsheets, write reports, analyze

databases, or use any of hundreds of other applications, the 6386 WGS makes perfect business sense.

By unleashing 80386 power to a second user, the AT&T 6386 WGS gives twice as many people the option to run applications written for MS-DOS<sup>1</sup>, UNIX<sup>®</sup> System V, or XENIX<sup>1</sup>. Plus it's XT and AT<sup>2</sup> compatible.

For more information on how your business can benefit from this special 6386 WGS offer, contact your participating AT&T Authorized Reseller, your local AT&T Account Executive, or call 1 800 247-1212, ext. 931.

<sup>1</sup>MS-DOS and XENIX are registered trademarks of Microsoft Corporation.  
<sup>2</sup>XT and AT are registered trademarks of IBM.  
Duration of offer may vary.

©AT&T 1988



As  
American  
as...



It's true, our Consumer Information Catalog is filled with booklets that can answer the questions American consumers ask most.

To satisfy every appetite, the Consumer Information Center puts together this helpful Catalog quarterly containing more than 200 federal publications you can order. It's free, and so are almost half of the booklets it lists on subjects like nutrition, money management, health and federal benefits.

So get a slice of American opportunity. Write today for your free Catalog:

**Consumer Information Center  
Department AP, Pueblo, Colorado 81009**

U S General Services Administration

of RAM, while an EMS 4.0 board addresses up to 32MB.

Before buying a board that's supposed to support EMS 4.0, ask the following questions: Does the board allow for more than 64K of program code in expanded memory? Can the board access more than 8MB of RAM? Note, too, that some of the EMS 4.0 specifications are voluntary and aren't always observed even by the manufacturers that developed them. For best results, call the board maker's technical support department, describe the programs you need to run, and grill tech support about the product's capabilities.

## PC Plaudits

Recently I tried to install an Alarm-Card (a card that makes a loud sound if the PC is tampered with) into a Leading Edge Model D. But the card wouldn't fit in the slot. When I secured the card's mounting bracket to the back of the PC, the card hung over one end of the slot.

I immediately called Alarm-Card in Bellevue, Washington, and although the representatives had never encountered my problem before, they volunteered to mill new oval slots into the card for the mounting bracket screws so the card could be adjusted to fit the slot. Moreover, they sent the special card by express mail and arranged for prepaid pickup of the original card. Talk about service!

*Steve Lawrence  
Denver, Colorado*

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



# How Farsighted Executives Are Using Their PC's For The Fun Of Profit.

By William J. Spink

For years now you've been hearing about the wonderful things personal computers will do for The Executive of the 80's—at least in theory.

But what's the *reality*? Can a PC help you enjoy your work more and show a greater profit, here and now? According to your peers, the answer is "yes."

"With just a few keystrokes," says Al Lynch, Director of Corporate Planning and Research for JCPenney Company, "I can screen companies, find possible acquisitions or 'scope-out' competitors. It's a real competitive edge."

Walt Casey, V.P. of Communications at ConAgra says, "I spend a lot of time each day poking into this and tracking that. It's *much* easier when you can immediately get the facts from a computer, rather than having to make a series of phone calls."

"One of Dow Jones News/Retrieval's services, QuickSearch, is a Godsend," adds Jim Posner, a respected retail consultant. "It gives me detailed corporate reports within minutes—I don't even have to leave the office."

## Instant information: the executive advantage.

To lead in today's marketplace, you need information like *that*," Lynch says, snapping his fingers.

He recalls an example of how Dow

Jones News/Retrieval®—the business and financial information service from Dow Jones & Company, Inc.—gave JCPenney Company a real advantage.

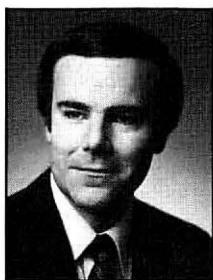
"Let's just say that a 'major player' in our industry was being acquired. Within a few hours we knew more about the takeover candidate than the bidder did. Honestly, we knew more than some investment bankers did."

## Decision-making with the leading edge.

"Then we started getting the corporate insider trading data," Lynch continues. "It showed us some things that influenced a major deal."



Al Lynch  
Director of Planning  
and Research,  
JCPenney Co.



Walt Casey  
Vice President  
Corp. Communications,  
ConAgra, Inc.



James Posner  
President  
James Posner  
Assoc. Ltd.

"This service really makes a difference in the day-to-day running of your business. It can pay for itself very quickly."

## Surprisingly easy.

All you need to access the service is a PC and modem. Using the service is

## What can you get from your PC?

Dow Jones News/Retrieval gives you . . .

- Exclusive online access to the full text of *The Wall Street Journal*
- Current and historical stock quotes
- Business news as it happens
- 10-K and 10-Q data
- Leading investment analysts' reports
- Complete corporate profiles

Over 40 services including MCI Mail®, the Official Airline Guide™ and more.

"No problem," according to Posner.

"There's no difficulty using the service. I ask for pointed, specific information and get exactly what I need. It's much easier than manual research."

Walt Casey agrees. "Dow Jones News/Retrieval is simple enough for anyone who's at all comfortable with computers to use it effectively from their very first day online."

## Making the right decision.

There are hundreds of online information services, many offering business data. How can you pick the best one?

"It was apparent from the first step that the most useful system was Dow Jones News/Retrieval," remembers Casey. "It offers so much of the information you're looking for—from general news and stock quotes, to data on our company and industry. It was the best single source."

"I've had other services, but Dow Jones News/Retrieval has the most useful business information in the right form," says Posner. "The time I spend 'playing' on the computer makes more money for me—and for my clients."

Now that's the *fun* of profit! ■

## Get 8 FREE hours online to experience the "fun of profit" on your PC.

YES, I'm ready to experience the fun of profiting from my PC. Send me a Dow Jones News/Retrieval® Business Membership Kit, including multiple passwords, 8 free\* hours of online time, a year of *Dowline*™ Magazine, a comprehensive User's Guide and waiver of my first year's annual \$12 service fee—for only \$49.95.

- ☐ \$49.95 Business Membership Kit  
☐ Bill me later  
 Charge to my ☐ Master Card ☐ VISA  
☐ AmExp  
 Acct.# \_\_\_\_\_ Exp. \_\_\_\_\_  
 If you pay by credit card, future charges will be billed to that account.  
 Signature(required) \_\_\_\_\_  
☐ Check enclosed

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City/State/Zip \_\_\_\_\_  
 Daytime phone \_\_\_\_\_  
 Computer make and model \_\_\_\_\_  
☐ Please send more information.

For faster service, call 1-800-221-7700, Ext. 323L today!

## DOW JONES NEWS/RETRIEVAL®

From Dow Jones & Company, Inc.

*The information that powers today's business.™*

DJN/R Membership Kit, P.O. Box 186, Drexel Hill, PA 19026-9973

323L

\*This offer expires December 31, 1989. Free time is per account. New domestic and Canadian subscribers only. Free time must be used within 30 days after receipt of password(s). Some additional fees may apply on certain services. ©1988 Dow Jones & Company, Inc. All rights reserved. MCI Mail is a registered service mark of MCI Communications Corp. The Official Airline Guide is a trademark of Official Airline Guides, Inc.



# Samtron Color Monitors Make Sense In Black & White.



Whether you want one color, no colors or 256 colors, Samtron monitors probably have all the specs you're looking for. Without all the usual expense. That's because we don't offer you every model under the sun. Only the most popular ones.

Like our new CGA, EGA and VGA series.

Which means they can be mass produced in Korea very economically. By Samsung, the world's largest monitor manufacturer.

Which also means their reliability is world class. And they're designed in the U.S. for a completely American look and feel.

So before you spend too much green on high-priced monitors, check out Samtron's colors.

You'll like the way their numbers look in black and white.

## SAMTRON

SAMSUNG ELECTRON DEVICES

**USA HEADQUARTERS**  
SAMSUNG ELECTRON DEVICES  
AMERICA, INC.  
TEL: (213) 802-8425  
FAX: (213) 802-8820  
**PARTS & OEM SERVICE**  
TEL: (714) 522-1282

**CUSTOMER SERVICE**  
EAST  
TEL: (800) 227-3378  
MID-WEST  
TEL: (800) 277-3378  
WEST  
TEL: (800) 543-5752

**HOME OFFICE**  
SAMSUNG ELECTRON DEVICES  
SEOUL, KOREA  
TEL: (02) 772-6688  
TELEX: STARNEC K33217  
FAX: (02) 772-6679

**USA DISTRIBUTORS**  
SAMSUNG AMERICA INC.  
TEL: (201) 592-7900  
IMCOM GROUP INC.  
TEL: (800) 255-8163  
SAMSUNG PACIFIC INT'L INC.  
TEL: (408) 970-8844

**CANADIAN DISTRIBUTORS**  
CANARA TECHNOLOGIES INC.  
TEL: (416) 890-2525  
STERLING MICRO SYSTEM INC.  
TEL: (604) 270-3233

Circle 309 on reader service card





## THE HELP SCREEN

### PC World offers answers and advice at every level

Backtrack through Paradox, pass the time, manage your media, detach Word style sheets, alternate CONFIGurations, effect 2K clusters, discover why CHKDSK and DIR give different file sizes, and learn an alternative to the em dash.

Karl  
Koessel

#### Paradox Lost

**Q.** *While using the Paradox query function, I came upon a significant flaw. Searching a field for entries greater than or equal to F locates entries beginning with letters F through Z. However, specifying less than or equal to F as the search criteria locates only those entries beginning with E back down through A. It's almost as though when searching backward, Paradox loses entries starting with F. I am curious to know whether anyone else has come across this same bug.*

Steven G. Ritter  
Owasso, Oklahoma

**A.** The problem you're having is not really a bug; it's a consequence of the way ASCII strings are compared. Obviously A is less than B, and D is greater than C. But A is also less than AA because it's shorter.

Let's say the field you're searching through contains last names. When you look for every name greater than or equal to M, Paradox, dBASE, and other data base systems correctly find *Macintosh*, *Mermaid*, and *Morris*, all of which are greater than the single letter M. However, searching for all names less than M will not find any names that begin with M because they will all be longer (greater) than M. Finding names beginning with M back through A, therefore, requires a little thought. One solution is to search for everything less than

the next letter (N, in this case). Or, you can search for everything less than or equal to MZZZ, which should kick out all words beginning with M.

#### If You've Got the Time

**Q.** *I was pleased to see LOCK-KEYS.COM [The Help Screen, PCW, April 1988] and TYPE-AHED.SYS [Star-Dot-Star, PCW, April 1988]. Both have been quite useful. Now, how about a way to automatically answer the DATE and TIME commands in an AUTOEXEC.BAT file with <Enter>s? It's silly to have to supply these <Enter>s from the keyboard when the date and time have already been provided by the internal clock.*

Karen A. Mullen-Zagale  
Louisville, Kentucky

**A.** The DATE and TIME commands are issued automatically if a system does not have an AUTOEXEC.BAT file because PCs,XTs, and their clones do not have a built-in clock/calendar. To be able to set the date and time, users often include those commands in AUTOEXEC.BAT files. For an AT, which automatically sets the date and time from its built-in clock/calendar, and for a PC or XT that has had a clock/calendar installed, these commands need not be executed every time you boot your system. (continues)



Just remove the DATE and TIME commands from the AUTOEXEC.BAT file and you won't have to answer them anymore.

### The Medium Is the Mess

**Q.** *The other night I copied a file onto a disk so I could work at home. Much to my surprise, my home computer would not read the disk; typing DIR returned the error message 'Sector not found'. On closer inspection, I realized that the disk was a high-density (1.2MB) disk that had been formatted to 360K. Back at work the next day, I found that 1.2MB drives could read the disk, but 360K drives could not. Curious, I formatted several more high-density disks to 360K and found that they too could be read by 1.2MB drives but not by 360K drives. Yet all the normal, double-density disks that I formatted to 360K in a 1.2MB drive could be read by both 1.2MB and 360K drives.*

*What gives? Why can't a 360K drive read a 360K-formatted high-density disk?*

*Jonathan Michaels*

*Redmond, Washington*

**A.** I know it's a surprise; I found out the hard way, too. The high-density disk medium has different magnetic properties than the double-density medium. It is thinner and holds a weaker magnetic charge than the double-density medium. And high-density drives generate a weaker signal than do double-density drives. 1.2MB drives, when writing in the 1.2MB format, write tracks twice as close together as do 360K drives, and they use a

weaker signal to help prevent track signals from "bleeding" over to a neighboring track. 360K drives expect stronger magnetic charges and can't distinguish the charges on high-density disks written by a high-density drive. That's why you get the message 'Sector not found'. (High-density disks work reliably in 360K drives as long as they are never written to by a high-density drive.) Double-density disks hold a stronger charge, but manufacturers universally caution users that 360K drives may not always be able to read the thinner tracks that 1.2MB drives write.

After reading about how to format a 720K (double-density) 3½-inch disk in a 1.44MB drive ("1.44MB Drives Yield 720K Disks," *The Help Screen, PCW*, August 1988), Dale Cardin of Manzana MicroSystems wrote to tell me that although I had given the correct parameters for formatting a disk to 720K in a 1.44MB drive, I did not mention that only double-density disks should be formatted to 720K. Although PS/2s can read high-density disks formatted to 720K, those disks cannot be read by 3½-inch drives in other systems, such as a laptop or an AT to which a 3½-inch drive has been added. Like the 5¼-inch disks, double- and high-density 3½-inch disks, used for 720K and 1.44MB disks, respectively, also have differing magnetic properties. Furthermore, the drives can distinguish between the two types of media and write to them with different signal strengths, burdening users of 3½-inch drives with the same problems that you've been having with 5¼-inch drives.

### A Lack of Style

**Q.** *I use Microsoft Word on a hard disk at the office and on a dual-floppy system at home. Although I haven't had any significant problems, I do have a minor complaint. When I want to take a document file home, I save my work to the hard drive and then save the file again to the floppy in drive A:. Once home, I run Word and issue <Esc> Transfer Load to load the document. Invariably, the floppy drive grinds annoyingly for some time before the file is loaded, and the error message 'Style sheet unavailable' appears at the lower left corner of the screen.*

*Is there some way I can get the file to load without Word wasting time looking for a style sheet that doesn't exist?*

*Richard Lutzer*

*Walnut Creek, California*

**A.** Sure. Save your Word document to the hard disk with <Esc> Transfer Save. Then issue <Esc> Format Stylesheet Attach, press <Delete> and <Enter>, save the file to drive A:, and quit. Those commands detach the style sheet from the file, and Word will no longer go looking for a style sheet when you load that file.

There may come a time, however, when you want to reattach the style sheet. Simply copy the style sheet onto the disk that holds the document. At home, Word will automatically find the style sheet on the floppy disk.

### Irreconcilable Drivers

**Q.** *Most of my computing is done on an IBM PS/2 Model 60. Once or twice a month, however, (continues)*



# "Carbon Copy Plus puts our LAN on the road!"

Steve Curcuru  
WNEV TV - Channel 7  
Boston, MA

## ***Carbon Copy Plus doubles your productivity—just ask our users!***

"When you have to keep a TV station up-and-running around the clock, you need as much help as possible. That's why we built an extensive LAN with more than 60 active nodes. And that's also why we rely on Carbon Copy Plus!"

"With Carbon Copy Plus, our reporters, producers and engineers can use ordinary phone lines to access the LAN—wherever they are. So it's almost as easy to log-in from across the country as it is from the next office. And if I'm home at night and there's a network problem, I simply use Carbon Copy Plus to remotely access the network and locate the problem. In fact, we've found that roughly 90% of network problems can be remotely solved using Carbon Copy Plus."

### **Remote Control Puts You In Control!**

Like Steve Curcuru and the rest of the team at WNEV, you'll find Carbon Copy Plus is the ideal product for remote LAN access. But even if you don't have a LAN, Carbon Copy Plus is ideal for sharing a DOS application with a distant user, giving a remote product demonstration or just running programs located on your office PC from home.

### **Join the Crowd!**

Find out why Carbon Copy Plus is the leader in remote control software. Call us today and join thousands of satisfied users like Steve Curcuru. You'll be in good company!



## ***Carbon Copy plus***

A separate Carbon Copy Plus is required for each location.  
Carbon Copy Plus is a trademark of Meridian Technology.

**MERIDIAN TECHNOLOGY INC**

A SUBSIDIARY OF MICROCOM

7 Corporate Park Suite 100 Irvine, CA 92714 (714) 261-1199



*I must access a System/36 to enter some data and run a few reports. In order to connect to the System/36, my PS/2's CONFIG.SYS file must reference three device drivers—VDSK.SYS, FSDDX.SYS, and FSDD.SYS—which together consume a whopping 91,312 bytes of RAM. The rest of my time on the PS/2 requires only the statements DEVICE=C:\DOS\ANSI.SYS, FILES=44, and BUFFERS=25.*

*Can you suggest a way to selectively activate the System/36 device drivers only when they're required? I sorely need that near 90K of memory to run certain other applications in a single pass, instead of having to break them into two separate jobs.*

*William Keith Clark, Jr.  
Carson City, Nevada*

**A.** Yes, the commands within CONFIG.SYS execute only when the system is initiated. To activate one set of CONFIG.SYS commands instead of another requires starting the PC with a different CONFIG.SYS file.

You can use a pair of batch files to automate switching between the two configurations. You'll need to create two CONFIG files. Let's assume that you name the one that references the System/36 device drivers CONFIG.S36, and the everyday one CONFIG.PS2. If you want, you can also create two AUTOEXEC files, AUTOEXEC.S36 and AUTOEXEC.PS2 (both should contain a PATH command that includes the string C:\BATCH;C:\DOS;C:\UTILITY). Finally, you need to create two batch files, S36.BAT and PS2.BAT (see **FIGURE 1**), and store them in the \BATCH directory (if it doesn't

#### S36.BAT:

```
COPY C:\CONFIG.S36 C:\CONFIG.SYS
COPY C:\AUTOEXEC.S36 C:\AUTOEXEC.BAT
C:\UTILITY\WARMBOOT
```

#### PS2.BAT:

```
COPY C:\CONFIG.PS2 C:\CONFIG.SYS
COPY C:\AUTOEXEC.PS2 C:\AUTOEXEC.BAT
C:\UTILITY\WARMBOOT
```

exist, make one). These two batch files simply replace the current CONFIG.SYS and AUTOEXEC.BAT files with the batch files' associated CONFIG and AUTOEXEC files and then restart the system by calling WARMBOOT.COM from the \UTILITY directory.

To create WARMBOOT.COM, change to the \UTILITY directory and save the lines shown in **FIGURE 2** in an unformatted ASCII text file called WARMBOOT.DBG. Note that you must include the blank line that follows the JMP command. Next, issue DIR C:\DOS\DEBUG.COM to check for the presence of DEBUG in the \DOS directory. If it's not there, copy it from your original DOS Supplemental Programs disk to the \DOS directory (some versions of DOS have DEBUG on the Operating disk).

```
A 100
MOV DX,40
MOV DS,DX
MOV BX,72
MOV WORD PTR [BX],1234
JMP FFFF:0

R CX
11
N WARMBOOT.COM
W
Q
```

**FIGURE 2:** WARMBOOT.DBG contains the DEBUG commands that create WARMBOOT.COM.

**FIGURE 1:** These two simple batch files restart the PC after replacing the current CONFIG.SYS and AUTOEXEC.BAT files.

Now type DEBUG<WARMBOOT.DBG; this command loads DEBUG and feeds it the keystrokes held in WARMBOOT.DBG, creating WARMBOOT.COM. Test the program by typing WARMBOOT and pressing <Enter>. If it works, delete WARMBOOT.DBG.

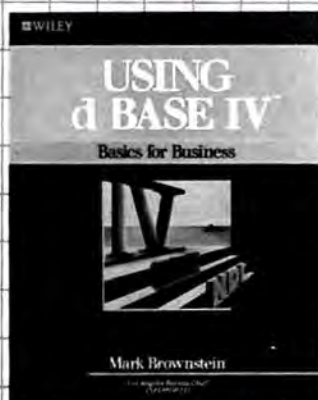
Now you can, at any DOS prompt, issue the command S36 to restart the system with CONFIG.SYS referencing the System/36 device drivers, or issue PS2 to restart your system in its usual configuration.

## Cluster Buster

**Q.** *Isn't it true that one of DOS 3.00's more significant improvements was changing the hard disk cluster size from 8K to 2K? When I upgraded from DOS 2.10 to DOS 3.30, my hard disk's clusters were still 8K, even after I reformatted the drive. I know because I performed the following test: Log on to drive C:. Issue DIR. Write down the number of 'bytes free'. Create a small file. [You can make a 1-byte file by typing COPY CON TEMP and pressing <Enter> <Enter> <F6> <Enter>.] Issue DIR again. Write down the new number of 'bytes free'. Subtract the second number from the first; (continues)*



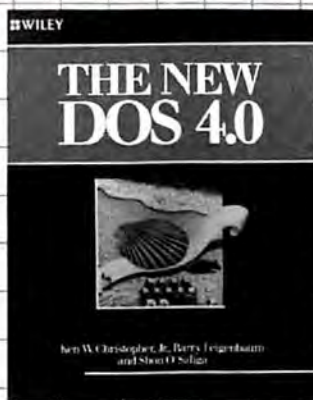
# Always the Smart Choice.



## USING dBASE IV™ Basics for Business

Mark Brownstein

An example-rich guide, by *InfoWorld* editor Mark Brownstein, to the powerful features and functions of the new dBase IV.  
(0 471-61749-0) \$19.95  
Available December



## THE NEW DOS 4.0

Ken W. Christopher, Jr.,  
Barry A. Feigenbaum, and  
Shon O. Saliga

From the IBM architects themselves, here is a complete guide, for novices and experienced users, to the new DOS 4.0.  
(0 471-50257-X) \$22.95



## R:BASE® FOR DOS A Business User's Guide

Susa Condliffe

Emphasizing business applications, this practical, hands-on tutorial delivers all the capabilities of the newest version of R:BASE.  
(0 471-60064-4) \$21.95

When you go to work with your computer, sit down with the best. Wiley Computer Books give you incisive, on-target instruction, top authors, and a complete selection that covers the latest software, hardware, and applications. Get smart—with Wiley.

**HANDS-ON HYPERCARD™**  
Designing Your Own Applications  
Mimi Jones and Dave Myers  
(0 471-61513-7) \$22.95

**HARD DISK SMARTS**  
Everything You Need to Choose and Use Your Hard Disk  
Chris A. Bosshardt  
(0 471-63847-1) \$21.95

**WORDSTAR® CLASSIC RELEASE 5**  
An Advanced Book  
Ruth Ashley and Judi N. Fernandez  
(0 471-63619-3) \$19.95



**IBM® PS/2**  
A Business Perspective  
Revised Edition  
Jim Hoskins  
(0 471-62126-9) \$19.95

**DESKTOP PUBLISHING WITH WORDPERFECT® 5.0**  
Jimmy J. Tevis  
(0 471-61848-9) \$22.95

**ADVANCED WORDPERFECT®**  
A Power User's Guide  
Patricia Farrell  
(0 471-63728-9) \$18.95



# WILEY

Wiley works for your computer.

Available at your local bookstore.

John Wiley & Sons

605 Third Avenue, New York, NY 10158

Call Toll-Free: 1 800 526-5368



what remains is the cluster size in bytes. Divide by 1024 to get the cluster size in K.

Now that I'm using DOS 3.30, how do I get 2K clusters? I noticed that you didn't tell how it's done when you wrote about upgrading DOS in the September issue of PC World.

Alan Palmer  
Chicago, Illinois

**A.** You're right; I had forgotten about the cluster size change and didn't mention how to achieve it.

When upgrading to DOS 3.00 or a later version from a version earlier than 3.00, you can reformat the hard disk and get 2K clusters. Obviously, you should first back up the hard disk. However, before FORMAT will produce 2K clusters, you must boot from the new DOS's floppy disk (or a copy) and run FDISK to remove the DOS partition, and then reinstall it. Finally, format the partition, restore your files, and replace all the DOS files on the hard disk with the new DOS's versions.

### Older Format

**Q.** Do I have to reformat the hundreds of floppy disks (which were formatted with DOS 2.10) that I am currently using if I upgrade my hard disk to DOS 3.30?

Howard T. Atlas  
Massapequa Park, New York

**A.** No, all versions of DOS can read disks formatted by earlier versions.

### File Size Discrepancy

**Q.** My AT clone has 512K of user memory and 512K of ex-

tended memory. When I recently tried to convert a less-than-100K .EXE file into a binary, the command EXE2BIN MENU.EXE simply returned the error message 'Insufficient memory', even though CHKDSK showed over 400K bytes free.

I copied MENU.EXE to a blank floppy and ran DIR. It showed that the file occupied 77,232 bytes, while CHKDSK said there were '77312 bytes in 1 user files'. What's the reason for the discrepancy in file sizes? And why did CHKDSK also show '0 bytes in 1 hidden files'?

Peter Kang  
Richmond, Virginia

**A.** EXE2BIN generates the insufficient-memory error message because it cannot convert .EXE files that are larger than 64K.

DIR returns the number of bytes that the file contains, while CHKDSK tells you how much disk space the file occupies. Disk space is assigned by whole numbers of clusters. Therefore, the smallest amount of disk space that can be assigned to a file is one cluster. DOS formats single-sided 5¼-inch disks with 512-byte clusters; double-sided 5¼-inch disks with 1K clusters; high-density 5¼-inch disks with 512-byte clusters; double- and high-density 3½-inch disks with 512-byte clusters; and hard disks with clusters from 2K to 8K, depending on the size of the disk and the version of DOS.

The hidden file you refer to is a volume label that was on the disk before you copied MENU.EXE. (The label name appears when you issue a DIR of the disk.) Although the label occupies an entry in the file directory (as do subdirectory names), it is not erased when you delete all

the files. Use the DOS command LABEL to remove or replace the label.

### Super Em Dash

Reader Richard Tamler of Los Angeles has come up with an alternative to the July *Help Screen's* suggestions for Page-Maker users trying to generate an em dash on non-PostScript laser printers: "Use one underlined space (or more, depending on the pitch) and raise it to its superscripted position by checking the appropriate box in the 'Type specifications' menu. Strictly speaking, it's not really an em dash, but it looks like one, and this method is easier than kerning, drawing lines, or using *Publisher's Type Foundry*."

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

## POWER TIP NO. 24

### Tag WordPerfect Files

When you display the contents of a WordPerfect directory with the List Files key (<F5>), you can individually tag and untag files (for copying or deletion) by pressing the asterisk key. To tag or untag all the files at once, press <Alt>.<F5>.

George Beinhorn  
Nevada City, California



# Tandy Computers: The broadest selection of PCs in America.



## The Tandy® 4000 LX

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

To streamline your heavy business workload, 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-727  
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/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



# BUYING THE RIGHT PRODUCT AT



**AMDEK \$135**  
Video 410  
Monochrome Display

## MONITORS

**Amdek**  
Video 210 Amber.....\$89.99  
Video 432 PS/2 A/W VGA.....169.00  
Color 722 Dual Mode RGB.....449.00  
Color 732 12" PS/2 VGA.....499.00  
**Cornerstone**  
Single Page Display.....899.00  
**Magnavox**  
7BM623 12" TTL Amber.....85.99  
CM8762 14" Comp/RGB.....279.00  
9CM053 14" Hi-Res EGA.....379.00  
9CM082 14" VGA Display.....449.00  
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-1272 12" TTL Mono.....85.99  
PB-1418F 14" Flat TTL A/G/W..129.00  
PB-1452 14" RGB Color.....239.00  
PB-1422EG 14" Hi-Res EGA...359.00  
**Polaroid**  
Palette EGA Plus.....2499.00  
**Princeton Graphics**  
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  
AST-VGA Plus Adapter.....389.00  
Hot Shot 286 Board.....399.00  
Rampage 286 512K.....439.00

**Boca Research**  
Top Hat 128K Expansion.....99.00  
Bocaram/AT O-4MB Card.....149.00  
Boca Multi-EGA.....169.00  
Bocaram 50/60 Board.....1299.00  
MCA Serial/Parallel.....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....429.00  
**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.....449.00  
8087 Co-Processor.....119.00  
80387-16 Co-Processor.....529.00  
**NSI**  
Smart EGA Plus.....189.00  
**Quadram**  
Quad 386-XT PC Upgrade.....899.00  
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 VGA Display Adapter...299.00

VEGA V-RAM Adapter.....579.00  
**Zuckerboard**  
Monochrome Graphics Card...79.99  
AT-Primary Memory Board....99.99

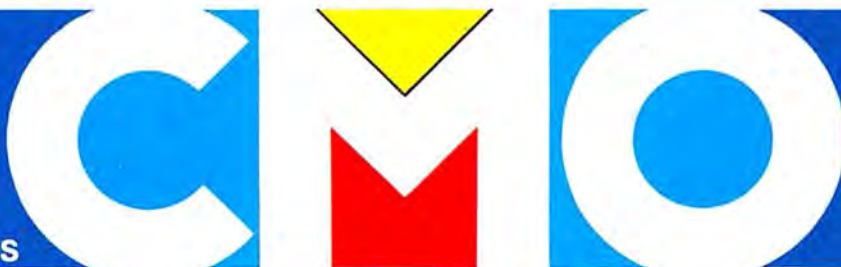
## STORAGE DEVICES

**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**  
5 1/4" Bernoulli Box II.....899.00  
**Irwin**  
110D 10MB XT Tape-Backup..219.00  
**Miniscribe**  
8425 20MB 3 1/2" 40msec....279.00  
3650 40MB 5 1/4" 61msec....369.00  
3053 44MB 5 1/4" 25msec....599.00  
6085 70MB 5 1/4" 28msec....699.00  
**Mountain**  
TD-4440 40MB Ext. PS/2 AT..599.00  
60 MB Mountain Tape.....999.00  
Dual 5 1/4" Beta Bernoulli...1899.00  
**PC-TOO**  
TD4000 40MB Tape-Backup..349.00  
**Plus Development**  
20MB Hard Card.....599.00  
40MB Hard Card.....779.00  
20MB Passport.....489.00  
40MB Passport.....649.00  
**Seagate**  
ST-225 20MB 1/2 Height.....249.00  
ST-238 30MB 1/2 Height.....279.00  
ST-251 40MB 1/2 Height.....399.00  
ST-251-1 40MB 28ms.....499.00  
**Sony**  
3 1/2" 720K Floppy Drive.....89.99  
**Sysgen**  
Bridge-File PS/2 360K.....249.00  
Bridge-File PS/2 Drive.....249.00  
Bridge-Tape 40MB Backup...499.00  
Durapak Single 15MB.....999.00  
Smart Image 60MB Int.....479.00  
Smart Image 60 Ext. Tape...589.00  
QIC-File 60MB Tape.....599.00



**ORCHID**  
Designer VGA  
Adapter **\$349**

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  
**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**  
3088/286 Lap Tops..... Call



**SYSGEN**  
Pro System 12MHz  
40MB w/Tape Back-Up  
**\$2199**

## MODEMS

**Anchor**  
2400 Baud Internal.....189.00  
2400 Baud External.....169.00  
**ATD-Zuckerboard**  
1200 Baud Nud 1/2-Card.....79.99  
**Best Products**  
Smart 2400 1/2-Card w/Soft...149.00  
**Everex**  
Evercom 923 1200 Baud Int...79.99  
Evercom 940 2400 Baud Int...179.00  
**Hayes**  
Smartmodem 1200 Ext.....289.00  
Smartmodem 2400 Ext.....439.00  
**Intel**  
PS/2 2400B Internal.....319.00  
**Practical Peripherals**  
1200 Baud Int.....79.99  
2400 Baud Stand Alone.....189.00  
Macintosh 2400SA.....239.00  
**J.S. Robotics**  
2400 Baud Direct Int.....179.00  
2400 Baud Direct Ext.....199.00



**BROTHER**  
M-1109 100CPS  
Dot Matrix  
**\$169**

## PRINTERS

**Brother**  
M-1509 180cps, 132 col.....389.00  
HR-40 40cps, Daisywheel....669.00  
FAX-100 Facsimile 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  
LQ-2550 500cps, 24-Pin..... New  
**Hewlett Packard**  
Think Jet 2225.....379.00  
**NEC**  
P2200 Pinwriter 24-Wire.....379.00  
P5200 24-Pin 265cps.....599.00  
P5300 24-Pin 132 column....799.00  
LC-890 Postscript Laser....3495.00  
**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-420 Facsimile Machine...1599.00  
**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  
**Borland**  
Quattro.....169.00  
**Central Point**  
PC Option Board Deluxe....129.00  
**Computer Associates**  
Accpac Easy Accounting.....79.99



**LOGITECH**  
High Resolution  
Buss Mouse  
**\$99**

**Fox Software**  
Fox Base+ Development....219.00  
**5th Generation**  
Fastback Plus.....89.99  
**IMSI**  
Optimouse w/Dr. Halo.....79.99  
Page Perfect Desktop Publ...269.00  
**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  
**PCSG**  
Lucid 3.0 Spreadsheet.....109.00  
**Word Perfect Corp.**  
Word Perfect 5.0.....249.00  
**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

OVER 350,000 SATISFIED CUSTOMERS • ALL MAJOR CREDIT CARDS ACCEPTED • CREDIT CARDS ARE NOT CHARGED UNTIL WE SHIP

**POLICY:** Add 3% (minimum \$7.00) shipping and handling. Larger shipments may require additional 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.

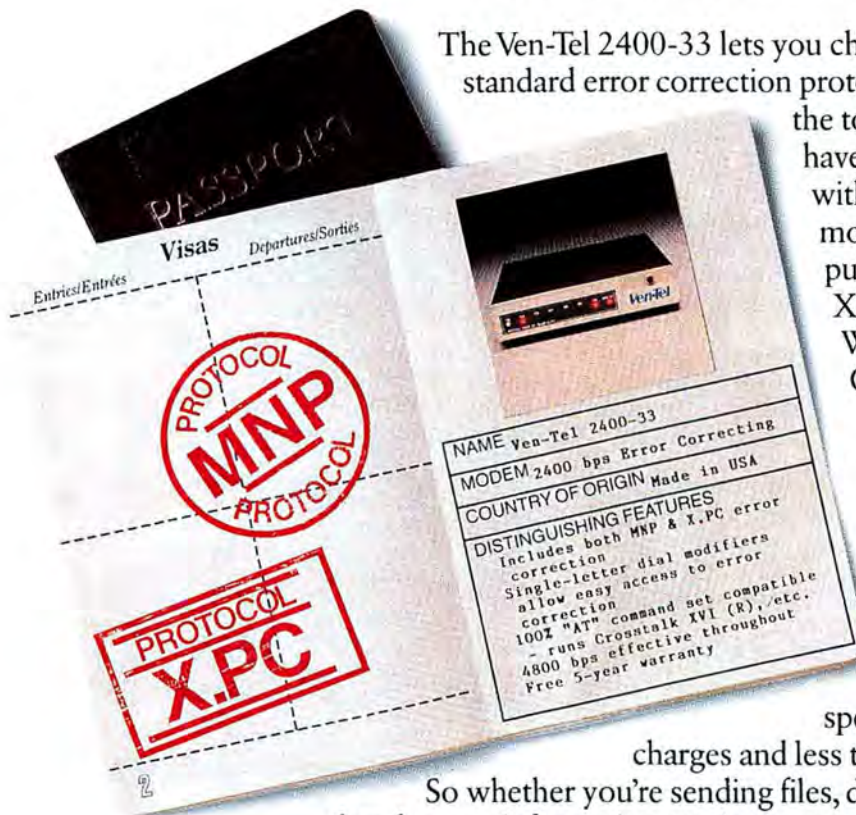
Circle 116 on reader service card

B212

**MMC**  
MICROCOMPUTER  
MARKETING COUNCIL  
1000 E. Main Street, Suite 100  
Williamsport, PA 17701



# The error correcting modem that ensures safe passage for your data—no matter where it's traveling.



The Ven-Tel 2400-33 lets you choose between the two standard error correction protocols (X.P.C. and MNP) at the touch of a key. So you'll have error free connections with over 350,000 MNP modems *and* with major public data networks using X.P.C.—like Tymnet, MCI, Western Union and GE Geisco.

And the 2400-33 not only protects your data, it's faster than *any* non-error corrected modem. MNP Level 5 data compression can double your throughput up to 4800 bps—and higher speeds mean reduced phone

charges and less time spent transmitting.

So whether you're sending files, downloading expensive data from an information service or managing your personal portfolio, you'll know that your critical data is 100% correct.

The Ven-Tel 2400-33. The only modem that guarantees your data a flawless trip...no matter where it's traveling.

## Ven-Tel

Modems

Our free booklet, "How To Select The Correct Modem," contains specific information about the 2400-33 and our full line of modems. To request your copy, call 800-538-5121.

Circle 11 on reader service card





# STAR-DOT-STAR

\* \*

## A global exchange of personal computer discoveries

Index a data base on a related file's field, sum 1-2-3 columns with a macro, load Freelance graphics into Ventura, create .PICs with a view, enter BASIC math in DOS, and go bug busting.

Edited  
by  
Tom Swan

### Sorting Out Your Relations

A common *dBASE III* task is indexing a data base file on a field in a related file. For example, suppose you have the two files shown in **FIGURE 1** and want to alphabetize *ADVANCES.DBF* by employee names, which are stored separately in the file *EMPLOYEE.DBF*.

Using the *SET RELATION* command, this job becomes relatively easy. To list *ADVANCES.DBF* by employee name, just issue the commands in **FIGURE 2**. **FIGURE 3** displays the results.

*Rafael Q. Montemayor  
Mandaluyong, Philippines*

*Editor's note: The two files must be related; that is, they must share a common field (in this case, EMPNO). As an added benefit, this arrangement conserves disk space by letting you store lengthy text in one file and then refer to that text by shorter codes stored in other files.*

### 1-2-3 Totem Pole Totals

Writing 1-2-3 formulas to add up columns that contain subtotals is a time-consuming and error-prone task. It's too easy to miss a cell or to include a subtotal within the range, throwing a totem-pole sum out of kilter.

For more reliable formulas, I wrote a macro [see **FIGURE 4**] that automatically totals columns,

skipping embedded subtotals. To create it, enter the macro commands into columns A and B as shown in the figure. [Note that rows 8 and 11 are blank, and that although the contents of cells B3, B4, and B12 are shown wrapped, each must be entered on its own line.] Then issue */Range Name Labels Right*, type **A1.A11**, and press **<Enter>**.

To use the macro, assign the range name *SUM* to the range of cells in the column to be totaled and the range name *TARGET* to the cell you want the total to appear in. When you press **<Alt>-S**, a formula string *@SUM(SUM)* is created in the cell *TARGET*. Then the macro uses the *@CELLPOINTER* ("CONTENTS") function to search for a cell containing dashes (assuming that subtotals are preceded by a line drawn with the *\-* command, as is usually the case). Each time it locates one, it adds characters to the *@SUM(SUM)* string that will subtract value in the subtotal cell below. An *EDIT* function deletes the label prefix, changing the final string into a formula.

*Brian T. Copeland  
Warminster, Ontario*

### Freelancing With Ventura

My colleagues and I have had trouble loading Lotus's *Freelance Plus* graphics into *Ventura* (continues)



**ADVANCES.DBF**

EMPNO	ACCT	AMOUNT
00001	51350	100.00
00002	23510	200.00
00003	74400	1500.00
00004	68680	300.00
00005	50564	20000.00
00006	60540	750.00

**EMPLOYEE.DBF**

EMPNO	NAME
00001	Jing
00002	Patsy
00003	Odi
00004	Carol
00005	Dick
00006	Mike

**FIGURE 1:** These two simple batch files restart the PC after replacing the current CONFIG.SYS and AUTOEXEC.BAT files.

*Publisher*, even though *Ventura* is supposed to accommodate Lotus .PIC files as well as a host of other graphics formats. We finally solved the problem when we discovered that while both *Ventura* and *Freelance* support the metafile graphics standard, they use different file extensions.

When exporting a metafile, *Freelance* adds the extension .GMF. As an experiment, I renamed a test file, changing the file's extension to .CGM, the extension *Ventura* expects for metafile graphics files. *Ventura* then had no problem loading the graphics file.

Changing the extension to match *Ventura*'s expectations works fine, but it requires exiting to DOS. Then I found a simpler way, which doesn't involve DOS. I simply change the default \*.CGM in *Ventura*'s item selector box to \*.GMF, and voilà, the box fills with a list of all my *Freelance* graphics files.

*Don Murray*

*Pemberton, British Columbia*

## BASIC Pipe Lines

I don't have a memory-resident calculator but often need answers to simple math problems. I used to start BASICA, enter a calculation, and then issue SYSTEM to return to DOS, but I hated wasting the time. By accident, I stumbled on a quick way to accomplish the same thing, shunting expressions from DOS

to BASICA with lines such as:  
ECHO PRINT 2+2 | BASICA

The ECHO command sends the PRINT statement to DOS's standard output, which the vertical bar pipes to BASICA. After displaying the answer, BASICA automatically returns to DOS. The same trick works with GW BASIC, too.

*Dave Bushong*

*Concord, New Hampshire*

```
SELECT 1
USE employee
INDEX ON empno TO byempno
SELECT 2
USE advances
SET RELATION TO empno INTO employee
INDEX ON a->name TO byname
LIST a->name, empno, acct, amount
```

**FIGURE 2:** WARMBOOT.DBG contains the DEBUG commands that create WARMBOOT.COM.

A->NAME	EMPNO	ACCT	AMOUNT
Carol	00004	68680	300.00
Dick	00005	50564	20000.00
Jing	00001	51350	100.00
Mike	00006	60540	750.00
Odi	00003	74400	1500.00
Patsy	00002	23510	200.00

**FIGURE 3:** ADVANCES.DBF can be sorted on a field from EMPLOYEE.DBF via the common field EMPNO.

```

      A      B
1  \S      {LET TARGET,"@SUM(SUM)"}~
2          {GOTO}SUM~
3          {IF @CELLPOINTER("COL")<27}{LET COLUMN,
           @CHAR(@CELLPOINTER("COL")+64)}~
4          {IF @CELLPOINTER("COL")>26}{LET COLUMN,
           @CHAR(@CELLPOINTER("COL")/26+64)&
           @CHAR(@MOD(@CELLPOINTER("COL"),26)+64)}~
5          {DOWN}
6          {FOR COUNTER,1,@ROWS(SUM)-2,1,SUMMER}
7          {GOTO}TARGET~{EDIT}{HOME}{DEL}~
8
9  COLUMN
10 COUNTER
11
12 SUMMER  {IF @CELLPOINTER("CONTENTS")="-"}{LET TARGET,+TARGET
           &"-"}&COLUMN&@STRING(@CELLPOINTER("ROW")+1,0)}~
13         {DOWN}
```

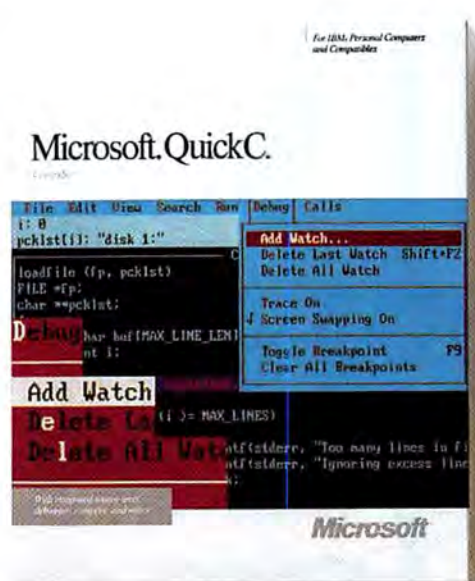
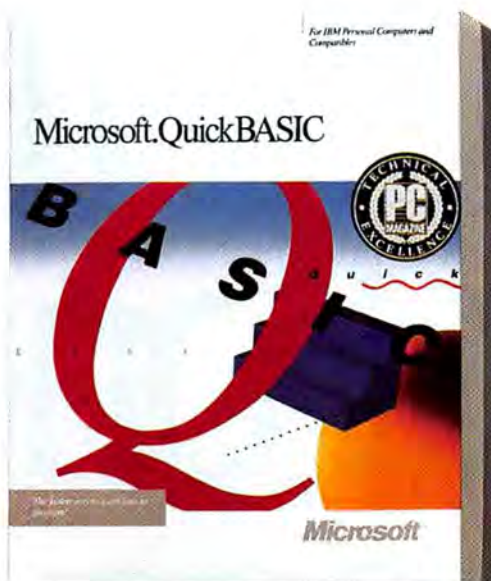
**FIGURE 4:** This 1-2-3 macro totals a column even if it contains embedded subtotals.



If anyone  
tries to tell  
you that one  
language  
fits all, turn  
the page.



# To each



# Quick.

Despite what some software companies are saying, one language just can't be all things to all programmers. Which is why Microsoft offers a language for every level.

When you're starting out, you need learning tools that make it easier. Take our Quick languages, for instance. Each one features an integrated development environment that puts a powerful editor, compiler, debugger and on-line help within easy reach. And of course, all Quick languages are mouse-driven, so all commands are just a point and a click away.



More specifically, Microsoft® QuickBASIC comes with on-line support: QB Advisor serves as a state-of-the-art electronic manual, and QB Express can teach you how to use the environment in just minutes. Of course, you'll be more productive even faster with our new Easy Menus and the instant environment.

Or maybe you already know how to program and want to be introduced to the power of C.

Microsoft QuickC® is your language. The fastest way to learn C: just use its integrated source-level debugger and advanced graphics capabilities. You'll be up and writing C programs in no time. Just like the name implies.



# his own.

## Microsoft C 5.1

Optimizing Compiler

For Personal Computers Running  
the MS-DOS or MS-DOS  
Operating System



Now includes OS/2 system support

Microsoft

## Microsoft BASIC 6.0

Interpreter

For Personal Computers Running  
the MS-DOS or MS-DOS  
Operating System



Now includes OS/2 system support

Microsoft

# Professional.

Professional programmers are in a league all their own. So are the tools Microsoft provides the professional.

Each of our professional languages offers the complete development solution. Including the acclaimed CodeView®. An optimizing compiler for power. OS/2 support for access to the next generation of computing. And Microsoft Editor for the most sophisticated source code editing.

As for the most powerful BASIC ever to grace a PC, there's BASIC Compiler.

LOTUS	Lotus® 1-2-3® Metro™ Express
WORDPERFECT	WordPerfect®
ALDUS	PageMaker®
ORACLE	Professional Oracle® Oracle Server
MICRORIM	R:BASE®
PETER NORTON	Norton Commander Dan Bricklin's Demo Program
MERRILL LYNCH	DARWIN

Our languages speak for themselves—all of these industry hard hitters use Microsoft languages.

With its talent you have the ability to create smaller, faster executables.

Which isn't to say Microsoft C Optimizing Compiler doesn't have a few talents of its own. Lightning fast at running executables, it also features an incremental linker and support for various powerful platforms like MS-DOS® and Microsoft Windows, as well as Presentation Manager.

So no matter what level of computer programmer you are, Microsoft makes a language that lets you be the best you can possibly be. Which goes to show you, one language company really does fit all.

**Microsoft®**  
Making it all make sense.

PageMaker is a registered trademark of Aldus Corporation. Lotus and 1-2-3 are registered trademarks and Metro is a trademark of Lotus Development Corporation. R:BASE is a registered trademark of Microrim, Inc. Oracle is a registered trademark of Oracle Corporation. WordPerfect is a registered trademark of WordPerfect Corporation.



## .PICS With a View

Rather than run a separate program to view graphics files, you can change a displayed image into an executable file containing its own viewing software.

To demonstrate the process, first create the sample graphics

```
10 SCREEN 1,1 : KEY OFF : CLS
20 B=195 : C=60
30 FOR I=0 TO B STEP 5
40   LINE(C,B-1)-(I+C,I),3
50   LINE(B-I+C,B)-(I+C,B-1),2
60 NEXT I
70 DEF SEG=&HB800
80 BSAVE "DEMO.PIC",0,&H4000
```

**LISTING 1:** Run DEMO.BAS to create a sample .PIC file for converting with the program in FIGURE 5.

```
A100
JMP 4107

A4107
MOV AH,F
INT 10
CMP AL,7
JZ 412D
XOR AH,AH
PUSH AX
MOV AL,5
INT 10
MOV AX,B800
MOV ES,AX
MOV SI,107
XOR DI,DI
MOV CX,2000
CLD
REPZ
MOVSW
XOR AH,AH
INT 16
POP AX
INT 10
INT 20

N VIEWPIC.COM
R CX
402F
W
Q
```

**FIGURE 5:** PIC2COM.PAT adds viewing code to BSAVE-format graphics files.

file DEMO.PIC by running the BASIC program DEMO.BAS shown in **LISTING 1**. Next, enter the text in **FIGURE 5** with any ASCII text editor, saving the file as PIC2COM.PAT. Be sure to include the two blank lines. With DEBUG.COM in the same directory as PIC2COM.PAT (or available via the PATH command), type **DEBUG DEMO.PIC > PIC2COM.PAT**. This creates VIEWPIC.COM, containing both the original image plus the viewing code. To display the picture, type VIEWPIC and press <Enter>. When you've finished enjoying the view, press any key to return to DOS.

Denny "Zuko" Yamar R.  
Bandung, Indonesia

*Editor's note: Graphics files must be CGA images in the same format that the BASIC command BSAVE uses. Be aware that you may find .PIC files containing data that cannot be converted. If you're not sure whether a .PIC file is the right kind, operate on a copy of your original. To save converted images that contain the viewing code, rename VIEWPIC.COM before converting additional files. You might then, for example, create slide shows of multiple images by running the renamed .COM viewers in succession, perhaps from a batch file.*

## DEVELOPER'S TOOLBOX

### Let's Go Bug Busting

Finding the bugs in software is dark and dreary work, lightened in part by several new debugging tools that take advantage of

special features in my system's 80386 processor.

The 80386 contains several debugging registers normally unavailable to applications. These registers allow programs to run at full speed under the control of debugging software, which watches for memory changes and halts programs that have no business reading or writing at specified addresses. Programs like *Soft-ICE*, *MagicCV*, *Periscope*, and Borland's *Turbo Debugger* use these special registers to add hardware-level debugging capabilities to any 80386-based system.

In the past, such capabilities required purchasing a hardware in-circuit emulator (ICE), costing \$18,000 or more. *Soft-ICE* emulates a hardware ICE, providing most of the same capabilities for \$386—a far more reasonable cost. Although you can use *Soft-ICE* as a stand-alone debugger, the program shines in adding hardware debugging features to existing products such as DOS DEBUG and CodeView—the source-code debugger shipped with Microsoft's C, Pascal, BASIC, Fortran, and Macro Assembler (MASM) languages.

*MagicCV* is an 80386 protected-mode program that loads CodeView in a virtual 8086 machine. It requires at least 384K of extended memory, 640K to run CodeView and *Soft-ICE* simultaneously. With enough memory, *MagicCV* and *Soft-ICE* provide the advantages of a hardware ICE plus the added safety of running CodeView from protected memory.

For debugging Turbo C and Pascal source code, I'm head  
(continues)



THE HOTTEST  
COMPUTER PROGRAM OF THE YEAR!

# Interlude II

I bought you a computer program for Christmas.

*You what??*

You'll like it. It's full of sexy and romantic surprises.

*Really!*

Look at this one—Love on the Rocks...with a twist of fun. Or Jungle Fever...me Tarzan, you Jane!

*Oooooooh, how about Satin Dreams... to turn us into dream lovers. Or Some Enchanted Evening...guaranteed to put romance back in our lives!*

Now what do you think of my gift?

*C'mon, Tarzan...let's go play.*

Turn your computer into a magic genie this Christmas with Interlude II.

Interlude II is the most sensational computer program on the market. Each time you play, the program starts with a computerized interview to probe your deepest desires and fantasies. Then it suggests a romantic or sexual scenario (called an Interlude) to match your mood of the moment. Over 160 Interludes are contained in the program, including Love Odyssey, Light My Fire, From Here to Ecstasy, Caveman Capers, Thriller, A Gift of Love, The Pleasure Tapes, Madam's Menu and Rembrandt's Delight. Whether you feel romantic, serious, playful or ever so naughty, this program has an Interlude to match your mood.

Go ahead. Give your sweetheart Interlude II for Christmas. It's the gift that keeps on giving...all year long!

NOTE: Interlude II is available for the IBM PC/XT/AT, PCjr<sup>1</sup> and compatibles or the Apple II, II+, IIc and IIe<sup>2</sup>.

<sup>1</sup> Trademarks of International Business Machines. <sup>2</sup> Trademarks of Apple Computer, Inc.

Circle 78 on reader service card

Call your nearest software dealer for availability or complete and return this coupon to:

Recreational Technology, Inc.  
2900 Wilcrest, Houston, TX 77042

Accepted for Payment:

\_\_\_\_ Check or money order

\_\_\_\_ MasterCard® Acct. # \_\_\_\_\_

\_\_\_\_ VISA® Acct. # \_\_\_\_\_

Charge customers must sign here \_\_\_\_\_

Name \_\_\_\_\_

Age \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Check one:

\_\_\_\_ IBM Version

\_\_\_\_ Apple Version

PCW

Charge customers may order tollfree  
24 hrs/day 7 days/wk.

**1-800-727-8353**

\$39.95 + Shipping Charges:

\_\_\_\_ UPS Reg.\* or First Class  
\$3.00 (U.S.)

\_\_\_\_ UPS Blue Label\* 2-day del.  
\$5.00 (U.S.)

\_\_\_\_ Sales Tax—TX res. \$3.20 (8%)

\$ \_\_\_\_\_ TOTAL

\*Must have street address or UPS shipping.



STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION REQUIRED BY 39 U.S.C. 3685

1. PC World Magazine, Pub. No. 07378939
2. Date of filing: October 17, 1988
3. Published monthly
- 3A. No. of issues published annually: 12
- 3B. Annual subscription price: \$29.90
4. Known office of publication: 501 Second St., San Francisco, CA 94107
5. Complete mailing address of the headquarters of general business offices of the publisher: PCW COMMUNICATIONS, INC., 501 Second St., San Francisco, CA 94107
6. The names and address of the publisher, editor and managing editor are Publisher: John Griffin, PCW COMMUNICATIONS, INC., 501 Second St., San Francisco, CA 94107; Editor: Richard Landry, PCW COMMUNICATIONS, INC., 501 Second St., San Francisco, CA 94107; Managing Editor: Ed Bott, PCW COMMUNICATIONS, INC., 501 Second St., San Francisco, CA 94107
7. The owner is: IDG COMMUNICATIONS, INC., Patrick McGovern, 5 Speen St., Framingham, MA 01701. The names and addresses of stockholders owning or holding 1% or more of the total amount of stock are listed below.  
None
8. There are no known bondholders, mortgagees or other security holders owning or holding 1% or more of the total amount of bonds, mortgages or other securities.
9. Extent and nature of circulation  
Average no. copies each issue during preceding 12 months: A. Total no. copies (net press run), 634,025; B. Paid and/or requested circulation 1. Sales through dealers and carriers, street vendors and counter sales, 89,055; 2. Mail subscription (paid and/or requested), 413,980; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 503,035; D. Free distribution by mail, carrier or other means, samples, complimentary, and other free copies, 8,554; E. Total distribution (sum of C and D), 511,589; F. Copies not distributed 1. Office use, left over, unaccounted, spoiled after printing, 2,586; 2. Return from News Agents, 119,850; G. Total (sum of E, F1 and 2—should equal net press run shown in A), 634,025.

Actual no. copies of single issue published nearest to filing date: A. Total no. copies (net press run), 800,439; B. Paid and/or requested circulation 1. Sales through dealers and carriers, street vendors and counter sales, 89,710; 2. Mail subscription (paid and/or requested), 547,452; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 637,162; D. Free distribution by mail, carrier or other means, samples, complimentary, and other free copies, 9,914; E. Total distribution (sum of C and D), 647,076; F. Copies not distributed: 1. Office use, left over, unaccounted for, spoiled after printing, 3,373; 2. Return from News Agents, 149,990; G. Total (sum of E, F1 and 2—should equal net press run shown in A), 800,439.

11. I certify that the statements made by me above are correct and complete. John Griffin, President & Publisher

# THE FAST TRACK READS

When so many business leaders and buyers are reading and depending on *PC World*, shouldn't you be advertising with us?

## PC WORLD

For the Business of Computing.  
An IDG Communications Publication

PCW Communications, Inc.

over heels about Borland's *Turbo Debugger*, sold with the company's newest language product, the MASM-compatible Turbo Assembler. Known in the press as the CodeView Killer, *Turbo Debugger* debugs C, Pascal, and assembly language source code. It can also take advantage of 80386 debugging registers, load itself into extended memory, and perform all the operations of CodeView, *MagicCV*, and *Soft-ICE* combined. A pleasure to use, *Turbo Debugger* has the best displays and command hot keys of any debugger on the market. Borland's got another winner.

*Periscope*, a time-tested favorite of many programmers, comes in several configurations—some with memory cards, others with an optional breakout switch installed by poking a wire into an occupied peripheral slot. (This sounds dangerous, but the process is fully explained in the manual and, if you're careful, is unlikely to cause any harm.)

*Periscope Model II* comes with the breakout switch already in place. All models can take advantage of 80386 debugging registers. *Periscope* debuggers are highly technical products requiring much experience to use effectively. Casual programmers are probably better off with CodeView or *Turbo Debugger*.

For OS/2 debugging, the story takes a sinister twist, especially when multiple processes (called threads) sew up your code. Because several active threads may call the same subroutines, you not only need to set breakpoints on specific memory areas, but you may also need to know which process has called an interrupted instruction. For this purpose, Microsoft provides a protected-mode version of CodeView that

runs under OS/2 and has special features for debugging threaded processes. The protected-mode CodeView can also display structured variables—for example, listing named fields in Pascal records. (*Turbo Debugger* has a similar feature for viewing structures.)

Software tools that use special 80386 debugging features are giving developers new ways to get the bugs out of their code. Debugging is never easy, but the next time I go bug busting, I know who I'm gonna call.

### WHERE TO BUY

#### Soft-ICE

Nu-Mega Technologies  
P.O. Box 7607  
Nashua, NH 03060-7607  
603/888-2386

**List price:** \$386

**Requirements:** IBM Series II, 80386-based PC, or PC equipped with an 80386 coprocessor card

Not copy protected

**Technical support:** free to registered users, M-F 9-5

**Other support services:** none

**For more information, circle 730 on reader service card.**

#### MagicCV

Nu-Mega Technologies

**List price:** \$199

**For more information, circle 731 on reader service card.**

#### Periscope Model II

The Periscope Company  
1197 Peachtree St.  
Atlanta, GA 30361  
404/875-8080, 404/875-4726 (technical support)

**List price:** \$175

**Requirements:** IBM PC, XT, or AT including 80386 or other software-compatible machine; DOS 2.00 or later version; 64K available RAM

**Technical support:** Free to registered users M-F 1-5 p.m.

**For more information, circle 732 on reader service card.**

(continues)



# Almost anyone can use our spreadsheet right out of the box

That's because Silk is the only spreadsheet that gives you an on-line, context sensitive, "live" screen tutor that makes learning almost child's play.

## Learn As You Work

As you move through each step, you'll see instruction on the right hand side of your screen which guides you and literally teaches as you work.

And, since it's context sensitive, when you change a command your Silk screen tutor changes to match it. You can remove or activate the screen tutor at any time you wish.

Other spreadsheet programs are so difficult to learn that most users master only a fraction of their real potential. Instead, Silk's on-line screen tutor treats you with kid gloves. It will make you a power-user in a few sessions without ever studying the manual.



With this feature you can re-allocate increased payroll or a revised financial budget at the touch of a key instead of hours of complex modeling.

You can even keep some cells at a fixed value. Many users find this feature alone is worth the purchase price.

And Silk even includes a lost work recovery feature, so you'll never lose your work again!



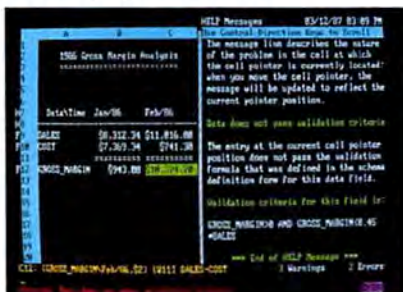
"Silk's improved graphics, fine use of function keys, interactive help, global search and replace, and easy-to-arrange worksheet are reason enough to buy... At some point, you have to think about moving onward and upward (from 1-2-3). Silk gives you reason enough."

— PC Magazine

Best of all, you can purchase Silk now directly from Daybreak for only \$99 during this special promotion. A real value savings compared to its regular \$298.00 retail price.

Of course, not everyone can use Silk immediately. Little Rebecca, shown here, will probably have to wait at least until the third grade.

Everyone else, use your Visa or MasterCard, and order Silk today.



## Beyond 1-2-3

Silk is simple to use but powerful. It maintains the spreadsheet features that made 1-2-3 so popular but adds what 1-2-3 and the others lack.

Silk lets you build formulas as large as 1,000 characters and append each cell with text notes, so you'll always remember what your calculations are based on.

Silk has its own unique screen editor that lets you edit large cell contents—even formulas up to half a screen long. No other spreadsheet can.

## Auto Allocation

Silk even has a powerful new allocation feature that automatically distributes values proportionately over any number of cells you choose for any reason you wish to cut the pie.

## 30 DAY MONEY-BACK GUARANTEE

If for any reason you are not completely satisfied, return the product within 30 days for a full purchase price refund.

## NEW, Never lose your work again!

Everyone loses work when there's a power failure or when a keyboard locks up. And there really is nothing you could do except start all over again.

Until now!

Introducing Cocoon.

Cocoon's new software technology literally records your work in progress, no matter how complex.

Cocoon works in the background saving a log of each of your keystrokes to disk precisely in the order you make them.

Then, if there's a power interruption or keyboard lock-up, Cocoon can reconstruct your work (each key stroke exactly in the same sequence) even after your computer has lost them.

Cocoon works with any popular application such as 1-2-3, WordPerfect, Symphony, and dBase, to name just a few. It will work for yours.

Order Cocoon now at the special promotion price of only \$79.95 (reg. \$99.95). A great value for a real work-saver.



**Silk Special Price**  
Only \$99.95

**Cocoon Special Price**  
Only \$79.95

**Bonus Offer\***  
**Both Only**  
**\$149.95**

\*Offer ends December 31st



**1-800-888-0848** Ext. 636C

Mail <b>DAYBREAK</b> Dept. 636C	
To: TECHNOLOGIES, INC. 212138 Hawthorne Blvd., Ste. 5629	
Torrance, CA 90509	
Name _____	
Company _____	
Address _____	
City _____ State _____ Zip _____	
Phone ( ) _____	
<input type="checkbox"/> Sets Both @ \$149.95 <input type="checkbox"/> Copies Silk @ \$99.95 <input type="checkbox"/> Copies Cocoon @ \$79.95	
Add shipping & handling \$6 each U.S. & Canada (\$40 each everywhere else)	
CA residents add 6.5% sales tax	
Total \$ _____	
Check diskette size <input type="checkbox"/> 5 1/4" <input type="checkbox"/> 3 1/2"	
Payment Method (allow 2 weeks for delivery)	
<input type="checkbox"/> Check or money order enclosed, made payable to Daybreak Technologies, Inc. (Sorry No CODs)	
Charge my: <input type="checkbox"/> Visa <input type="checkbox"/> MasterCard	
Account # _____	Exp. Date _____
Signature _____	
<small>both Silk and Cocoon require an IBM PC or compatible with DOS 2.0 or later. Silk requires at least 128K with a hard disk recommended. Cocoon requires a hard disk.</small>	

© 1988 Daybreak Technologies, Inc.

Circle 292 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

## 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.

### Turbo Assembler and Debugger

Borland Int'l  
1800 Green Hills Rd.  
Scotts Valley, CA 95066  
408/438-8400

**List price:** \$149.95

**Requirements:** DOS 2.00 or later version; Assembler 256K, Debugger 250K of available RAM (can be in a remote PC or a separate virtual machine in a 386-based system)

**Technical support:** free to registered users, M-F 8-5, toll-free number for customer orders and information

For more information, circle 733 on reader service card.

### Softstrips

Users of Cauzin's Softstrip Reader System can obtain Softstrips of *Star-Dot-Star's* December program listings by sending a self-addressed envelope to *PC World*, December Softstrips, 501 Second St., San Francisco, CA 94107-1496.

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

### POWER TIP NO. 25

#### To Cell and Back With 1-2-3

With 1-2-3's Goto key, you can travel to any part of the worksheet. Press <F5> and use the cursor navigation keys to go to the new spot. To return to your starting point, just press <Esc>.

Kay Landis  
Silver, Texas



2500 WEST COUNTY ROAD 42 • #5 • BURNSVILLE, MN 55337 • (612) 894-0595

## A Small Case For BIG Performance!!!

### TOSHIBA



**CALL**

T1000  
T1200F  
T1200H  
T3100  
T3200  
T5100

**CALL**

### ZENITH

#### SUPERSPORT



Dual Floppy  
**CALL**

20 MB HD

**CALL**

SUPERSPORT  
286/20  
**CALL**

### MITSUBISHI



**New!**

#### MP286L/20

- 11" Diagonal Black & White Display
- 20 MB Hard Disk
- 12 MHz 80286
- 1.4 MB Floppy Drive

#### Introductory Price

**\$2695.00**

Dual Floppy (1.4 MB) Model  
**\$2195.00**

### From MegaHertz

#### Easy Talk 3270

3270 Emulation Card for  
Toshiba Laptops; Fully supports  
IRMA & IBM Emulation.  
Auto-Config. - No Jumper  
Changes required.  
Includes software for 3270 and  
IND/FILE Transfer Support

**\$599.00**

#### Easy EGA

EGA Card for Toshiba T1200  
and T3100 Laptops. Supports  
MDA, HGC, CGA & EGA

**\$299.00**

#### Easy Talk E2400

2400 Baud Modem for the  
Epson Equity LT

**\$239.00**

**Weltec . . .**  
External 5.25" FDD  
**\$199**

*Specify TOSHIBA, ZENITH or NEC\**

*\*No cable w/NEC Drive - Cable included in NEC Laptop Box*

#### MHz INTERNAL MODEMS

1200 Baud \$139 2400 Baud \$239

*Specify:*

Toshiba, NEC EL/HD,  
Zenith 181/183 or SupersPort

#### WonUnder

Single card expansion slot for  
the T1100+, T1200, T3100/20 & T5100 **\$299**

Diconix 150P Portable Printer **\$299**  
Laplink Plus **\$79**

*When Purchased with any Laptop*

- Competitive Price
- Corporate Volume Discounts
- Net Terms to Qualified Corporate Accounts

Circle 34 on reader service card

Prices Subject  
to Change  
Without Notice

To Order Call:

FAX Number: 894-6175

**(800) 255-4012**

IN MN: (612) 894-0595



# 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	Realtime 386									
	Realtime 386	Fastlane 386	Fastlane 386	Fastlane 386	Math 386	PC Turbo 386-10	Realtime 386	Realtime 386	Realtime 386	Realtime 386
Speeds up IBM PC-1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N	N	N	N
Microprocessor	80286	80286	80286	80286	80286	80286	80286	80286	80286	80286
Memory Cache	16K	8K	64K	8K	N	8K	8K	8K	12K	12K
On-board memory	N	N	DP1	N	1024K	N	N	N	N	N
Computer processor retained	N	Y	N	N	Y	N	N	N	N	N
Change Speed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Change speed without rebooting	Y	N	Y	Y	Y	N	N	N	N	N
Change speed within application	N	Y	Y	N	N	N	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N	N	N	N
RAM disk included	N	Y	N	N	Y	N	N	N	N	N
Print spooler included	N	Y	N	N	Y	N	N	N	N	N
Low-cost card	SH	SH	I	I	I	SH	SH	SH	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.

**QMS-PS 810 \*\*\*\*\***  
**PostScript Laser Printer**  
**SPECIFICATIONS**  
**Price**  
 \$5,195  
**Date First Shipped**  
 June 1987  
**Memory Included**  
 2MB (expandable to 3MB) (Extended Memory Option is \$350)  
**Marking Engine**  
 Manufacturer: Canon SX  
 Life expectancy: 200,000 or 5 years  
 PostScript version: 47.0  
 Imaging method: Direct positive exposure  
 Recommended toner cartridge: Canon (5,000 sheets)  
**Power Requirements**  
 120V, 60Hz, 500W

**PRODUCT RATINGS**  
 (Graphs showing performance metrics)

Each product receives its own detailed report.

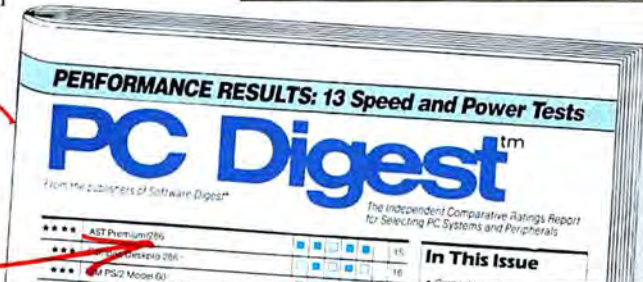
### New changes and pressures ahead! Will you be ready?

**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!

The Master Ratings Chart on each issue's front cover provides at-a-glance comparative data on every product.



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

☐ **YES**, begin our no-risk trial subscription (12 monthly issues) to *PC Digest*. You'll send the current issue, without obligation, on a 30-day examination basis. If we're dissatisfied, we have the right to cancel within 30 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 \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( \_\_\_\_\_ ) \_\_\_\_\_

(in case we have a question about your order)



**NATIONAL SOFTWARE TESTING LABORATORIES**  
 One Winding Drive,  
 Philadelphia, PA 19131-9990



# CATALOG



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
■ Connectivity	page 262
■ Disk Drives	page 262
■ Expansion Units	page 263
■ Insurance	page 263
■ Memory Chips	page 263
■ Peripherals	page 263
■ Plotters	page 264
■ Printers	page 264
■ Security	page 264

## MISCELLANEOUS

■ Accessories	page 264
■ Bar Coding	page 265
■ Business Opportunities	page 265
■ Catalogs	page 265
■ Computer Insurance	page 265
■ Contracts	page 265
■ Data/Disk Conversion	page 266
■ Disk Copy Service	page 266
■ Disks	page 266
■ Mailing Lists	page 267
■ Networking	page 267
■ Publications	page 267
■ Rental	page 267
■ Supplies	page 267
■ Typesetting	page 268

## SOFTWARE

■ Accounting	page 268
■ Business Applications	page 268
■ Church Applications	page 270
■ Communications	page 270
■ Construction	page 270
■ Data Base	page 270
■ Data Entry	page 271
■ Desktop Publishing	page 271
■ Educational	page 271
■ Engineering	page 272
■ Entertainment/Games	page 272
■ Financial	page 272
■ Flow Charting	page 273
■ Graphics	page 273
■ Health	page 273
■ Home Use	page 274
■ Inventory Control/Management	page 274

■ Languages	page 274
■ Laser Fonts	page 274
■ Legal	page 274
■ Mailing List Programs	page 275
■ Maintenance Management	page 275
■ Manufacturing	page 275
■ Medical	page 275
■ Music	page 276
■ Project Management	page 276
■ Public Domain/Shareware	page 276
■ Real Estate	page 276
■ Security	page 277
■ Sales/Marketing	page 277
■ Statistics	page 277
■ Surveys	page 278
■ Taxes	page 278
■ Terminal Emulation	page 279
■ Utilities	page 279
■ Weather	page 279
■ Word Processing	page 279

## ADVERTISING SALES STAFF

Sharon Van Leuven  
Western Ad Manager

Eric Cressy  
Western U.S.

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.

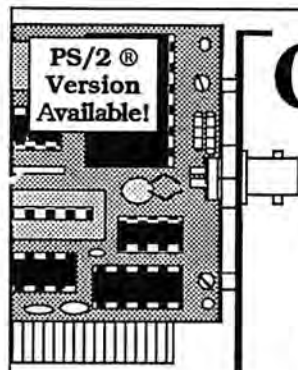
For further information regarding the Catalog, space closings and material deadlines, please call Toll-Free 800/435-7766. Within California, call 800/435-7760.

PC World  
501 Second Street  
San Francisco, CA 94107

**PcW** PCW Communications, Inc.  
An IDG Communications Publication



## HARDWARE/Accessory Boards



## Connect with ARCnet™

\* Top Quality \* Tested by Novell \* One Year Warranty

ARCNET CARDS AND HUBS  
ETHERNET CARDS  
STANDARD AND PS2 BUS  
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

### 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, XT's, AT's, & 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

### Communications/ Modems

### 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

### FREE FAX PAPER

With  
Every Fax  
Machine  
Purchase



\* BEST PRICES IN THE COUNTRY  
\* FULL SERVICE AND TRAINING  
\* NO SALES TAX

**Fax of America**

America's Low Price Fax Distributor

CALL TOLL 800-342-FAXX

FREE IND. CALL 1-219-256-7019

TOP DISCOUNTS ON...

Sharp • Murata • Ricoh

CIRCLE 485 ON READER SERVICE CARD

### 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, 800/241-4310, ext. 768

### Motherboard Clock \$59

SideClock does not use an expansion slot! The Innovations' 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

### TOSHIBA LAPTOPS

T1000.....\$759.00  
T1200F/IB.....\$1329.00/1549.00  
T1200H/IB.....\$2199.00/2399.00  
T3200.....\$3640.00  
T5100.....\$4649.00

\$385.00

MACHINES

## FAX

### SANYO COMPUTERS

Sanyo LapTop ..... \$ 995.00  
2-3.5,720 k Floppies, 640k Ram  
Ser. Par. Clock Supertwist Display  
Sanyo AT 286 System ..... \$1495.00  
Sanyo AT 386 System ..... \$2125.00  
Sanyo SF 600 Copier.....\$ 545.00

Murata MI/1200/1600.....\$ 695/Call  
Ricoh 07/10/20 Call/Call/S1595  
Toshiba 30100 / 3300 ...\$ 935/Call  
Cannon 20 (100)/8.....\$1075.00/Call  
Sharp FO 300/420.....\$1095/1295  
Sharp FO 220/550..... Call Lowprice  
Sanyo SF100/SF200 ...\$ .9995/1195

Terms: Prepayment Prices Visa M/C/COD+2% Restock 20% prices can change.

T.P.C. 12603 Hoover St. Garden Grove, CA 92641

Rent\*Buy\*Lease 800-444-3199 FAX 714-891-1202

CIRCLE 591 ON READER SERVICE CARD

### Computers/Systems

IBM PS-2 MODEL 50/21	\$2675	APPLE MAC PLUS	\$1200
30-02/30-21	\$1265/\$1695	MAC SE / MAC SE-20	\$1875 / \$2375
60-40/60-70	\$3390/\$3725	MAC II / MAC II-40	\$2875 / \$3675
80-40/80-70/80-70	\$4375 / \$4875	IMAGEWRIE II	\$425
8503/8512	\$185 / \$435	EPSON LX-800	\$185
COMPAQ 286/1	\$2075	FX-850 / 1050	\$335 / \$485
386-60/386-130	\$5565/\$7045	LO 500 / 850	\$329/\$335
PORT II-20/4	\$1875/\$2775	LO 1050 / 2500	\$719 / \$809
PORT III-20/38-40	\$3635/\$4145	SHARP PC-4501	\$629
H.P. LASER JET II	\$1675	PC-4502 / 4521	\$1135 / \$1895
DESK JET / 7475A PLOTTER	\$685 / \$1275	PC-7000A / 7100	\$1265 / \$1895
TOSHIBA T1000/T1200	\$745 / \$2225	PC-7202 / 7221	\$1895 / \$2520
3100-20 / 3200	\$2995 / \$3525	SHARP FAX MACHINES	
AST 286-80	\$1615	FO 220 / FO 300	\$999 / \$1175
286-120 / 286-140	\$2250 / \$2600	FO 420 / FO 500	\$1295 / \$1465
386-300 / 386-340	\$3470 / \$3920	TOSHIBA FAX 30100	\$1075

F2C, Inc. • 818/901-9662 • VISA/ MC Prices subj. to change.

CIRCLE 463 ON READER SERVICE CARD

### 12 MHz 40M HD COMPLETE SYSTEM

ONLY \$1300

(W/1M 80NS \$1600  
0 W/S \$1153)

\*80286-12 CPU, 8/12 MHz  
\*Legal Phoenix BIOS  
\*Full Size Case w/8 slots  
\*200 VV PS  
\*80287 Socket  
\*51251 (42.8 M 40 ms)  
\*512K 120 ns RAM  
\*Clock/Calendar W/B  
\*4M Controller, 1/2 HD  
\*Enhanced KB  
\*SAMSUNG Monitor  
\*MGP Card

\*30 Day Satisfaction Guarantee

\*One Year Limited Warranty

(512) 258-4607

### 12MHz OW/S 65M HD (RL 1:1)

ONLY \$1680

(W/1M 80NS \$1900  
SI 15.3 1:1 CONTROLLER)

20 MHz 286 SYSTEM SI 23 ADD \$380

EGA System ..... Add \$600  
16AC 360K/720K/1.44 M FD ..... \$95/\$110/\$140  
ST251-1/51277R/ST4096 ..... \$450/\$450/\$620  
EVEREX 40M/HMM TAPE DRIVER ..... \$430/\$480

TEXAS EXPRESS COMPUTER

11802 Charing Cross Rd. Austin, TX 78759



**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

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

## 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

**OUR SPECIAL OFFER...**

WHOLESALE  
PRICE  
ON EVERYTHING  
**NOW**

CASH & CARRY  
OR  
UPS

**Tandy**  
**Radio Shack**  
**Everex**  
**IBM**  
**Compaq**  
**Apple**  
**National**  
**Grain Processing**  
**Computer Warehousing**

**NATIONAL**  
COMPUTER WAREHOUSING LLC  
1200 Hwy 377, Granbury, TX 76048

**YOUR WHOLESALE PRICE** **1-800-433-SAVE**  
(817) 573-4111  
Customer Service & In Texas (817) 573-4220  
\*Excludes IBM and Apple products

CIRCLE 458 ON READER SERVICE CARD

## Name Brands ★ Low \$\$

EXPANSION BOARDS	
AST Sixpackplus (64-384K)	\$129
Advantage 128k-15M	\$249
Advantage2 386 for PS2 80 W/Ok	\$429
Rampage (Ok-2M)	\$189
Rampage 286 (512k-2M)	\$409
Rampage2 286 for PS2 50/60	\$409
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 5-14" 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

## 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

## Tandy® Computers

Cellular Phones & FAX  
Best Prices Best Service

**1-800-633-0197**  
Ks. Res. & Cust. Serv.  
1-913-364-2171

**The Cisum Company**  
400 Pennsylvania  
Holton, Ks 66436

CIRCLE 487 ON READER SERVICE CARD

## Disk Drives

## DISC DRIVE REPAIR SPECIAL

### SPECIAL COUPON

Capacity	Flat Rate	SPECIAL
10-14mb	\$75	
15-19mb	\$99	
20-30mb	\$125	\$112.50
31-40mb	\$150	\$135.00
41-49mb	\$175	\$157.50
50-85mb	\$210	\$189.00
86-120mb	\$275	\$247.50
121-150mb	\$325	\$292.50
Test & Evaluation	\$25	
VALID THROUGH 12/30/88		

We repair most major brands of  
both hard and floppy disc drives  
**90 day warranty on all repairs.**  
**5 day turn-around time.**

**FLOPPY DRIVE REPAIRS**  
CAPACITY FLAT RATE  
180k-500k . . . . . \$35  
501k-1.2mb . . . . . \$45

**We have an extensive  
inventory of disc drives.**  
**jb TECHNOLOGIES, INC.**  
21011 Itasca St. - #F  
Chatsworth, CA 91311  
Telephone (818) 709-6400



## Expansion Units

### 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

### 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



**INSURE YOUR COMPUTER AGAINST ACCIDENTAL BREAKAGE**  
**1-800-822-0901**

CIRCLE 560 ON READER SERVICE CARD

## Peripherals

### 9-Track Tape Subsystem



### MINISTREAMER™

Now you can exchange data files between your IBM PC/XT/AT and any mainframe or mini-computer 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 1/2" 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

### 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

## Memory Chips

### MEMORY CHIPS

256K	64K
64Kx4	256Kx4
Genuine Intel®	IMEG

8087 80287  
80387-25Mhz

In the box with manual and warranty

**ESSKAY**

718-353-3353

CIRCLE 471 ON READER SERVICE CARD

## Insurance



**SAFWARE®** 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

**SAFWARE**

SAFWARE, The Insurance Agency Inc.

CIRCLE 517 ON READER SERVICE CARD

### MEMORY CHIPS

256K	64K
64Kx4	256Kx4
Genuine Intel®	IMEG

8087 80287  
80387-25Mhz

In the box with manual and warranty

**ESSKAY**

718-353-3353

CIRCLE 483 ON READER SERVICE CARD

### Never pay for another ribbon!



**MacInker™**, the automatic ribbon re-inker re-inks any fabric ribbon at 5 cents/re-inking in black or any color. Lubricating ink cools ribbon, extends printhead life. Avg. re-inkings per cartridge, 60-100. **Universal MacInker** (cartridge or spool) \$68.50. **Epson or Imagewr.** \$42.00. **Multicolor adaptors** available for 4-color cartridges. Over 100,000 sold, over 20,000 printers supported. Satisfaction or 30 day refund. Free keybeeper-flashlight for orders >100\$. **Order toll free** or call for free catalog.

(800) 547-3303 **Computer Friends**  
14250 Science Pk. Dr.  
Portland OR 97229  
tel. (503) 626-2291  
fax (503) 643-5379

Major credit cards,  
cod. POs from national  
accounts accepted

CIRCLE 483 ON READER SERVICE CARD



### 9-TRACK TAPE

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write 800/1600/8250
- 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 middlemen—Go direct!  
**FLAGSTAFF ENGINEERING** 802-779-3341  
FAX 779-5998

CIRCLE 582 ON READER SERVICE CARD



## 9-Track Tape Drives: Yes! for IBM PC/XT/AT/386 and PS/2



Interchange tapes from mainframes.

### Important features:

- 800, 1600, 3200, 6250 BPI
  - EBCDIC/ASCII conversion
  - IBM & ANSI labeled tapes
  - Network backup
  - DOS, XENIX, Microport
  - Highest quality customer service
- For quick delivery we stock all major manufacturers' tape drives, including Cipher, Kennedy, M4 Data, Qualstar. Prices start at \$3,755. Call Today!

Overland Data, Inc.

5620 Kearny Mesa Rd. • San Diego, CA 92111

Tel: (619) 571-5555

FAX: (619) 571-0982

CIRCLE 554 ON READER SERVICE CARD

## Printers

### Laser Printer Accessories

- HP 1 MB Memory Expansion \$299
  - HP 2 MB Memory Expansion \$599
  - HP/Canon EP/EP5 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

## Security

### Security Kits • Cust Cables

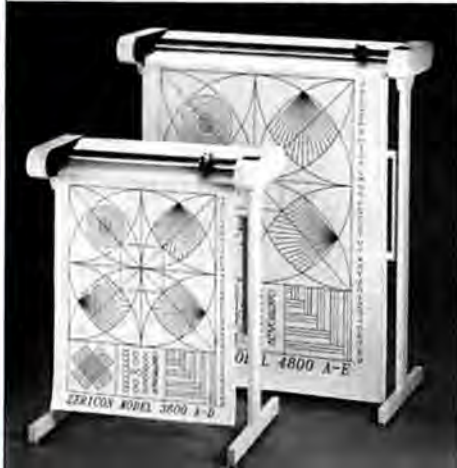
PC Lock secures PC, XT, PS2, & clones, including base, monitor, keyboard, & most peripherals & boards. Attractive 8' steel cable. Lock incl. No tools req. \$back guarantee. \$50 + \$4s/h. Special kits also avail. for Mac & many others. Custom PC Cables, any length, connect any devices. Std. 8' \$29.95.

Mac Products

20241 San Gabriel Valley Dr.  
Walnut, CA 91789  
714/595-4838

## Plotters

## Affordable Large Format Plotting



C-D  
**\$1695**  
(Sugg. ret. \$2295)

A-D  
**\$2295**  
(Sugg. ret. \$2695)

A-E  
**\$2695**  
(Sugg. ret. \$2995)

Made in USA

### Features that say value ...

**Economical:** \$1,000 less than other large format plotters.

**Compatible:** Operates with all popular CAD software supporting DM/PL.

**Multiple Media Sizes** as small as 8 1/2" x 11" or as large as 36" x 48" eliminates the need for a second plotter.

**Practical speed you can really use:** 10" per second assures good drawing throughput while optimizing the speed at which most plotter pens can draw without skipping.

**Repeatability and Resolution:** .004 assures quality suitable for the most demanding applications including PCB artwork.

**Vacuum Paper Hold Down** guarantees perfect registration.

CALL NOW AND WE'LL SEND YOU A FREE SAMPLE PLOT.

(415) 490-8380

Dealer inquiries invited.

**ZERICON**

40491 Encyclopeda Circle, Fremont, CA 94538

DM-PL is a trademark of Houston Instrument

CIRCLE 532 ON READER SERVICE CARD

## 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/MC/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

## MISCELLANEOUS/Accessories



### 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

**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 Mangosa St. SF. CA 94107

CIRCLE 550 ON READER SERVICE CARD

## 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  
Plainville, NY 11803

CIRCLE 508 ON READER SERVICE CARD

### 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 85325

602/634-7515; FAX 602/634-4620

### Mouse Pads

Co. Logo Specialist.

Grey, Green & Red Pads.

Size: 9 1/4" x 8" x 3/8"

• 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



## Bar Coding

**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** **\$495.00**  
**Bar Code Reader**  
**FREE Brochure (916) 622-4640**

**Bear Rock**  
SOFTWARE COMPANY, INC.  
6069 Enterprise, Placerville, CA 95667  
CIRCLE 557 ON READER SERVICE CARD

**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

**Bar Code Solutions**  
**ON-LINE BAR CODE READER NETWORK**  
**NEW PC-WAND 300** - up to 128 reader data collection system • Auto-discriminates • Collects, formats and transmits to PC or host.  
**PC-WAND 800** WanderWand - programmable portable bar code readers.  
**PC-WAND 200** - terminal wedge on a serial "party line" for mini's.  
**PC-WAND 100** - emulates 2nd keyboard.  
**NEW** - bar code printing software packages for your printer

**DEALER INQUIRIES INVITED**  
**INTERNATIONAL TECHNOLOGIES & SYSTEMS CORP.**  
635 North Berry Street, Suite C, Brea, CA 92621  
**PHONE: 714 990-1880**  
**FAX 714 990-2503**  
CIRCLE 501 ON READER SERVICE CARD

**VARIANT MICROSYSTEMS**  
**BAR CODE READERS/DELIVER**  
**WAND / LASER / MAGNETIC CARD CONNECTIVITY**  
• Keyboard wedges (Internal/External) for IBM PC XT AT PS 2 and portables  
• RS232C wedges for WYSE, Link, Kimtron (terminals)  
• Auto-discriminate between codes 3 of 9, UPC, EAN 12 OF 5, Codabar, Code 128  
• Interface with wands, Symbol Technologies LS 7000 8000 and Photographic Sciences listers  
• Bar code and label printing software  
• Full two year warranty  
• 30 Day Money Back Guarantee  
• Extensive VAR Dealer Discounts

**VARIANT MICROSYSTEMS**  
3140 De La Cruz Blvd.  
Suite 200  
Santa Clara, CA 95054  
(408) 980-1880

CIRCLE 448 ON READER SERVICE CARD

**LABELING SOFTWARE**

**for DOT MATRIX and Laser Printers (Epson/IBM/Oki/LaserJet)**  
• Design Label on one Screen  
• Any format, any size  
• Text readable from 50 ft.  
• 13 Text Sizes, 12 Bar Codes  
• UPC/EAN, 128, Codabar, MSI, Code 39, MIL-STD, AIAG  
• Logos, Color, Reverses, Lines  
• Laser Soft Fonts (8 ppm)  
• Fast • Easy • File Input  
• Label above by \$279 program  
• Other DOS programs from \$49  
• Menu-driven XENIX-\$199  
• DOS callable routines from \$159

**Bar Code Readers**  
**PC/XT/AT and PS/2**  
Plus all compatibles and Kimtron, WYSE-60, Link, & RS-232  
• Attaches as 2nd Keyboard  
• No software changes  
• Rugged metal pen and holder  
• Reads 1 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**  
**CA 408/458-9938**  
**30 Day \$ Back Guarantee**

**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 572 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  
• 3 1/2 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

**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  
800/415-9522, 214/357-7751

**Largest Software Library**  
World's largest software library. Thousands of powerful programs for IBM/PC, XT, AT (3.5 format available) & Apple IIe, GS. Items including business, CAD, education, games & religion. Free catalog sent to you by Airmail, specify your computer type, write:  
**Reliant, Dept-PC**  
PO Box 33610  
Shuangwan, Hong Kong

**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 361782  
Garland, TX 75046-1782  
214/276-8072

**Computer Insurance**

**SAFWARE**  
Insure your computer. Safware 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 Sam to 10pm EST (Sat 9 to 5)  
**Safware, The Insurance Agency**  
2929 N. High St., PO Box 02211  
Columbus, OH 43202  
800/848-3469, 614/262-0559



## Data/Disk Conversion

### 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"

### TAPE/DISK CONVERSIONS



Conversion services to or from over 1250 computer systems:  
• Magtapes • 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

### 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

### Conversions from \$15

Use your old files on your new system with your new software.  
• WP document files  
• Data Base files  
• Choose 3.5", 5.25", or 8" disks.  
Satisfaction Guaranteed. Purchase orders welcome. Quantity discounts available.  
C.R. Designs  
1109 S. Plaza Way, Suite 145  
Flagstaff, AZ 86001  
602/774-7688

### Disk Copy Service

### Duplication from 59¢

Affordable rates only 59¢ for 5.25" & \$1.59 for 3.5" 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

### Disks

### BUY QUALITY FOR LESS! MAXELL

5 1/4" DS/DD 59¢

3 1/2" DS/DD 1.15

**LIFETIME WARRANTY**

Price based on quantity of 300 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

### 5.25 DISKETTES

**24¢ EA.**

**100% GUARANTEED**

MEDIA SOURCE and DiskAmerica have joined, to offer you the LOWEST PRICED 100% CERTIFIED DISKETTES.

### FORMATTED DISKS COST LESS!

100% CERTIFIED, FORMATTED, GUARANTEED DISKS  
AT THESE PRICES YOU CAN'T AFFORD TO WAIT!

PRODUCT	PRICE	MINIMUM
FORMATTED 5.25 DS/DD	39¢ ea.	100
FORMATTED 3.5 DS/DD	1.59 ea.	50
SONY 3.5 DS/DD	1.69 ea.	50
SONY 3.5 SS/DD	1.49 ea.	50
GENERIC 3.5 DS/DD	1.29 ea.	50
GENERIC 3.5 SS/DD	1.19 ea.	50
UNFORMATTED 5.25 DS/DD	24¢ ea.	100
HIGH DENSITY 5.25 DS/HD	89¢ ea.	50

### CALL NOW!!!

1-800-356-2553 or 1-404-952-2990

FREE LABELS, SLEEVES AND WRITE PROTECTS.  
VISA, M/C, DISCOVER, AMEX or UPS COD

CIRCLE 477 ON READER SERVICE CARD



### YOUR OWN DESKTOP CONVERSION SYSTEM

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write most 8" 5 1/4" 3 1/2" diskettes from IBM systems and word processors
- Read & write 1/2" 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

- Tape Conversion - 9T, 800, 1600, 6250 BPI
- Disk Conversion - 3 1/2", 5 1/4", 8"
- Data Entry - Scanning, Key Entry
- Programming - Customized Results
- Disk Duplication - 3 1/2", 5 1/4", 8"

Distributor of AUTOFAK DISK DUPLICATING EQUIPMENT and the new IMAGER TAPE BACK-UP SYSTEM

**MEDIA CONVERSION CORP.**  
Chicago, IL (312) 858-4566

CIRCLE 462 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

### BUY QUALITY FOR LESS! DYSAN

5 1/4" 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

### AMERICAL GROUP

5 1/4" DS DD 29¢ ea.

INCLUDES SLEEVES & LABELS Min. Qty: 200

**100% LIFETIME WARRANTY**

3 1/2" DS DD (min 25)	1.10 ea.
5 1/4" DS DD (min 30)	.69 ea.
5 1/4" DS DD (Color)	.90 ea.
5 1/4" DS DD (Color, min 100)	.45 ea.

Visa/MC accepted  
12132 Sherman Way  
N. Hollywood, CA 91605

Shipping \$4.00 per min order/\$2.00 each additional lot

**(818) 765-3040**

CIRCLE 541 ON READER SERVICE CARD



## Why waste your time formatting disks?

## Preformatted disks save you time and money!

Memorex • Nashua • 3M

5<sup>1</sup>/<sub>4</sub>" (from 48c) • 5<sup>1</sup>/<sub>4</sub>" HD • 3<sup>1</sup>/<sub>2</sub>" • 3<sup>1</sup>/<sub>2</sub>" 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

## 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.

Twintet Electronic Co.  
39 Bowery, Box 396  
New York, NY 10002

## Supplies

reconditioned



## TONER cartridges!

for laser printers & Canon PC Copiers

BETTER THAN NEW!

- 20% MORE TONER
- DARKER PRINT
- 100% GUARANTEED

Willow Products Corp.  
3857 Willow Ave. Pgh. PA 15234

**\$44.95**

We buy empties - \$10

call for brochure

**800-426-8196**



CIRCLE 535 ON READER SERVICE CARD

## 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

## Mailing Lists

## Publications

### 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, mod, 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

### 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

## Networking

**Finally...  
An Office Network  
You CAN Afford!**

**\$100 Per PC**

- Printer Sharing (up to 18 PCs)
- File Transfer (speeds up to 4000 cps)
- Simple to Install, Easy to Operate

**\$100 Per PC**

**ExcellNET**  
**800-284-8509**

CIRCLE 571 ON READER SERVICE CARD

### National Laser Recharge

Save your money! Let us recharge your toner cartridges for HP Series I & II, Apple, Canon, QMS & others. All Canon, PC models 100% Guaranteed Factory-Like recharge method. No drill & fill! Long Life method for only \$49 incl. s/h. Up to 7 charges per cartridge Color avail. We buy empties - \$10. Send cartridge w/check or Money Order To:

National Laser Recharge  
1413 W. Loop 281, Ste. 101  
Longview, TX 75604  
214/297-0200

CIRCLE 472 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

**laserstar data**

## TONER CARTRIDGE REMANUFACTURER

100% GUARANTEED \* JUMBO REFILLS

COLORS \* QUANTITY RATES \* 24 HR. TURN AROUND

**FROM \$34.95**

**2 DAY FREE AIR RETURN**

**WHERE QUALITY COUNTS**

9 BRISCOE ST., WOBURN, MA. 01801

**617-932-8667**

CIRCLE 484 ON READER SERVICE CARD

## AUTHENTIC NEC RIBBONS

	MULTISTRIKE	FABRIC
SPINWRITER 3500/8800	\$ 7.98	\$ 7.02
SPINWRITER 5500/7700	\$ 3.18	\$ 3.48
PINWRITER P5XUP9XL	\$ 9.06	\$ 9.48
PINWRITER P2200	N/A	\$ 7.62
PINWRITER P2/P6	N/A	\$ 7.86
PINWRITER P3/P	N/A	\$10.44
PINWRITER P5200/P5300	\$10.14	\$11.16

LASER CARTRIDGE \$14.58  
OPTICAL PHOTO CONDUCTOR \$105.48  
PRINT MASK/ORG. RIB GUIDE (3/pkg) \$ 2.89

Minimum purchase of \$75.00  
FREE FREIGHT - SAME DAY SHIPPING  
ALL NEC RIBBONS AVAILABLE

CALL FOR QUANTITY DISCOUNTS  
TOLL FREE 1-800-274-7221 EXT. 373  
IN AZ CALL (602) 265-6311 EXT. 373  
BETWEEN 9AM AND 6PM EST  
VISA/MC/AMERICAN EXPRESS

CIRCLE 489 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 \$5.00. • **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

## 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

## Typesetting

### 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

### 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

## Accounting At Its Best

**ACT 1**  
SCREES  
**\$17950**

- +11.50 Shipping & Handling, U.S. Effective November 1, 1988
- **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

### Attention Peachtree

Business Accounting Users:  
Expand the Use of Your  
Present Accounting Data With

### QuickCheck™

Checking Account  
Management System:

- Links to Your Existing Data
- Simple to Operate with Menus & Help Messages
- Easy Checkbook Reconciliation
- Yearly History File
- Registers, Reports & More!

### Also Included:

- Prints 1099's ■ Prints Labels
- Plus Much More!

Call or Write:

**M&M Computer Systems**  
1386 Solomon Rd.  
Santa Maria, CA 93455  
805/934-2180

Only \$9900

CIRCLE 579 ON READER SERVICE CARD

### 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

### 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

### 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

### 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

### 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

### Contabilidad en Español

Entrar clientes, Inventario, Imprima cuentas. Todo facil de leer en Espanol pantallas y reportajes. Sus operadores y clientes no necesitan ser bilingue para comprenderlo. Los mas recientes jalar abajo menus por operacion facil. Requiere PC y disco duro, 640k, tipo IBM imprenta. Instrucciones completas en Espanol. \$200 por los programas. *Sistemas Espanolas*  
79 Daily Drive, #167  
Camarillo, CA USA 93010  
805/987-8411

### FORTUNA Accounting

Manual published (ISBN 962-7325-01-5). Proven in med/large companies. Double posting to G/L, A/R or A/P. Simple to use-design identical to manual system based on books & pen. Example data files included. All DB 3+ source programs included. \$30 (manual, 5\*360K disks, s/h). Support thru Fax: 852/3-785-4137.

*Fortuna Automation & Machinery Co.*

Block B, 6/F, Ka Ming Court  
688 Castle Peak Road  
Kowloon, Hong Kong

### MARS Accounting

Designed by CPA's. G/L, A/R, A/P, Job/Unit Cost Acctg; multi-division, manual/system checks, easy to learn & use. Users are running on 1st day. Includes functions found in Solomon, ACCPAC, DAC & others. HD & DOS reqd. \$199 + \$9.95 s/h. 30 day money back 20% restock fee. MO/ checks only.

*Computer Software Systems*  
4610 Bloom  
Boise, ID 83703  
208/338-1210

## Business Applications

## Business Plans

**BizPlanBuilder™** Quickly & easily complete an effective business / marketing plan for presentation to investors, Sr. management or clients. A comprehensive and proven framework —Over 85 pages of outlines, headlines, structured sentences & paragraphs, lists, financials, suggestions... already typed into 29 ASCII text files & Lotus®. Follow tutorials & edit into a finished plan. Includes manual. Preferred by investment capital experts, corp. mgrs & experienced consultants. \$99<sup>ms</sup>+\$3 UPS

**Tools For Sales™** 30-day accept / return  
13335 Wildcrest Drive Site license avail.  
Los Altos Hills, CA 94022 Visa/MC/AmEx  
800/442-7373 • 415/941-9191 Call today.

CIRCLE 555 ON READER SERVICE CARD

## LetterBase™

**PERSONAL FORM LETTERS**  
New E-Z way to keep track of people AND print dated and self-addressed form letters AUTOMATICALLY.

Also does custom letters, labels for rotary desk files and phone directories. Extremely EASY and FAST. IBM, 384K, HD. Supports Laser printers.

### CATALOG OFFER

Send only \$79.95 today—receive FREE program to convert standard mail list files.

(714) 838-1888 Visa/MC  
Parkside Computer Systems  
1241 Landfair #B, Santa Ana, CA 92705

CIRCLE 467 ON READER SERVICE CARD



## Do-It-Yourself Business Plan

Type your data into our spreadsheet models for cash flow, ratios, graphs, complete financials. Looseleaf manual walks you through the steps to create a complete business plan. Includes all you need, even sample texts on disk.

**Business Plan Toolkit \$99.95**

Use with Lotus 123 on a PC, or Excel on a Mac. (\$5.00 shipping, 7% tax in CA)

### Palo Alto Software

260 Sheridan Av #219 Palo Alto, CA 94306

(800) 336-5544, CA (415) 325-3190

CIRCLE 487 ON READER SERVICE CARD

## EZ-FORMS Lite™ \$29

"The Fabulous Forms Generator, Filler, Filer & Manager!"

- Revise, Fill-in/out (pre-printed), & Print forms - fast!
- On-line help/manual, req. 320K, DOS-2.1+, supports most printers including HPLJ.
- With 90+ forms & manual, \$49+s/h
- S/H: \$5/US48; \$10 N. America; \$15 foreign; TX tax 8%. USA checks/MO, ok. Mail orders to: EZK Corp., 403 NASA 1E Suite W29c, Webster, TX 77598 USA

Visa/MC/Dis./AX ORDERS ONLY-  
1-800-US-EASY-X ext. W29c  
Info: 713-338-2238 • EZBBS: 713-280-8180

CIRCLE 589 ON READER SERVICE CARD

## PAPERLESS PURCHASING

With QP\* Purchasing Management Software you can:

- Use an IBM PC-AT to manage your purchasing system effectively
- Manage an unlimited number of items and vendors
- Manage vendor selection to lower cost and improve delivery performance
- Integrate receiving and inventory control modules

SAVE TIME & MONEY  
while improving overall purchasing performance with QP\* System from:

**DYNAMIC Software**

109 S. Main St., Greer, SC 29651  
(803) 877-1122

CIRCLE 475 ON READER SERVICE CARD

## THE GENERAL STORE RETAIL OPERATIONS SYSTEM

The complete software system for RETAIL. Multiuser/Network ready. Cash Drawer, Bar Code and online credit card auth.



Accounts Receivable  
Inventory Control  
Point of Sale  
Accounts Payable  
General Ledger  
Mailing List  
• Hardgoods  
• Apparel

**\$995**  
Dealers welcomed.

**Critchlow Data Sciences, Inc.**  
(804) 428-0005  
P.O. Box 6420 - Virginia Beach, VA 23466

CIRCLE 470 ON READER SERVICE CARD

## 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™**

HOG Software, Inc.

381 Old Jail Lane, Barnstable, MA 02630

For faster service, (617) 362-8109

CIRCLE 510 ON READER SERVICE CARD

## 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

## 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. Full featured demo disk: \$4 s/h.

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 computer 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: 6714995

## 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

## TSA88-Transportation

Solves problems with 510 origins and/or destinations. Fully menu-driven, spreadsheet style display. Transportation Simplex Algorithm start/restart options, primal & dual solutions, sensitivity analyses, report generator, storage of problems & solutions, user's guide & examples. \$149.

Eastern Software Products  
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

## THE Best POS AVAILABLE TODAY!

**CASHTRAX**

ORDERS: 800-448-0088

CIRCLE 474 ON READER SERVICE CARD





## 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

## ANSWERMAN™

Easy-to-use information manager. Great for keeping track of job info & hard-to-organize facts & figures. Instant access to all other info on the same topic. Menu driven; enter info in any format. Manual included. For IBM's & compatibles. \$99 (MD add 5% tax). Satisfaction guaranteed.  
CITADEL, Inc.  
PO Box 1203  
Laurel, MD 20707  
301/470-2977

## Church Applications

### 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 overpriced 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 (806) 262-7726

CIRCLE 514 ON READER SERVICE CARD

## 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

## 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 3 1/2 & 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

## AGC Church Systems

Interactive modules for church administration since 1981. OFFICIAL system for many denominations. Powerful Query w/word processing & spreadsheet interface. User groups (1,600+ Users). Semi-annual updates, toll-free support, Quick-Train learning system, help screens, networking. No-risk demo.

AGC Corporation  
1001 AGC Drive  
Cleveland, TN 37312  
800/873-7435, (800) USER HELP)  
615/478-3636 (TN)

## Communications

### 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 1/4" and 3 1/2" 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

102 South Main Street, Park Ridge, IL 60068 312-825-0110

CIRCLE 503 ON READER SERVICE CARD

## 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

## Data Base

### Entering Names & Addresses Into Your Computer?

- Double Your Speed
- Greater Accuracy
- Save on Postage

dZIP does it all and more for only \$295.00. Call Today...

800-443-8834  
In CA 714-661-5885

MELISSA Data Co.  
32118-8 Pasco Adelanto  
San Juan Capistrano, CA 92675

CIRCLE 592 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.  
813 Reddick St.  
Santa Barbara, CA 93101  
805/966-3666

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.

Quadbases Systems Inc.  
790 Lucerne Drive #51  
Sunnyvale, CA 94086  
408/738-6989



## Text Retrieval Data Base

**Concordance™** stores and instantly retrieves notes, research, resumes, on-line manuals, rules and regulations — any full text data.

Features powerful search mode, highlighted browse, report writer, editing, tutorial, context-sensitive help, save and replay queries, and more. Supports OCR input.

\$495 with 30-day money back guarantee. Call now for more information 213/785-0623

**Dataflight Software**

10573 W. Pico Blvd., #68  
Los Angeles, CA 90064

## Data Entry

### Data Entry Emulator

Fast, accurate heads-down data entry & two-pass verification for PCs. Quick/easy formatting. Features include: auto-dup, constants, format chaining, range checks, table look-ups, operator stats, a complete edit language inc, Rev 10 key option. Lots more— Free 30 day trial. PC's \$395.

**COMPUTER KEYES**

21929 Mukah Rd.  
Woodway, WA 98020  
800/356-0203, 206/776-6444  
fax 206/776-7210

### 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  
800/543-6879, 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

## A Data Entry System Perfect Enough to Satisfy Type "A" Personalities.

If you demand the same accuracy, perfection, and hard work from your data entry software as you do from your self, then **RODE/PC** is your type of product. **RODE/PC** is a type "A" solution for people who insist on easy application design, powerful validation, two pass and trail verify modes, exceptional conditional processing, full record output control, complete system management facilities, data security and much more. **RODE/PC** is an extraordinary product to meet extraordinary requirements.

Like **RODE/PC**, your hardware must be right for today and ready for tomorrow. **DPX** recommends **RODE/PC** with the IBM® Personal System/2® products. They feature an integrated system design and the quality and dependability you expect from IBM. Along with the IBM OS/2® the Models 50, 60, 70, and 80 offer the exclusive "IBM Micro Channel™" Architecture.

See for yourself why 6 of the 10 largest companies and thousands of others in the US have selected **RODE/PC** as the ultimate PC data entry solution. Our customers say "**RODE/PC** is a beautiful product, designed by people who clearly understand the market." Call us to discuss your data entry plans and ask about our evaluation program.



**DPX/IDEAS**

Data Entry Division  
20823 Stevens Creek Blvd., Suite 130  
Cupertino, CA 95014  
(408) 973-9292

IBM Personal System/2 and OS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation.

CIRCLE 558 ON READER SERVICE CARD

## Desktop Publishing

### 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, Pspint 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

## 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

## Educational

### VIDEO INSTRUCTION TOOLS

Throw away your  
computer manuals!

Intro To IBM-PC (1 1/2 hours) ..... \$79.95  
MicroSoft Works (1 1/2 hours) ..... \$79.95  
Q & A (1 1/2 hours) ..... \$79.95  
Lotus 1-2-3 (3 hours) ..... \$99.95  
Wordperfect 4.2 (3 hours) ..... \$99.95  
Wordperfect 5.0 (4 1/2 hours) ..... \$129.95  
DOS (4 1/2 hours) ..... \$129.95  
Ventura Publisher (2 hours) ..... \$59.95  
Ventura - techniques (2 hours) ..... \$179.95  
PageMaker - PC (2 hours) ..... \$179.95  
PageMaker - MAC (2 hours) ..... \$179.95

These video tapes are self-contained training guides, which demonstrate each and every command in a given software package, while showing the computer screen and keyboard SIMULTANEOUSLY.

Call for Product Information  
1-800-537-1641

IN MI CALL (313) 729-0325  
**MICHAEL HALVERSON & ASSOCIATES**  
1313 Newburgh  
Westland, MI 48185

**COD**

CIRCLE 578 ON READER SERVICE CARD

### 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



## 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  
**MICRO PLUS**  
TECHNOLOGIES, INC.

**\$79.95**  
per class  
Extension 857

**1-800-628-2828**

## 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

## 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

## Engineering

### 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

## Eng./Sci. Graphics

Engineering/scientific graphics. OMNILOT [S] (screen graphics) & OMNILOT [P] (plotter driver) provide integrated eng./sci. 2D & 3D graphics w/NO PROGRAMMING! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, 3D wireframe & more! OMNILOT [S]: \$195. Add [P]: both \$295.

Microcompatibles  
301 Prelude Drive  
Silver Spring, MD 20901  
301/593-0683

## Entertainment/ Games

**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

## 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 \$5 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  
GE RIDGE SERVICES, INC.  
170 B Way, Suite 201PCW  
New York, NY 10038  
Info 718-317-1961

CIRCLE 584 ON READER SERVICE CARD

## THE LOTTO EDGE HI-TECH LOTTO ANALYZER

**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: 800/992-0045, 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



## ADULT SOFTWARE

For IBM PC, XT, AT PS/2 & Compatibles  
World's Largest Distributor  
Now-Same Day Shipping

Volume I	\$11.95 ppd
Volume II	\$11.95 ppd
Volume III	\$16.95 ppd
M1 thru M9	\$5.00 each ppd
Catalog Disk	\$5.00 ppd

Check or money order accepted  
Foreign orders & 3.5" orders add \$1.00 per disk  
AOS • P.O. Box 106-PC • Marion, CT 06444

CIRCLE 461 ON READER SERVICE CARD

## COMPUTER AIDED WORRY™

A giant stride, possibly backward, in the application of computers to human needs. Throughout history, every new development spawns worry. Automobiles spawn auto repairs, lunch spawns lovehandles, teeth spawn dentists. Expensive psychiatrists insist that you do your own worrying. For pennies, **CAW™** will fret about the worries you input. For the person, office or relationship that has everything, especially worries. Hilarious Worriers Guide and IBM PC Worry Prog. \$19.95 + 2.85 s/h. To Order: 800-628-2828 ext. 512.

**STARBIRD, 7506 Valburn Dr., Austin, TX 78731**

CIRCLE 479 ON READER SERVICE CARD

## POKER

Pros play our games seriously. You can play for fun!

**7 Card Stud** ..... \$54.95  
**Texas Hold'em** ..... \$54.95

Almost live from Las Vegas! Simulate casino or private games. Set skill levels for each of 1-9 computer opponents. Beginner to expert. Select betting limits, antes, etc. Poker Calculator™, Hand/Game Analyzer™ included. IBM/compatible, 192k, mono/color, 30-day \$5-back. Same-day shipping. Visa/MC/COD call. Or send Check (no delay) MO to:

**The WorkWare™ Company**  
5130 E. Charleston, Ste. 5  
Las Vegas, NV 89122  
(702) 641-4931

CIRCLE 490 ON READER SERVICE CARD

## 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 Josaki Tutor™. Add \$3 S&H

**Toyogo, Inc.** 76 Bedford Street, #34-W  
617-861-0488 Lexington, MA 02173

CIRCLE 565 ON READER SERVICE CARD

## 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. R.J.L. Systems  
106 New Haven Ave.  
Milford, CT 06460  
203/878-0376

## Financial

### NumberCruncher™

- RAM - resident calculator with 35 functions! Basic functions, Scientific equations. Programmer calculations. Plus financial calculations, including:
  - IRR
  - NPV
  - Loans
  - 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

### LOAN MAKER® \$89.95

Godfather of Loan Calculation & Amortization Programs. Instantly computes results. Used by CPAs, attys., 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)

### 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



**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

**Pers. Financial Plan**  
Become more prosperous! 82 powerful programs include: budget, balance sheet, goals/tasks/decisions, comp. interest, annuity, NPV, amort., real estate-pers./invest., 88 Fed Tax, insurance, college, portfolio mgt, simulation, retirement, reports & more! 4 disks, 200 p. manual. \$89. 30 day trial, free info. **Advanced Fin. Planning Grp Inc.**  
PO Box 3610 Dept. P  
Ann Arbor, Michigan, 48106  
313/994-1478

**TMA™**  
The Mortgage Administrator handles up to 10,000 loans, user friendly, instant payoffs, check printing, coll. histories, auto. post., handles fixed/balloons/GPMS/ARMS, calculates pymts., print sched., 1098/1099s, late notices, amort. sched., late customer list, labels, PC/MS DOS/512K Demo \$20. Program \$595.  
**Creative Software Inc.**  
c/o F. Childs  
80 SW 14th Ave.  
Boca Raton, FL 33486  
407/395-5690

**....INVESTORS....**  
Low priced CynoTech's fast/accurate manual data entry, bar chart & trend analysis: quickly chart price history, estimate trends to predict price direction, know change relative to market & spot support/resistance levels. CGA/EGA/MCGA graphics. DOS 2.0+. Write now for free summary. Demo disk \$5 + NY tax.  
**Cynoseure Software**  
P.O. Box 65 Dept. W  
Syracuse, NY 13209  
315/468-3594

**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

**Good Software Corp.**  
13601 Preston Rd. Suite 500W  
Dallas, Texas 75240  
(800) 272-GOOD

**\$99.95**

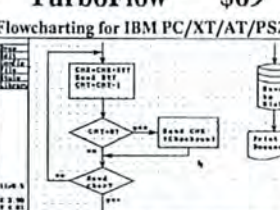
CIRCLE 460 ON READER SERVICE CARD

## Flow Charting

**Better Flowcharter**  
Know before you buy! **Easy-Flow** is the superb flowcharting program chosen by over 30,000 users, and very favorably reviewed in the March 10th 1987 issue of PC MAGAZINE. See the "Advertisers Index" under **HavenTree** to find our large display add in this issue.

**HavenTree Software Limited**  
Order Desk: 1-800-267-0668  
Information: (613) 544-6035

**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

### FORTTRAN 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  
703/440-0063

## 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

### Diet Analyzer

Ideal for weight control, menu planning, special diets, recipe analysis. Tracks calories, sodium, cholesterol, fiber, + 20 others for 1000 foods (incl. many fast foods) & 100 exercises. Can add more. Multi-day averages. \$49.95 + 2.50 s/h. 30 day trial. AMEX/MC/VISA/Chk. Demo disk \$5. Free catalog.  
**Natural Software Limited**  
129 Pearsall Place  
Ithaca, NY 14850  
800/626-2511, 607/272-0157 (NY)



## Home Use

### 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 94043

CIRCLE 505 ON READER SERVICE CARD

### ECONOMICAL FAMILY ORIENTED SOFTWARE

(for IBM or Compatibles)

Family Variety Pak ..... \$45  
Family Finance Pak ..... \$45  
Family Business Pak .... \$45  
Family Genealogy Pak ... \$55

**FAMware™**

1580 East Dawn Drive  
Salt Lake City, Utah 84121  
(801) 943-6908 / (800) 327-9835

### 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

### Genealogical Computing

Edited by Paul Anderock w/various contributing editors, GENEALOGICAL COMPUTING is the first & best periodical in this rapidly expanding & exciting field. New books & software programs reviewed & data bases discussed. Computer interest group listings & hardw/softw/ directories provided. Subscription \$25.  
Ancestry, Inc.  
PO Box 476  
Salt Lake City, UT 84110-0476  
800/531-1790  
Subscription \$25

## Inventory Control/ Management

### SINCE 1980

Our Order Processing software has helped distributors to increase profits. Picking Tickets, Order Acknowledgements, Packing Lists, Invoices, Credit Memos, Statements and Purchase Orders. You can have current information every day. Fully integrated.

Order Processing  
Inventory Control  
Backorder Management  
Purchase Orders  
Invoicing  
Accounts Receivable  
Commission Tracking  
Sales Analysis

Free brochure. Demo available.  
(713) 261-2220

**Blue Ridge Software, Inc.**

P.O. Box 640 Stafford, Tx 77477

CIRCLE 469 ON READER SERVICE CARD

### "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

### 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.  
R.J.L. Systems  
106 New Haven Avenue  
Milford, CT 06460  
203/878-0376

### 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

### Stock-Master 4.0

This commercial grade, high performance inventory system for Mfrs 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

### "Fill 'n Save"™ Power Tool

for Inventory Management.  
• ADD-ON Tool-Box for improved Turns and Customer Service  
• Set-up in minutes  
• EASY link to your acctg pkg via Lotus compatible data export  
• Works w/ Dac Easy acctg call/write for free brochure  
Computer Applications Tech., Inc.  
P.O. Box 30164  
7316 Wisconsin Avenue, Suite 407  
Bethesda, MD 20814  
800/343-2952 or 301/657-4290

## Languages

### LAHEY FORTRAN

If you demand the very best, then you should be using a  
Lahey PC Fortran Language System.

<b>F77L-EM/32-Bit</b>	<b>Programs up to 4 GB on your 80386</b>	<b>\$895</b>
<b>F77L-EM/16-Bit</b>	<b>Programs up to 15 MB on your 80286</b>	<b>\$695</b>
<b>F77L</b>	<b>"Editor's Choice" PC Magazine</b>	<b>\$477</b>
<b>Lahey Personal</b>	<b>Full 77 Standard, Debugger, Linker</b>	<b>\$ 95</b>

For porting or developing, there is no substitute for a Lahey Compiler. Call (800) 548-4778 today to discuss your programming needs.

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

### Online JCL!

Reference IBM OS & VS Job Control Language online via an interactive JCL Manual! Self-paced 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

## Laser Fonts

### \$1.50 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

## 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  
915/672-2901

**Lahey**



## Mailing List Programs

### 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

## 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

## "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

## 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

## Mr. Lister™

Dedicated list manager for organizing customer data and automating mailouts. 12 User-Definable Fields for addresses, account #'s, phone #'s, etc. Define your own label format. Sort on any Field. Letter-Merge routine for automating your mailings. Save Time! Requires 256K RAM. \$79.00 Demo \$15.00  
Automated Micro  
710 Lakeway, Suite 140  
Sunnyvale, CA 94086  
408/245-0350

## Zip Code Directory

79,000 zip codes on floppy disks. Complete file with city, state & county. Excellent for data entry use & for quick look-ups. "Look-up" software included. All formats available. Same day shipping \$99. Call or write  
MicroEast  
28 Julie Lane  
Barksdale Estates  
Newark, DE 19711  
302/454-1724

## 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 20385

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 mfgs, 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. Cycle 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 dev., 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

## 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



# CATALOG



## 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.**  
813 Reddick 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 print-outs call:  
**Realty Automation, Inc.**  
11365 Eastshore Drive  
Hayden Lake, ID 83835  
208/772-3259

## Sales/Marketing

### SALES PRODUCTIVITY MULTIPLIED

**MANAGES YOUR:** Contact list. Appointments. Expenses. To-do list. Call backs. Sales forecast. Price list. Contact history. Optional factory/purchase orders.

**GENERATES:** Customized quotes. Follow-up letters. Labels. Custom management reports. Mail-merge files.

**ADDITIONAL FEATURES:** Menu driven. FAST. Autodials phone. User definable fields. Supports color monitors. On-line help screens. Single user & LAN Versions. Password protection. Money back Guarantee.

**Sales Manager**

By **PROFESSIONAL COMPUTER SOLUTIONS**  
8322 Furlong  
Houston, TX 77271

CIRCLE 478 ON READER SERVICE CARD

## 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 \$7.50 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

## 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)
- creates demos with remote unlock option
- allows protected upgrades by modern SBS
- 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

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



## 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

### 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 500 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

### SOLO

NEW from BMDP. Menus & fill in the blank panels 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



## High performance STATISTICAL SYSTEM

# STATS+

Limited time price \$149

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, dBase, 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

## 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

## 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 interview-ing option available.

Creative Research Systems  
15 Lone Oak Ctr., Dept. W  
Petaluma, CA 94952  
707/765-1001

## Taxes

**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**  
TAX PREPARATION SOFTWARE

CIRCLE 459 ON READER SERVICE CARD

## Surveys

## SURVEY MATE™

The Integrated Survey Package.

- Easy, fast and accurate data entry with automatic values, range, logic checks, age calc, verification, verbatim entry/report for open-ends
- Frequencies
- Recording
- Crosstabs
- Regression
- ASCII File Export
- Up to 1,000 Fields and 32,000 Cases
- Users in 44 Countries

**\$195.00**

- 60-day Money-Back Guarantee
- David Foster & Associates, Inc.  
360 Harvard Ave.  
Monroe, Vermont, NY 10552  
(914) 699-9414 for information  
(800) 622-4070 for orders  
(800) 942-7117 in IL

CIRCLE 480 ON READER SERVICE CARD

## MAGNET 1099

Magnetic media reporter for IRS forms 1098, 5498, W-2G and all 1099's. Creates an IRS format floppy and prints paper forms for payees/recipients.

- Menu Driven Screens, User Friendly
- Computer Data Validation Checks
- Double Entry with Cross Validation
- Imports Data from last years IRS disk
- Technical support
- Comprehensive Documentation
- \$299 Visa®/MasterCard® accepted

**Information Reporting Systems, Inc.**

P. O. Box 2333  
Pearland, TX 77588-2333  
(713) 485-1797

CIRCLE 476 ON READER SERVICE CARD

## E-Z Tax Filer

Magnetic Media Submission  
Compliance for new  
1988 Format changes

- W2 or 1099 Formats
- User friendly, menu driven
- Prints Forms
- Venifies for Correctness
- Import Data from ASCII files
- Satisfies IRS/SSA magnetic media filing requirements
- Telephone support

**Myrick Computer Services, Inc.**

1310 TOWER LANE  
ERIE, PA 16505  
IN PA: 814-455-6410  
800-854-3709

W2/SSA \$69.00 1099/IRS \$69.00 Shipping & Handling \$3.50  
Specify 5 1/4" or 3 1/2" diskettes MC/VISA/COD Accepted

CIRCLE 473 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

## 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

## 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

## 1099's-ON-DISK

Meet IRS regs to file 1099's on magnetic media. Use your IBM-compatible PC's to prepare 5-1/4" diskette, print forms and reports. For all 1099's, 1098, 5498, W-2G. Fast, easy to learn and use, manual included. Not copy protected. Only \$69 plus \$3 shipping, MC/VISA accepted. Our third year.

Custom Craft Software, Inc.  
5730 R St.  
Lincoln, NE 68505  
402/464-3184

## 1988 Taxes

Calculate 1988 Federal Income Taxes with TAX PLAN.

- 20 Forms & Schedules
- Prints Forms
- Audits Taxes
- Multiple Returns
- Saves to Disk

IBM/compatibles & Amigas. Save \$5. Order before 12/31/88, only \$29.95. Shipping 1/31/89. Add \$4 s/h. MA add 5% tax.  
Quality Business Systems  
PO Box 805  
Hudson, MA 01749  
800/225-5800

## AM-TAX

If you have a PC, this is the way you should be preparing your 1988 income tax return. Fast, easy, & accurate. No spreadsheet software reqd. Thousands of satisfied users.

### Regular Version:

Supports 19 schedules and forms (1040, A-SE, 2106, 2119, 2210, 2441, 3903, 4136, 4562, 6251, 8598, 8615).

Prints IRS-approved forms and schedules, plus a graphic 1040 on Epson or IBM-type dot printers. Works with overlays and pin-fed forms. Requires IBM-comp. 256K.

### Only \$45

### NEW Advanced Version:

All of the regular features plus more forms (1040ES, 3800, 4137, 4255, 4684, 4797, 8582), and laser printed 1040 w/graphics on HP-type lasers. Req. 384K and hard drive.

### Only \$60

Electronic filing. Add \$200.

State programs for CA, NY, NJ, MD, MO, and VA. Data auto transferred from federal tax forms. \$30 each.

MC/Visa. 30-day guarantee.

### AM SOFTWARE

P.O. Box 25010  
Kansas City, MO 64119  
(816) 241-0014

CIRCLE 481 ON READER SERVICE CARD



## Terminal Emulation

### 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—



**GRAFPPOINT™**  
1485 Saratoga Avenue  
San Jose, CA 95129  
(800) 426-2230  
CA (408) 446-1919

CIRCLE 509 ON READER SERVICE CARD

## 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 54602  
Call Toll-Free  
1-800-242-6368  
or Dealer Nearest You



CIRCLE 530 ON READER SERVICE CARD

## 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

## DISKPACK™

No. 1 backup software, 10 megs onto as few as 2 floppies in 4 min! Compresses files up to 80%. 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 back guarantee. \$89 + \$3 sh. Biologic.  
11982 Coverstone Cir./Suite 1622  
Manassas, VA 22110  
703/368-2949 (fax 703/361-8251)

## IBM Uses CP/M & Apple

"The best", "strongly recommended"-PC Mag.  
• UNIFORM copies files, reads & writes directly to 200 CP/M disk formats on the PC,XT,AT-by Micro Solutions. \$62.95 + \$3 s/h.  
• MATCHPOINT 1/2 card transfers Apple DOS, SOS, CP/M & ProDOS files to IBM PC,XT,AT. \$185 + \$3 s/h (includes FREE UniForm).  
Blue Heron  
1108 S. Second St.  
DeKalb, IL 60115  
815/758-2355

## Opt-Tech Sort/Merge 4.0

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. Biologic  
11982 Coverstone Cir./Suite 1622  
Manassas, VA 22110  
703/368-2949 (fax 703/361-8251)

## YORDOS

### CUSTOMIZE & ENHANCE DOS!!

- Edit/execute any text on screen.
  - Re-display prior commands.
  - Assign function key macros.
  - Automatic backups when erasing.
  - Run automatic jobs by date/time.
  - Keep an audit trail of commands.
  - Abbreviate/re-name DOS commands.
- \$24.95 inc s/h. Checks please.  
Tusk Software  
P.O. Box 1911  
Wakefield, MA 01880  
617/245-1164

## 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

## Utilities

### AT's DON'T NEED 360KB DRIVES

Allows copying of IBM files for use on IBM PCs, XTs, and compatibles with no hardware or software modifications. A 360K floppy drive is not required. "CPYAT2PC" may reside on your IBM AT hard disk and copies 1 file or entire subdirectories in 1 step. Price \$79 - \$4 s/h.

**MICROBRIDGE COMPUTERS INTERNATIONAL, INC.**  
655 Sky Way - Suite 125  
San Carlos, CA 94070  
1-800-523-8777  
(CA) 415-593-8777  
FAX 415-593-7675



CIRCLE 513 ON READER SERVICE CARD

### Ammunition to conquer your biggest problems!

with V-EMM (32 megabytes)  
without V-EMM (640 kilobytes)

- 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.



**V-EMM™**  
Fort's Software  
P.O. Box 1295  
Loveland, CO 80539  
(303) 663-5629

CIRCLE 551 ON READER SERVICE CARD

## Weather

### Add a Weather Station to your Computer.



ONLY \$575  
VISA/MC/AMEX accepted

Makes a great Christmas Gift

You know how much you depend on your computer. With PC Weather Pro, your IBM PC, XT, AT or other compatible can give you the weather as well. And even keep a perpetual record. Includes hardware, software and weather instruments.

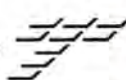
#### Here's what you'll measure.

- Wind speed/direction
- Inside/outside temperature
- Barometric pressure
- Rainfall

Other software options available. Ask when you call.

#### TMI inc.

4000 Knorr Way Place  
2-120 Lake Oswego, OR 97035  
1-800-247-5712  
In Oregon (503) 635-9966



CIRCLE 523 ON READER SERVICE CARD

## Word Processing

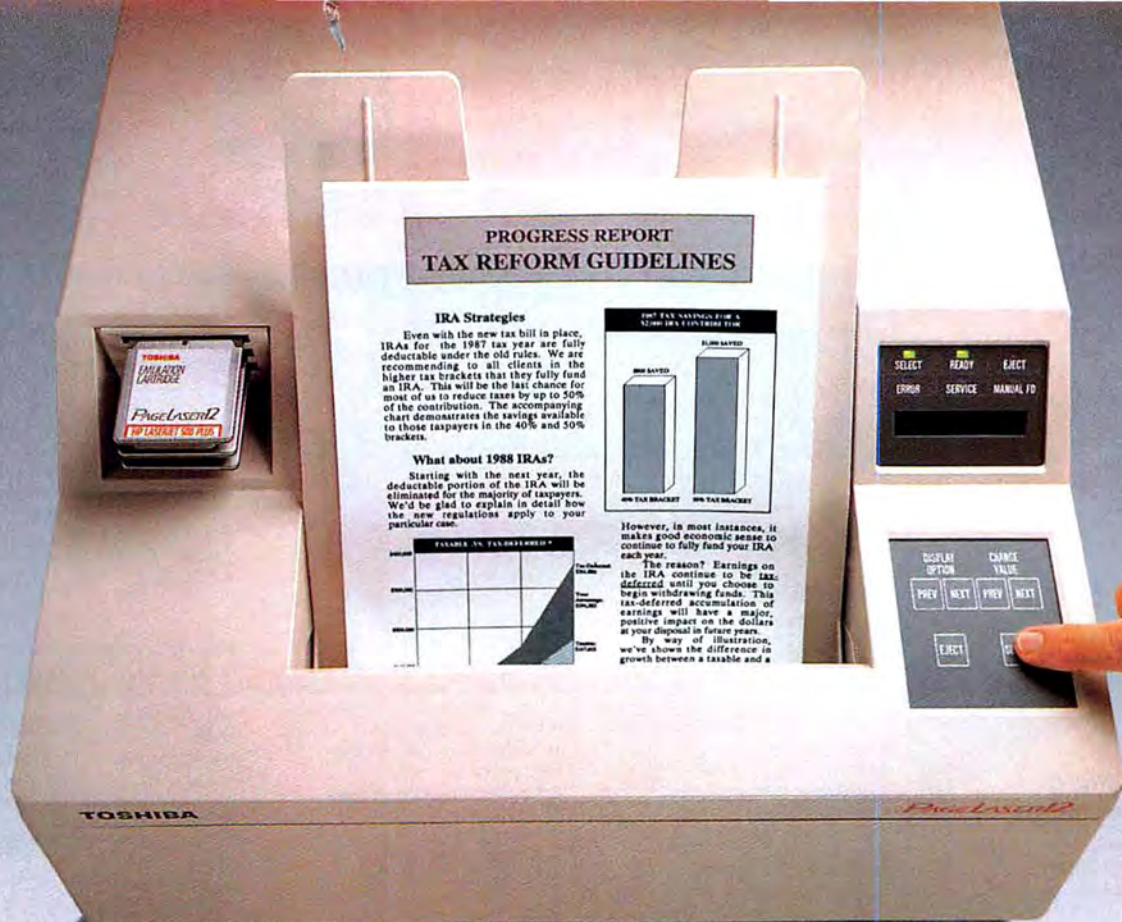
### PC-Write™ Ver. 2.71

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

## M.S. Windows Products

Our SPELLER checks spelling while other programs run. It is compatible with most word processors' files \$34.95. The Windows programmers' reference manual contains Windows routine lists \$19.95. TYPING program \$19.95. Other products are available. Free information! CA residents add 7% tax.  
Kwan Technologies, Inc.  
PO Box 64160  
Sunnyvale, CA 94086-4160





# If You Think Its Speed Is Impressive, Wait Until You See How It Handles.

In the world of laser printers, the PageLaser12 is an absolute speed demon.

Because at an incredible 12 pages per minute, it's 50 percent faster than most laser printers. Which means you can finish your paperwork 50 percent faster as well.

But all the speed in the world is meaningless without paper handling that's equally quick and nimble. So with our optional dual bin sheet feeder, the PageLaser12 offers three-bin versatility and a massive 750-sheet paper capacity. And our optional automatic envelope feeder lets you zip through 100 envelopes at a time without reloading.

All told, the PageLaser12 has the ability to access

up to four different paper sources—whether it's letter, legal, letterhead or envelopes—without having to change paper bins by hand.

Naturally, standard equipment includes all the most popular emulations you'll need to get started, including HP LaserJet®-compatible fonts.

So whether you use the versatile PageLaser12 in a single-user high speed/high volume application or in a shared environment, you won't find a better way to get your paperwork moving faster.

To find out more about the PageLaser12, call 1-800-457-7777. That is, of course, if you're ready to break a few speed limits around the office.

LaserJet is a registered trademark of Hewlett-Packard.



In Touch with Tomorrow  
**TOSHIBA**

Toshiba America Inc., Information Systems Division



## Advertiser Index A to Z

Get more information—  
circle the appropriate  
number on the reader  
service card.

### Reader Service Number

- 150 Addison Wesley  
page 175
- Advanced Computer Products  
page 295
- 306 American Small Business  
Computers  
page 47
- Anthro Corp.  
page 58
- 51 Arche Technologies, Inc.  
page 64
- Arlington Computer Products  
pages 292-293
- 302 ATI Technologies Inc.  
page 57
- AT&T  
pages 230, 232, 234
- 20 Bible Research Systems  
page 256
- 66 Big Blue Disk  
page 5
- 1 Blackship Computer Systems,  
Inc.  
page 24
- 34 Boffin Limited  
page 257
- 24 Bulldog Computer Products  
pages 308-309
- 17 Caere Corp.  
page 176
- 274 Central Point Software  
page 224
- 155 Central Point Software  
pages 26-27
- 262 Chipsoft  
page 48
- 38 Clarion  
page 7
- Compaq  
pages 73-78
- 4 Compuclassics  
page 311
- 72 Compusave  
page 310
- 28 Compuserve  
pages 34-35
- 213 Computer Direct, Inc.  
pages 90-91
- 200 Computer Discount Warehouse  
pages 303,304-305

### Reader Service Number

- 116 Computer Mail Order  
pages 244-245
- 7 Comtel Trading Co.  
page 296
- 181 Concentric Data Systems  
page 133
- 254 Core, Int'l.  
page 162
- Curtis Manufacturing  
page 9
- DAC Software, Inc.  
page 173
- 279 Datastorm Technologies, Inc.  
page 72
- 292 Daybreak Technologies  
page 255
- 74 Dell Computer Corp.  
pages C2,C3,C4,P1
- 266 Digital Research, Inc.  
page 189
- 249 Discount Micro Products, Inc.  
pages 194-195
- 60 Diskette Connection  
page 310
- Dow Jones News/Retrieval  
page 235
- 111 Eltech  
page 59
- 185 Everex Systems  
page 87
- 255 F & W Communications  
page 314
- 240 Fast Micro  
page 306
- 250 Fivestar Computers  
pages 18-19
- 227 Gateway 2000  
page 307
- 118 Glorious Union Information  
Systems  
page 40
- 122 Great Western Technology  
page 310
- 313 Hard Drives, Int'l.  
page 300
- 79 Haventree Software, Ltd.  
page 46
- 228 Hercules  
page 229
- 26 Hewlett Packard  
pages 31,32
- 143 Intel Corp.  
pages 16-17
- 78 Interlude  
page 253
- John Wiley & Sons  
page 241
- 41 Kenosha Computer Center  
page 317
- 98 Kensington Microware, Ltd.  
pages C5
- 247 Lord Publishing  
page 83
- Lotus Development Corp.  
pages 67, 96-97, 113, 115
- 270 Lyco Computers  
pages 318-319
- 252 Macola Software  
page 109
- Maxell Corp. of America  
page 233

### Reader Service Number

- 263 Maynard Electronics  
page 161
- 170 Meridian Technology  
page 239
- MICROBEST  
page 320
- Micrografx  
page 20
- Micrologic  
page 193
- Microsell  
pages OUTSERT
- Microsoft  
pages 10-11, 41, 49-56, 249-251
- 65 Montgomery Grant  
page 298
- NEC Information Systems  
page 105
- 286 Netline  
page 80
- 132 Nitro Micro  
page 297
- NSTL  
pages 222-223, 258-259
- Oracle Corp.  
page 12
- 130 Parson's Technology  
page 299
- PC Connection  
pages 164-169
- 135 PC Network, The New  
page 301
- PC SIG  
page 315
- 144 Peachtree Software  
page 231
- 264 Perry Computers  
page 316
- 92 Peter Norton  
page 70
- 141 Plus Development Corp.  
pages 22-23
- 276 Proteus Technology Corp.  
page 44
- 214 QIC  
page 107
- 168 Quadram  
pages C6
- 221 Renegade Technologies  
pages 68-69
- 125 RP Systems  
page 312
- Ryans By Mail  
page 188
- 81 707 Computer Sales  
page 302
- 309 Samtron Electron Devices  
page 236
- 27 Scottsdale Systems  
page 321
- 31 Secure-It  
page 30
- 223 SF Micro  
page 313
- 283 Shamrock  
page 294

### Reader Service Number

- 97 Sigma Designs  
page 28
- 284 Simple Net  
page 15
- 236 SoftKlone  
page 185
- Softline  
page 227
- 22 Software Add-Ons  
page 316
- 173 Software Link, The  
pages 42-43
- Software Publishing  
page 25
- Software Spectrum  
page 191
- 281 Softworld Publishing  
page 79
- 54 Sony Corp. of America  
page 131
- 25 Spinnaker Software  
page 103
- 69 Spinnaker Software  
page 101
- 154 Star Industries  
page 117
- 43 Star Micronics  
page 116
- 197 Tandy/Radio Shack  
page 243
- 212 Tandy/Radio Shack  
page 187
- 178 Telemart  
pages 60-61, 62-63
- 151 Timeworks  
page 8
- Toshiba America, Inc.  
page 280
- 207 Tussey Computer Products  
pages 290-291
- 10 Vendex Technologies  
page 181
- Vendex Technologies  
page 179
- 11 Ven-Tel  
page 246
- 278 Video Logic  
page 66
- 277 Video Seven  
page 163
- 243 Warehouse Data Products  
page 132
- 216 Wells American Corp.  
page 37
- 297 Western Digital/Paradise  
page 177
- 175 Word Perfect  
page 39
- 273 Yamaha Music Corp.  
page 221
- 206 Z Soft Corp.  
page 111



## ADVERTISING SALES & MARKETING REPRESENTATIVES

### Mark Glasner

Director of Advertising Sales  
(415/978-3178)

### Northwest

Sharon Van Leuven  
(Senior Account 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 (Senior  
Account Mgr.) (213/312-8008)

### Southern California (San

Diego/Southwest/Orange  
County)  
Christine Kopec (619/436-9882)

### Texas

Deborah Goldsmith  
(214/233-3492),  
Jeff Edman  
(Eastern Advertising Mgr.)  
(201/967-1350)

### New England (Boston)

Bob Ostrow (508/879-0700)

### Midwest (N. Chicago)

Robert Diftler (312/827-4477)

### Mid-Atlantic/Manhattan

Carolyn Casey (201/967-1350)

### Southeast (Atlanta)

Judy Sutter (404/394-0758)

### PC World Catalog

Sharon Van Leuven (Catalog  
Advertising Mgr.)  
Eric Cressy, Deborah Tarantino  
(800/435-7760 in Calif.;  
800/435-7766 outside Calif.)

IDG Communications  
International Marketing  
Services (508/879-0700,  
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)

Germany CW Publikationen,  
8000 Munich 40, West Germany  
(011 49 89 3 60 860)

## Advertiser Index by Product Category

Get more information—  
circle the appropriate  
number on the reader  
service card.

Reader  
Service  
Number

### HARDWARE

#### Boards/Cards/Chips

- 302 ATI Technologies Inc.  
page 57
- 228 Hercules  
page 229
- 141 Plus Development Corp.  
pages 22-23
- 221 Renegade Technologies  
pages 68-69
- 277 Video Seven  
page 163
- 297 Western Digital/Paradise  
page 177

#### Communications

- 255 F & W Communications  
page 314
- 118 Glorious Union Information  
Systems  
page 40
- 143 Intel Corp.  
pages 16-17
- 168 Quadram  
pages C6
- 11 Ven-Tel  
page 246

#### Computers

- 51 Arche Technologies, Inc.  
page 64
- AT&T  
pages 230, 232, 234
- 1 Blackship Computer Systems,  
Inc.  
page 24
- Compaq  
pages 73-78
- 254 Core, Int'l.  
page 162
- 74 Dell Computer Corp.  
pages C2, C3, C4, P1
- 111 Eltech  
page 59
- 250 Fivestar Computers  
pages 18-19
- 276 Proteus Technology Corp.  
page 44
- 214 QIC  
page 107
- 223 SF Micro  
page 313
- 154 Star Industries  
page 117
- 212 Tandy/Radio Shack  
page 187

Reader  
Service  
Number

- 197 Tandy/Radio Shack  
page 243
- 301 Toshiba America, Inc.  
page 85
- Vendex Technologies  
page 179
- 10 Vendex Technologies  
page 181
- 216 Wells American Corp.  
page 37
- 273 Yamaha Music Corp  
page 221

#### Input Devices

- 17 Caere Corp.  
page 176
- Microsoft  
page 41

#### LAN

- 173 Software Link, The  
pages 42-43

#### Monitors/Displays

- 255 F & W Communications  
page 314
- 309 Samtron Electron Devices  
page 236
- 97 Sigma Designs  
page 28

#### Printers/Plotters, etc.

- 26 Hewlett Packard  
pages 31, 32
- NEC Information Systems  
page 105
- 43 Star Micronics  
page 116
- Toshiba America, Inc.  
page 280

#### Storage Devices

- 185 Everex Systems  
page 87
- Maxell Corp. of America  
page 233
- 263 Maynard Electronics  
page 161

### SOFTWARE

#### Accounting/Financial

- 262 Chipsoft  
page 48
- DAC Software, Inc.  
page 173
- 247 Lord Publishing  
page 83
- 252 Macola Software  
page 109

- 130 Parson's Technology  
page 299

- 144 Peachtree Software  
page 231

#### CAD/CAM

- 306 American Small Business  
Computers  
page 47
- Micrografix  
page 20

#### Communications

- 279 Datastorm Technologies, Inc.  
page 72
- 170 Meridian Technology  
page 239
- 236 SoftKlone  
page 185

Reader  
Service  
Number

### Database Management

- 38 Clarion  
page 7
- Oracle Corp.  
page 12

### Desk Top Publishing

- 266 Digital Research, Inc.  
page 189
- Software Spectrum  
page 191
- 206 Z Soft Corp.  
page 111

### Education

- 66 Big Blue Disk  
page 5

### Entertainment

- 66 Big Blue Disk  
page 5

- 78 Interlude  
page 253

- Ryans By Mail  
page 188

### Graphics

- 79 Haventree Software, Ltd.  
page 46
- Lotus Development Corp.  
pages 96-97, 113, 115
- Software Publishing  
page 25
- 69 Spinnaker Software  
page 101

### Integrated Software

- Lotus Development Corp.  
page 67
- 25 Spinnaker Software  
page 103

### Lanugage

- Microsoft  
pages 10-11, 249-251

### LAN

- 286 Netline  
page 80
- 284 Simple Net  
page 15

### Other

- 150 Addison Wesley  
page 175
- 20 Bible Research Systems  
page 256
- Microsoft  
pages 49-56
- PC SIG  
page 315

### Spreadsheets/Templates/ Forms

- 181 Concentric Data Systems  
page 133
- 292 Daybreak Technologies  
page 255
- Lotus Development Corp.  
page 67

### Utilities

- 155 Central Point Software  
pages 26-27
- 274 Central Point Software  
page 224
- 181 Concentric Data Systems  
page 133



## FREE PRODUCT INFORMATION

Circle the number(s) for free information.

(1-350)

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	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							

Please print or type all information.

Name	Title
Company	
Address	City
State, Zip (zip code needed to ensure delivery)	Phone: Area code/Number

(1-350)

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	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							

Please print or type all information.

Name	Title
Company	
Address	City
State, Zip (zip code needed to ensure delivery)	Phone: Area code/Number

(1-350)

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	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							

Please print or type all information.

Name	Title
Company	
Address	City
State, Zip (zip code needed to ensure delivery)	Phone: Area code/Number

(1-350)

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	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														





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

- 292 Daybreak Technologies  
page 255
- Lotus Development Corp.  
pages 96-97, 113, 115
  - Micrologie  
page 193
- 92 Peter Norton  
page 70
- 281 Softworld Publishing  
page 79

**Word Processing/Aids**

- 150 Addison Wesley  
page 175
- 151 Timeworks  
page 8
- 175 Word Perfect  
page 39

**MISCELLANEOUS****Computer Accessories**

- Anthro Corp.  
page 58
  - Curtis Manufacturing  
page 9
- 98 Kensington Microware, Ltd.  
pages C5

**Mail Order**

- Advanced Computer Products  
page 295
  - Arlington Computer Products  
pages 292-293
- 34 Boffin Limited  
page 257
- 24 Bulldog Computer Products  
pages 308-309
- 4 Compuclasses  
page 311
- 72 Compusave  
page 310
- 213 Computer Direct, Inc.  
pages 90-91
- 200 Computer Discount Warehouse  
pages 303, 304-305
- 116 Computer Mail Order  
pages 244-245
- 7 Comtel Trading Co.  
page 296
- 249 Discount Micro Products, Inc.  
pages 194-195
- 240 Fast Micro  
page 306
- 227 Gateway 2000  
page 307
- 122 Great Western Technology  
page 310
- 313 Hard Drives, Int'l.  
page 300
- 41 Kenosha Computer Center  
page 317
- 270 Lyco Computers  
pages 318-319
- MICROBEST  
page 320
- 65 Montgomery Grant  
page 298
- 132 Nitro Micro  
page 297
- PC Connection  
pages 164-169
- 135 PC Network, The New  
page 301

Reader  
Service  
Number

- 264 Perry Computers  
page 316
- 125 RP Systems  
page 312
- 81 707 Computer Sales  
page 302
- 27 Scottsdale Systems  
page 321
- 283 Shamrock  
page 294
- Softline  
page 227
- 22 Software Add-Ons  
page 316
- 178 Telemart  
pages 60-61, 62-63
- 207 Tussey Computer Products  
pages 290-291
- 243 Warehouse Data Products  
page 132

**Other**

- John Wiley & Sons  
page 241
  - NSTL  
pages 222-223, 258-259
- 278 Video Logic  
page 66

**On Line Services**

- 28 Compuserve  
pages 34-35
- Dow Jones News/Retrieval  
page 235

**Security**

- 31 Secure-It  
page 30

**Supplies**

- 60 Diskette Connection  
page 310
- Maxell Corp. of America  
page 233
- 54 Sony Corp. of America  
page 131

**Products  
Featured in  
Editorial**

*Get more information—  
circle the appropriate  
number on the reader  
service card.*

Reader  
Service  
Number**Add-On Board**

- 607 12-PAK,  
Stritek,  
page 204
- 616 3270 Connection,  
IBM,  
page 205
- 620 386 Hypercache,  
Profit Systems,  
page 201

Reader  
Service  
Number

- 616 4-Port RS-232C interface,  
IBM,  
page 203
- 608 50/60-Megamem 2000,  
Advanced Microcomputer  
Systems,  
page 201
- 608 50/60-Megamem 8000,  
Advanced Microcomputer  
Systems,  
page 201
- 616 8-Port interface,  
IBM,  
page 203
- 616 8-Port RS-232C interface,  
IBM,  
page 203
- 769 AboveBoard 2 Plus,  
Intel,  
pages 201 and 110
- 769 AboveBoard Plus,  
Intel,  
page 110
- 769 AboveBoard Plus I/O,  
Intel,  
page 110
- 640 AC32 Dual Asynchronous  
Communications Adapter,  
Opto 22,  
page 203
- 640 AC33 Industrial I/O,  
Opto 22,  
page 203
- 640 AC34 Single Channel Industrial  
Asynchronous Adapter,  
Opto 22,  
page 203
- 622 Acram-8,  
SMT,  
page 201
- 609 Advantage/2,  
AST Research,  
page 201
- 609 Advantage/2-386,  
AST Research,  
page 201
- 790 Amdek VGA Adapter/132,  
Amdek,  
page 151
- 791 AST VGA Plus,  
AST Research,  
page 151
- 609 AST-3270/Coax II-CUT,  
AST Research,  
page 205
- 609 AST-3270/Coax IIA-CUT,  
AST Research,  
page 205
- 609 AST-3270/SNA II,  
AST Research,  
page 205
- 609 AST-3270/SNA IIA,  
AST Research,  
page 205
- 609 AST-5250 Gateway Option,  
AST Research,  
page 205
- 609 AST-5250/A Cluster Option,  
AST Research,  
page 205
- 609 AST-5251/12A,  
AST Research,  
page 205
- 658 BlueLynx 3270 Gateway,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 3270 Remote,  
Techland BlueLynx,  
page 205

Reader  
Service  
Number

- 658 BlueLynx 5250 Cluster,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 5250 Gateway,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 5250-11,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 5250-11 Cluster,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 5250-11 Gateway,  
Techland BlueLynx,  
page 205
- 658 BlueLynx 5250-12,  
Techland BlueLynx,  
page 205
- 658 BlueLynx COAXSYS,  
Techland BlueLynx,  
page 205
- 658 BlueLynx DFT-3270,  
Techland BlueLynx,  
page 205
- 610 Boca.MCA Parallel,  
Boca Research,  
page 203
- 610 Boca.MCA Serial/Parallel,  
Boca Research,  
page 203
- 610 BocaRam 50/60,  
Boca Research,  
page 201
- 610 BocaRam MCA 50Z,  
Boca Research,  
page 201
- 611 CI-SYS2-56,  
Chrislin Industries,  
page 201
- 639 CM/4 4 Channel Serial Adapter,  
Neotech,  
page 203
- 605 Connect/MC4,  
Monolithic Systems,  
page 204
- 605 Connect/MC8,  
Monolithic Systems,  
page 204
- 605 Connect/MC16,  
Monolithic Systems,  
page 204
- 613 CuPORT-FSP,  
Cumulus,  
page 203
- 613 CuPORT-P,  
Cumulus,  
page 203
- 613 CuRAM 16 +,  
Cumulus,  
page 201
- 613 CuRAM 80,  
Cumulus,  
page 201
- 638 DCP-186/MC,  
Emulex,  
page 203
- 604 DigiChannel 4,  
Digiboard,  
page 204
- 604 DigiChannel 4 I,  
Digiboard,  
page 204
- 604 DigiChannel 4 I +,  
Digiboard,  
page 204

(continues)



## Reader Service Number

- 604 DigiChannel 8, Digiboard, page 204
- 604 DigiChannel 8 I, Digiboard, page 204
- 604 DigiChannel 8 I +, Digiboard, page 204
- 604 DigiChannel 16, Digiboard, page 204
- 616 Display Station Emulation Adapter/A, IBM, page 205
- 673 DS-1000, Qua Tech, page 203
- 673 DS-2000, Qua Tech, page 203
- 673 DS-3000, Qua Tech, page 203
- 616 Dual Asynchronous Adapter, IBM, page 203
- 620 Elite 16/2, Profit Systems, page 201
- 620 Elite 16/2 +, Profit Systems, page 201
- 792 Everex EVGA, Everex Systems, page 152
- 793 Genoa SuperVGA, Genoa Systems, page 149
- 794 IBM PS/2 Display Adapter, IBM, page 152
- 617 IDEA Supermax/MC, IDEAssociates, page 201
- 617 IDEComm 3270/SNA/MC, IDEAssociates, page 205
- 617 IDEComm 3278/DFT/MC, IDEAssociates, page 205
- 617 IDEComm 3278/MC, IDEAssociates, page 205
- 617 IDEComm 5250/Plus/MC, IDEAssociates, page 205
- 617 IDEComm 5250/Remote Gateway/MC, IDEAssociates, page 205
- 617 IDEComm 5250/Remote/MC, IDEAssociates, page 205
- 617 IDEComm 5251/Gateway/MC, IDEAssociates, page 205
- 617 IDEComm 5251/MC, IDEAssociates, page 205
- 617 IDEComm 5251/Remote Share/MC, IDEAssociates, page 205

## Reader Service Number

- 617 IDEComm 5251/Share/MC, IDEAssociates, page 205
- 617 IDEComm 5251/MC, IDEAssociates, page 201
- 617 IDEComm 5251/MC, IDEAssociates, page 202
- 603 Intelliport PSS, Computone Systems, page 204
- 608 IOSIX-1, Advanced Microcomputer Systems, page 203
- 608 IOSIX-2, Advanced Microcomputer Systems, page 203
- 608 IOSIX-3, Advanced Microcomputer Systems, page 203
- 608 IOSIX-4, Advanced Microcomputer Systems, page 203
- 608 IOSIX-5, Advanced Microcomputer Systems, page 203
- 608 IOSIX-6, Advanced Microcomputer Systems, page 203
- 608 IOSIX-7, Advanced Microcomputer Systems, page 203
- 608 IOSIX-8, Advanced Microcomputer Systems, page 203
- 657 IRMA2 communications adapter, Digital Communications Assoc., page 205
- 657 IRLMALAN DFT Gateway MCA, Digital Communications Assoc., page 205
- 605 JustRAM/MC8, Monolithic Systems, page 201
- 621 MainLink II, Quadram, page 205
- 612 MC-8000, CMS Enhancements, page 201
- 608 Memory 32, Advanced Microcomputer Systems, page 201
- 608 Memory 32 w/ I/O, Advanced Microcomputer Systems, page 201
- 624 MicroRAM, Tecmar, page 201
- 624 MicroRAM AD, Tecmar, page 201
- 624 MicroRAM M80, Tecmar, page 201
- 606 MP2, Stargate Technologies, page 203 and 204

## Reader Service Number

- 608 MPCC1, Advanced Microcomputer Systems, page 205
- 633 MultiCom327PS, MultiTech Systems, page 205
- 602 Multiport/2, Arnet, page 204
- 673 MXI-1000, Qua Tech, page 203
- 795 Orchid Designer VGA, Orchid Technology, page 151
- 796 Paradise VGA Professional, Paradise Systems, page 149
- 601 PC-Slave/16N plus 4/PS, Alloy Computer Products, page 204
- 624 Plus 2 Module, Tecmar, page 203
- 606 Plus4 MC, Stargate Technologies, page 204
- 601 Plus 4/PC, Alloy Computer Products, page 204
- 606 Plus8 MC, Stargate Technologies, page 204
- 639 PP/1 Printer Adapter, Neotech, page 203
- 616 PS/2 2MB-8MB 80386 Memory Expansion Option, IBM, page 201
- 616 PS/2 80286 Memory Expansion Option, IBM, page 201
- 616 PS/2 80386 Memory Expansion Option, IBM, page 201
- 673 PXB-7200, Qua Tech, page 203
- 673 QS-1000, Qua Tech, page 203
- 621 Quadboard PS/Q, Quadram, page 201
- 621 QuadMEG PS/Q, Quadram, page 201
- 621 QuadPort PS/Q, Quadram, page 203
- 615 RAM II 2000, Everex Systems, page 201
- 615 RAM II 4000, Everex Systems, page 201
- 614 RAMbank-II, Diamond Flower Electric Instruments Company, page 201

## Reader Service Number

- 609 Rampage/2-286, AST Research, page 201
  - 609 RampagePlus/MC, AST Research, page 201
  - 619 RamQuest II, Orchid Technology, page 201
  - 619 RamQuest Extra, Orchid Technology, page 201
  - 623 RapidRAM 2, STB Systems, page 201
  - 623 RapidRAM 2/8, STB Systems, page 201
  - 623 Serial 2, STB Systems, page 203
  - 623 Serial/Parallel 2, STB Systems, page 203
  - 797 Sigma VGA/H, Sigma Designs, page 151
  - 601 Slave/286, Alloy Computer Products, page 204
  - 639 SP/1 Communication Adapter, Neotech, page 203
  - 673 SP-1000, Qua Tech, page 203
  - 673 SP-1050, Qua Tech, page 203
  - 639 SPC/1 Combination Adapter, Neotech, page 203
  - 624 S/P Module, Tecmar, page 203
  - 639 SSP/2, Neotech, page 203
  - 798 STB VGA Extra/EM, STB Systems, page 149
  - 632 SyncLink, Microgate, page 205
  - 616 System 36/38 Workstation Emulation Adapter/A, IBM, page 205
  - 799 Video-7 V-RAM VGA, Video-7, page 152
- CAD/CAM**
- 767 Generic Estimator, Generic Software, page 108
- Communications**
- 774 pcANYWHERE III, Dynamic Microprocessor Assoc., page 114
- Computer System**
- 840 386E, Kaypro, page 210
  - 832 386-20 Racer, Fortron, page 210



**Reader  
Service  
Number**

- 860** Acer 1100/20,  
Acer Technologies,  
pages 210 and 119
- 811** ALR 386/220 Model 401,  
Advanced Logic Research,  
page 210
- 813** ANI 386<sup>20</sup>,  
Alphanumeric Int'l,  
page 210
- 817** Arche Rival 386,  
Arche Technologies,  
page 210
- 818** AST Premium/386,  
AST Research,  
page 210
- 861** AT&T 6386 WGS,  
AT&T,  
pages 210 and 120
- 819** AT&T 6386E WGS,  
AT&T,  
page 210
- 820** C2 386,  
C2 Micro Systems,  
page 210
- 824** CCI ST/386,  
Computer Classifieds,  
page 210
- 825** CEI,  
Computer Expert,  
page 210
- 821** Cheetah cAT386,  
Cheetah Int'l,  
page 210
- 822** Club 386,  
Club AT,  
page 210
- 826** CS 5040-2,  
Cordata,  
page 210
- 827** CSS 386A,  
CSS Laboratories,  
page 210
- 780** Data General/One Model 2T,  
Data General,  
page 135
- 823** Deskpro 386/20,  
Compaq Computer,  
page 210
- 829** Dyna 386,  
Dyna Computers,  
page 210
- 781** Epson Equity LT,  
Epson America,  
page 136
- 863** Everex Step 386/20,  
Everex Computer Systems  
Division,  
pages 210 and 123
- 831** Fivestar 386,  
Fivestar Electronics,  
page 210
- 831** Fivestar FS-386,  
Fivestar Electronics,  
page 210
- 811** FlexCache 20386,  
Advanced Logic Research,  
page 210
- 811** FlexCache 20386 DT,  
Advanced Logic Research,  
page 210
- 864** Fortron 80386-20 Plus,  
Fortron,  
pages 210 and 124
- 833** General 386,  
General Technologies,  
page 210

**Reader  
Service  
Number**

- 782** Gridlite Plus,  
Grid Systems,  
page 138
- 848** GV 386/20,  
PC Designs,  
page 210
- 834** HEI 386 VFS,  
HEI Computer Systems,  
page 210
- 783** HP Portable Vectra CS Model  
20,  
Hewlett-Packard,  
page 140
- 865** HP Vectra RS/20,  
Hewlett-Packard,  
pages 210 and 127
- 837** IBM PS/2 Model 70-121,  
IBM,  
page 210
- 837** IBM PS/2 Model 80-111,  
IBM,  
page 210
- 837** IBM PS/2 Model 80-311,  
IBM,  
page 210
- 839** Ivy 386,  
Ivy Microcomputer,  
page 210
- 842** Matrix 386,  
Matrix Digital Products,  
page 210
- 844** ME 386-20,  
Micro Express,  
page 210
- 843** Micro 1 Tower 386,  
Micro 1,  
page 210
- 815** Mitac Paragon 386E,  
American Mitac,  
page 210
- 845** MP 386,  
Mitsubishi Electronics America,  
page 210
- 847** Osicom Executive 386/20,  
Osicom Technologies,  
page 210
- 841** Pacer 386-20,  
Laser Digital,  
page 210
- 816** PC 2386/65,  
Amstrad,  
page 210
- 814** PC 386 Business System,  
AMAX Engineering,  
page 210
- 814** PC 386 Tower System,  
AMAX Engineering,  
page 210
- 838** PC 386S-20,  
Intelligent Data Systems,  
page 210
- 846** PowerMate 386/20,  
NEC,  
page 210
- 866** Proteus Model 386-20,  
Proteus Technology,  
pages 210 and 128
- 851** QIC 386/20,  
QIC Research,  
page 210
- 844** Regal II,  
Micro Express,  
page 210
- 844** Roadrunner Plus,  
Micro Express,  
page 210
- 853** SEFCO Medallion 386,  
SEFCO,  
page 210

**Reader  
Service  
Number**

- 784** Sharp PC-4521,  
Sharp Electronics,  
page 141
- 856** SLA 386/20,  
Systems Integration Assoc.,  
page 210
- 854** Sirex 386-20,  
Sirex,  
page 210
- 855** Spear 386D,  
Spear Technology,  
page 210
- 800** Sun 386i,  
Sun Microsystems,  
page 218
- 836** Super 386C,  
Hyundai Electronics America,  
page 210
- 828** System 310,  
Dell Computer,  
page 210
- 852** System 386-20,  
Seattle Telecom & Data,  
page 210
- 857** Tandon 386,  
Tandon Computer,  
page 210
- 858** Tandy 4000 LX,  
Tandy,  
page 210
- 858** Tandy 5000 MC,  
Tandy,  
page 210
- 859** TCS 8000,  
Tatung Co. of America,  
page 210
- 785** Toshiba T1200H(B),  
Toshiba America,  
page 142
- 849** Value 386/20,  
PC Values,  
page 210
- 812** VHP 386,  
Advantech Corp.,  
page 210
- 786** Zenith SupersPort 286,  
Zenith Data Systems,  
page 143
- Data Base Management**
- 763** OnTrak,  
Active Software,  
page 106
- Desktop Publishing**
- 721** IBM Interleaf Publisher,  
IBM,  
page 172
- Development Tool**
- 731** MagicCV,  
Nu-Mega Technologies,  
page 247
- 732** Periscope Model II,  
The Periscope Co.,  
page 247
- 757** SoftCode,  
The Software Bottling Co.,  
page 104
- 730** Soft-ICE,  
Nu-Mega Technologies,  
page 247
- 733** Turbo Assembler and Debugger,  
Borland Int'l,  
page 247
- Disk Drive**
- 616** 115MB Fixed Disk Drive,  
IBM,  
page 207

**Reader  
Service  
Number**

- 644** 1333A,  
Micropolis,  
page 207
- 644** 1335,  
Micropolis,  
page 207
- 644** 1353A,  
Micropolis,  
page 207
- 644** 1354A,  
Micropolis,  
page 207
- 644** 1355,  
Micropolis,  
page 207
- 644** 1558-15,  
Micropolis,  
page 207
- 616** 314MB Fixed Disk Drive,  
IBM,  
page 207
- 616** 44MB Fixed Disk Drive,  
IBM,  
page 207
- 650** 525 Extra,  
Delkin Devices U.S.A.,  
page 206
- 616** 60MB Fixed Disk Drive,  
IBM,  
page 207
- 616** 70MB Fixed Disk Drive,  
IBM,  
page 207
- 642** ATplus 43,  
Core Int'l,  
page 207
- 642** ATplus 43E,  
Core Int'l,  
page 206
- 642** ATplus 44,  
Core Int'l,  
page 207
- 642** ATplus 44E,  
Core Int'l,  
page 206
- 642** ATplus 72,  
Core Int'l,  
page 207
- 642** ATplus 72E,  
Core Int'l,  
page 206
- 643** Bernoulli Box II B120i-MC,  
Iomega,  
page 207
- 643** Bernoulli Box II B120iu-MC,  
Iomega,  
page 207
- 649** Bridge File 3.5,  
Sysgen,  
page 206
- 649** Bridge File 360,  
Sysgen,  
page 206
- 649** Bridge File 5 1/4,  
Sysgen,  
page 206
- 646** ED130-PSO21,  
Priam Technology,  
page 206
- 646** ED45-PSO21,  
Priam Technology,  
page 206
- 646** ED62-PSO21,  
Priam Technology,  
page 206
- (continues)*



## Reader Service Number

- 612 EF 12/36, CMS Enhancements, page 206
- 612 EF 360/U, CMS Enhancements, page 206
- 612 F115ESDI, CMS Enhancements, page 207
- 612 F120M60-X, CMS Enhancements, page 207
- 612 F65M60-K, CMS Enhancements, page 207
- 612 F70ESDI-T, CMS Enhancements, page 207
- 612 H50M50-R, CMS Enhancements, page 207
- 642 HC150, Core Int'l, page 207
- 642 HC150E, Core Int'l, page 206
- 642 HC310, Core Int'l, page 207
- 642 HC310E, Core Int'l, page 206
- 642 HC380, Core Int'l, page 207
- 642 HC380E, Core Int'l, page 206
- 642 HC40F, Core Int'l, page 207
- 642 HC40FE, Core Int'l, page 206
- 642 HC90, Core Int'l, page 207
- 642 HC90E, Core Int'l, page 206
- 646 ID130-PSO41, Priam Technology, page 207
- 646 ID330-PSO71, Priam Technology, page 207
- 646 ID62-PSO41, Priam Technology, page 207
- 642 LAN150, Core Int'l, page 206
- 642 LAN150/2, Core Int'l, page 206
- 642 LAN150/D, Core Int'l, page 206
- 642 LAN310, Core Int'l, page 206
- 642 LAN310/2, Core Int'l, page 206
- 642 LAN310/D, Core Int'l, page 206

## Reader Service Number

- 642 LAN380, Core Int'l, page 206
- 642 LAN380/2, Core Int'l, page 206
- 642 LAN380/D, Core Int'l, page 206
- 648 LANStor LAN115PS, Storage Dimensions, page 207
- 648 LANStor LAN150EPS, Storage Dimensions, page 207
- 648 LANStor LAN150SPS, Storage Dimensions, page 207
- 648 LANStor LAN285EPS, Storage Dimensions, page 207
- 648 LANStor LAN285SPS, Storage Dimensions, page 207
- 648 LANStor LAN2-285SPS, Storage Dimensions, page 207
- 648 LANStor LAN2-570SPS, Storage Dimensions, page 207
- 648 LANStor LAN4-1140SPS, Storage Dimensions, page 207
- 648 LANStor LAN4-285SPS, Storage Dimensions, page 207
- 648 LANStor LAN4-570SPS, Storage Dimensions, page 207
- 648 LANStor LAN4-855SPS, Storage Dimensions, page 207
- 651 Matchmate 1200, Dolphin Systems, page 206
- 651 Matchmate 360, Dolphin Systems, page 206
- 639 Neotech 5 1/4-inch Disk Drive, Neotech, page 206
- 642 Optima 40, Core Int'l, page 207
- 642 Optima 40E, Core Int'l, page 206
- 642 Optima 44, Core Int'l, page 207
- 642 Optima 44E, Core Int'l, page 206
- 642 Optima 70, Core Int'l, page 207
- 642 Optima 70E, Core Int'l, page 206
- 645 Passport 20, Plus Development, page 207
- 645 Passport 40, Plus Development, page 207

## Reader Service Number

- 647 PhD145E, Procom Technology, page 207
  - 647 PhD330E, Procom Technology, page 207
  - 647 PhD5045, Procom Technology, page 207
  - 641 PRS-2, Pacific Rim, page 206
  - 641 PRS-2-360, Pacific Rim, page 206
  - 649 PSF360 w/ adapter, Sysgen, page 206
  - 616 PS/2 5 1/4-inch External Disk Drive, IBM, page 206
  - 647 PXF1200, Procom Technology, page 206
  - 647 PXF360, Procom Technology, page 206
  - 648 SpeedStor PS133, Storage Dimensions, page 207
  - 648 SpeedStor PS150, Storage Dimensions, page 207
  - 648 SpeedStor PS-155E, Storage Dimensions, page 206
  - 648 SpeedStor PS-300E, Storage Dimensions, page 206
  - 648 SpeedStor PS330, Storage Dimensions, page 207
  - 613 Stepping Stone 5.25/1.2, Cumulus, page 206
  - 613 Stepping Stone 5.25/360, Cumulus, page 206
  - 622 XD-360, SMT, page 206
- Display**
- 701 Amdek 632, Amdek, page 155
  - 702 Amdek 732, Amdek, page 155
  - 703 CTX CC-2431P, CTX Int'l, page 155
  - 704 imTEC 1453Q, Leading Technology, page 156
  - 705 Magnavox Professional VGA Color Display, N.A.P. Consumer Electronics, page 156
  - 706 Mitsubishi XC-1429C, Mitsubishi Electronics America, page 156
  - 707 Princeton PSC-28, Princeton Graphic Systems, page 156
  - 708 Quimax DM-3112, Quimax Systems, page 158

## Reader Service Number

- 709 Quimax DM-3114, Quimax Systems, page 158
  - 710 Relisys RE9513, Relisys, page 158
  - 711 Tatung CM-1296, Tatung Co. of America, page 158
  - 712 Tatung CM-1496, Tatung Co. of America, page 159
  - 713 Wyse WY-650, Wyse Technology, page 159
  - 714 Zenith 1390, Zenith Data Systems, page 159
  - 715 Zenith ZCM-1490, Zenith Data Systems, page 159
- Entertainment/Game**
- 727 Apollo 18: Mission to the Moon, Accolade, page 190
  - 723 Flight Simulator 3.0, Microsoft, page 182
  - 725 Mah Jongg 2.5, Nels Anderson, page 186
  - 724 Scenery disks, SubLogic, page 182
  - 726 Test Drive, Accolade, page 186
- Financial**
- 752 Ronstadt's Financials, Lord Publishing, page 100
- Font**
- 773 Publisher's Type Foundry 1.1, Z-Soft, page 112
- Graphics**
- 777 Draw Plus, Micrografx, page 114
  - 776 Pro3D/PC 1.1, Enabling Technologies, page 114
- Information Management**
- 720 Agenda 1.0, Lotus Development, page 170
- Integrated Software**
- 722 Framework III, Ashton-Tate, page 178
- LAN Hardware**
- 625 Acer 5270/MC, Acer Technologies, page 204
  - 661 DNA Networks, DNA Networks, page 204
  - 666 D-Link (DE-001/2), Localnet Communications, page 204
  - 666 D-Link (DN-001/2), Localnet Communications, page 204



**Reader  
Service  
Number**

- 671 EtherCard Plus/A,  
Western Digital,  
page 204
- 662 G/Ethernet LAN,  
Gateway Communications,  
page 204
- 670 LANPac 820.5/MC,  
Racore Computer Products,  
page 204
- 670 LANPac II/MC 8106,  
Racore Computer Products,  
page 204
- 664 Model 200/A,  
Invisible Software,  
page 204
- 659 Model E-1000,  
Axon,  
page 204
- 659 Model F200M,  
Axon,  
page 204
- 659 Model S100,  
Axon,  
page 204
- 667 NI9210,  
MICOM-Interlan,  
page 204
- 660 Omninet/1 MC,  
Corvus Systems,  
page 204
- 669 p1800 ProNet-10,  
Proteon,  
page 204
- 669 p1840 ProNet-4,  
Proteon,  
page 204
- 663 PCnic II Workstation,  
IMC Networks,  
page 204
- 663 PCnic II Workstation/Filesaver,  
IMC Networks,  
page 204
- 665 PS/2 Arcnet,  
LANmaster Division/Vestra  
Subco,  
page 204
- 665 PS/2 Ethernet,  
LANmaster Division/Vestra  
Subco,  
page 204
- 671 StarCard Plus/A,  
Western Digital,  
page 204
- 668 vLAN +,  
Networth,  
page 204
- 668 vNET,  
Networth,  
page 204

**Mailing List Program**

- 772 LetterMaster 4.0,  
Research Development Systems,  
page 112

**Miscellaneous**

- 766 EFAX-88,  
Elec & Eltak (U.S.A.),  
page 108
- 755 LINK,  
NetLine,  
page 102

**Modem**

- 618 2400B Modem 2,  
Intel,  
page 202
- 625 Acer Modem 2424/MC,  
Acer Technologies,  
page 202

**Reader  
Service  
Number**

- 626 Anchor 1200PS,  
Anchor Automation,  
page 202
- 626 Anchor 2400PS,  
Anchor Automation,  
page 202
- 636 Courier 2400/PS,  
US Robotics,  
page 202
- 613 CuModem 2400,  
Cumulus,  
page 202
- 615 Evercom II 24,  
Everex Systems,  
page 202
- 615 Evercom II 24 +,  
Everex Systems,  
page 202
- 634 Gammacomm,  
Gammalink Synchronous  
Communications,  
page 202
- 631 HC-4811,  
Hycom/Sharp,  
page 202
- 628 Hook-Up PS/24,  
Computer Peripherals,  
page 202
- 612 MC 2400,  
CMS Enhancements,  
page 202
- 637 MCM-24,  
Ven-Tel,  
page 202
- 637 MCM-24E,  
Ven-Tel,  
page 202
- 637 MCM-24E/NS,  
Ven-Tel,  
page 202
- 637 MCM-24/NS,  
Ven-Tel,  
page 202
- 633 MultiModem 224 ES,  
MultiTech Systems,  
page 202
- 633 MultiModem 224 PS,  
MultiTech Systems,  
page 202
- 629 PS-12,  
GVC-Chenel,  
page 202
- 629 PS-24,  
GVC-Chenel,  
page 202
- 630 Smartmodem 2400P,  
Hayes Microcomputer,  
page 202
- 632 SyncLink 24/2,  
Microgate,  
page 202
- 632 SyncLink 48/2,  
Microgate,  
page 202
- 672 Sync-Up 2/V.22bis,  
Universal Data Systems,  
page 202
- 635 TC921PS-12,  
Telenetics,  
page 202
- 635 TC921PS-24,  
Telenetics,  
page 202
- 635 TC921PS-96,  
Telenetics,  
page 202

**Reader  
Service  
Number**

- 608 XPRESS 12,  
Advanced Microcomputer  
Systems,  
page 202
- 608 XPRESS 24,  
Advanced Microcomputer  
Systems,  
page 202

**Operating System/  
Environment**

- 771 DeskMate 3.0,  
Tandy,  
page 110
- 771 DeskMate Workgroup  
Companion,  
Tandy,  
page 110

**Printer**

- 751 ALPS Allegro 24,  
ALPS America,  
page 99
- 768 CrystalPrint WP,  
Qume,  
page 108
- 758 Epson FX-1050,  
Epson America,  
page 106
- 758 Epson FX-850,  
Epson America,  
page 106
- 750 LaserJet IID,  
Hewlett-Packard,  
Boise Division,  
page 99

**Tape Backup**

- 650 40 Extra,  
Delkin Devices U.S.A.,  
page 209
- 616 6157 Streaming Tape Drive,  
IBM,  
page 209
- 652 Archive VP 150e,  
Archive,  
page 209
- 652 Archive VP 150i,  
Archive,  
page 208
- 652 Archive VP 60e,  
Archive,  
page 209
- 652 Archive VP 60i,  
Archive,  
page 208
- 652 Archive XL 3550,  
Archive,  
page 208
- 652 Archive XL 3560,  
Archive,  
page 208
- 649 Bridgetape,  
Sysgen,  
page 209
- 642 CT150/250I,  
Core Int'l,  
page 208
- 642 CT40E,  
Core Int'l,  
page 209
- 642 CT40I,  
Core Int'l,  
page 208
- 642 CT60/100E,  
Core Int'l,  
page 209
- 642 CT60/100I,  
Core Int'l,  
page 208
- 642 CTC150/250E,  
Core Int'l,  
page 209
- 615 Excel II 125,  
Everex Systems,  
page 209
- 615 Excel II 125i,  
Everex Systems,  
page 208
- 615 Excel II 60,  
Everex Systems,  
page 209
- 615 Excel II 60i,  
Everex Systems,  
page 208
- 615 Excel II 60T,  
Everex Systems,  
page 209
- 653 Galaxy 31150/MC,  
Genoa Systems,  
page 208
- 653 Galaxy 3150-60T/MC,  
Genoa Systems,  
page 208
- 653 Galaxy 3160/MC,  
Genoa Systems,  
page 208
- 653 Galaxy 32150Z/MC,  
Genoa Systems,  
page 209
- 653 Galaxy 3250-60TZ/MC,  
Genoa Systems,  
page 209
- 653 Galaxy 3260Z/MC,  
Genoa Systems,  
page 209
- 656 220,  
Irwin Magnetic Systems,  
page 208
- 656 225,  
Irwin Magnetic Systems,  
page 208
- 656 245,  
Irwin Magnetic Systems,  
page 208
- 656 265,  
Irwin Magnetic Systems,  
page 208
- 656 720,  
Irwin Magnetic Systems,  
page 209
- 656 725,  
Irwin Magnetic Systems,  
page 209
- 656 745,  
Irwin Magnetic Systems,  
page 209
- 656 765,  
Irwin Magnetic Systems,  
page 209
- 753 LAN 150-2000,  
Emerald Systems,  
page 100
- 753 LAN 60-2000,  
Emerald Systems,  
page 100
- 651 Matchmate 40MB-I,  
Dolphin Systems,  
page 208
- 651 Matchmate Tape,  
Dolphin Systems,  
page 209
- 627 MaynStream 150,  
Maynard Electronics,  
page 208

(continues)



**Reader  
Service  
Number**

- 647** PT-125,  
Procom Technology,  
page 209
- 647** PT-150,  
Procom Technology,  
page 209
- 647** PT-40,  
Procom Technology,  
page 209
- 647** PT-60,  
Procom Technology,  
page 209
- 649** QIC-File60 Plus,  
Sysgen,  
page 209
- 624** QT-125e,  
Tecmar,  
page 209
- 624** QT-125i/PS,  
Tecmar,  
page 208
- 624** QT-150e,  
Tecmar,  
page 209
- 624** QT-150i/PS,  
Tecmar,  
page 208
- 624** QT-40e,  
Tecmar,  
page 209
- 624** QT-40i/PS,  
Tecmar,  
page 208

**Reader  
Service  
Number**

- 624** QT-60e,  
Tecmar,  
page 209
- 624** QT-60i/PS,  
Tecmar,  
page 208
- 624** QT-90e,  
Tecmar,  
page 209
- 624** QT-90i/PS,  
Tecmar,  
page 208
- 655** Rapidrecover 1/8,  
Emerald Systems,  
page 209
- 655** Rapidrecover 1/4-60,  
Emerald Systems,  
page 209
- 655** Rapidrecover 1/4-150,  
Emerald Systems,  
page 209
- 649** Reliant 200 EXT,  
Sysgen,  
page 209
- 649** Reliant 200 INT,  
Sysgen,  
page 208
- 649** Reliant 300 EXT(125),  
Sysgen,  
page 209
- 649** Reliant 300 EXT(60),  
Sysgen,  
page 209
- 649** Reliant 300 INT(125),  
Sysgen,  
page 208

**Reader  
Service  
Number**

- 649** Reliant 300 INT(60),  
Sysgen,  
page 208
- 649** Reliant 500 EXT,  
Sysgen,  
page 209
- 649** Reliant 500 INT,  
Sysgen,  
page 208
- 601** Retriever/120,  
Alloy Computer Products,  
page 209
- 654** Series 4000 (internal),  
Mountain Computer,  
page 208
- 654** Series 4000,  
Mountain Computer,  
page 209
- 654** Series 6000 (internal),  
Mountain Computer,  
page 208
- 654** Series 6000,  
Mountain Computer,  
page 209
- 654** Series 7000/150 (internal),  
Mountain Computer,  
page 209
- 654** Series 7000/150,  
Mountain Computer,  
page 209
- 654** Series 7000/300,  
Mountain Computer,  
page 209

**Reader  
Service  
Number**

- 649** Smartimage Plus,  
Sysgen,  
page 209
  - 612** T40/2,  
CMS Enhancements,  
page 208
  - 601** Tape System/2,  
Alloy Computer Products,  
page 208
  - 655** VAST,  
Emerald Systems,  
page 209
- Time Management**
- 754** Who Works When,  
Newport Systems,  
page 102
- Utility**
- 760** PubTech File Organizer,  
Publishing Technologies,  
page 106
  - 765** Windows Manager,  
HDC Computer,  
page 108
- Word Processing**
- 801** Ami,  
Samna,  
page 92
  - 802** Microsoft Word 5.0,  
Microsoft,  
page 94
  - 770** PC Write 3.0,  
Quicksoft,  
page 110

# 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



M

A

I

L

Buy With  
Convenience

Buy With  
Confidence

PC WORLD  
Computer  
Products  
Shopping  
Guide

8 0 0 -

O

R

D

E

R



Swan Technologies



# LOVE 'EM or LEAVE 'EM!

## 30 DAY MONEY BACK GUARANTEE

No questions asked! It's obvious our prices are lovable. But we make this guarantee because we know you'll also love our quality products, toll-free technical support, 1 year warranty and same day shipping. Call one of our knowledgeable sales consultants and discover a few of the differences that separate the Swans from the ugly ducklings.

Swan XT10

Swan 286/10

Swan 386/20

Swan 386/16

Swan 286/12

DISTRIBUTED BY

Circle 207 on reader service card



**TUSSEY COMPUTER PRODUCTS**

P.O. BOX 1006  
STATE COLLEGE, PA 16804

**1-800-468-9044**





In business since 1984, TCP has been committed to constantly improving our selection, quality, and service.

Today, with a selection of over 1,000 items in stock, our goal is still to make your every purchase convenient and hassle-free.

■ Your Credit Card is not charged until your order is shipped.  
■ Orders arriving before 3:00 PM our time will be shipped out the same day.  
■ We insure your order at no extra cost.  
■ Tussey is a financially strong and well established company.

■ Our knowledgeable sales staff is well trained and ready to assist you.  
■ An advanced warehouse materials handling system assures your order is shipped out accurately and on time.

### 30 Day Satisfaction Guarantee

Your complete satisfaction is our top priority. Any Swan computer system may be returned within 30 days from the date of shipment for a full refund.\*

### Technical Support is Toll-Free

Our Technical and Service staff is on call Mon-Fri 9-5 EST to make sure that you get the most from your system.

### 1 Full Year Warranty

All Swan products include a full 1 year warranty on both parts and labor. A second year SEW (Swan Extended Warranty) is available.

Call or write for details.

### Fast Delivery ...

We ship within 24 hours.\*\*

\* Items returned must be as-new, without modification or damage. All warranty cards, manuals and packaging must be included. Return shipping must be prepaid and insured, bearing a RAC (Return Authorization Code) on the shipping label. Sorry - shipping charges are non-refundable.

\*\* Custom configured systems may take longer.

## Swan 286/12

**\$1049** Monitor not included

### 12MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80286 12/6 MHz Norton SI 13.7
- Phoenix BIOS
- 512K of RAM Expandable to 1MB
- 0 Wait State
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots, 6x16 bit, 2x8 bit
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

#### Options:

- 80287 Coprocessor
- Upgrade to 1MB
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add \$89

286/12 VIDEO OPTIONS Include Monitor & Video Adapter				
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	\$1199	\$1248	\$1598	\$1698
w/40MB Seagate #ST-251 HD	\$1599	\$1648	\$1998	\$2098
w/80MB Seagate #ST-4096 HD	\$1899	\$1948	\$2298	\$2398

XT, AT and OS/2 are registered trademarks of International Business Machines  
MS-DOS is a registered trademark of Microsoft Corporation

## Swan XT10

**\$519** Monitor not included

### 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 Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

#### Options:

- Phoenix BIOS
- 8087 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add \$89

XT10 VIDEO OPTIONS Include Monitor & Video Adapter				
Drive Options	Mono	CGA	EGA	VGA
Single Floppy	\$669	\$839	\$1068	\$1168
Dual Floppies	\$749	\$919	\$1148	\$1248
w/20MB Seagate #ST-225 HD*	\$949	\$1119	\$1348	\$1448
w/30MB Seagate #ST-238 HD*	\$995	\$1165	\$1394	\$1494

\* Includes Single 360K Floppy Drive

† Add \$49 For 14" Flat Screen Monitor

## Swan 386/16

**\$1969** Monitor not included

### 16MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80386 16/8 MHz Norton SI 17.6
- Phoenix BIOS
- 1MB (expandable to 2MB) RAM on memory card
- 80287 & 80387 Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

#### Options:

- Upgrade to 2MB
- 80387 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add \$89

386/16 VIDEO OPTIONS Include Monitor & Video Adapter				
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	\$2199	\$2168	\$2518	\$2618
w/40MB Seagate #ST-251 HD	\$2499	\$2548	\$2898	\$2998
w/80MB Seagate #ST-4096 HD	\$2799	\$2848	\$3198	\$3298

### SWAN VIDEO OPTIONS INCLUDE:

#### 12" MONOCHROME:

- Swan Switchable Video Card
- 12" Hi-Resolution Amber Monitor
- Tilt & Swivel Base

#### 14" MONOCHROME:

- Swan Switchable Video Card
- 14" Flat Screen Monitor
- Tilt & Swivel Base

## Swan 286/10

**\$849** Monitor not included

### 10MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80286 10/6 MHz Norton SI 11.2
- Phoenix BIOS
- 512K of RAM Expandable to 1MB
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots, 6x16 bit, 2x8 bit
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

#### Options:

- 80287 Coprocessor
- Upgrade to 640K or 1MB
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add \$89

286/10 VIDEO OPTIONS Include Monitor & Video Adapter				
Drive Options	Mono	CGA	EGA	VGA
Single Floppy	\$995	\$1165	\$1394	\$1494
w/20MB Seagate #ST-225 HD	\$1249	\$1419	\$1648	\$1748
w/40MB Seagate #ST-251 HD	\$1399	\$1569	\$1798	\$1898
w/80MB Seagate #ST-4096 HD	\$1699	\$1869	\$2098	\$2198

† Add \$49 For 14" Flat Screen Monitor

## Swan 386/20

**\$2349** Monitor not included

### 20MHz/0 Wait State

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

- 80386 20/8 MHz Norton SI 22.0
- Phoenix BIOS
- 1MB (expandable to 2MB) RAM on memory card
- 80287 & 80387 Coprocessor Socket
- 230W Power Supply
- 1.2MB Floppy Drive
- Ports: 2 Serial, 1 Parallel, 1 Game
- Dual Floppy/Dual H.D. Controller
- 8 Expansion Slots
- 101 Key Enhanced Keyboard
- Clock Calendar w/Battery Backup
- Swan Setup & Utilities Diskette

#### Options:

- Upgrade to 2MB
- 80387 Coprocessor
- 31/2" Floppy Drive
- SWAN/MS-DOS (3.3) add \$89

386/20 VIDEO OPTIONS Include Monitor & Video Adapter				
Drive Options	Mono	14" Flat Mono	EGA	VGA
Single Floppy	\$2499	\$2548	\$2898	\$2998
w/40MB Seagate #ST-251 HD	\$2879	\$2928	\$3278	\$3378
w/80MB Seagate #ST-4096 HD	\$3179	\$3228	\$3578	\$3678

#### CGA

- Swan Switchable Video Card
- RGB Monitor

#### EGA

- Swan EGA Video Card
- 14" EGA Monitor

#### VGA

- Swan VGA Video Card
- 14" VGA Monitor
- Tilt & Swivel Base

## 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

## Swan Video Cards

ALL CARDS INCLUDE 1 YR WARRANTY

**SWITCHABLE**  
from Hercules® to CGA .....\$69

- Parallel Port

#### EGA

- 640 X 480

Resolution

- EGA/CGA/TTL

- Parallel Port \$129

#### VGA

- Compatible with all
- 17 VGA Modes .....\$219



## Swan AT-Style Keyboard

- 101 Key Enhanced Keyboard
  - XT & AT compatible
  - Full 1 year warranty
- \$69**

## Swan Tape Drive

- QIC -40 operating std.
- Network compatible
- Full 1 year warranty
- 40MB Drive, Internal .....\$339
- 40MB Drive, External .....\$429

Call For Pricing on Tape Cartridges!

## EDUCATIONAL and CORPORATE ACCOUNTS

We offer a full line of services catering to your needs. To reach our Educational & Corporate Sales Department

Call 1-800-468-9044  
FAX: 814-237-4450

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.

Member of:

**MMC**  
MICROCOMPUTER  
MARKETING COUNCIL  
of the Direct Marketing Association, Inc.



OPEN: 8:00AM - 11:00PM Mon - Fri, 10:00AM - 8:00PM Sat, 12:00PM - 8:00PM Sun East Coast Time

CALL TOLL FREE 1-800-468-9044

For Information  
Call 814-234-2236  
FAX 814-237-4450





# Arlington Computer Products gives you the best prices on IBM PCs...and Compaq too!

## IBM PERSONAL SYSTEM II

Model 30, 20 MB, w/Monitor .....	\$1899
Model 50, 20 MB, w/Monitor .....	\$2749
Model 50Z, 30 MB, w/Monitor .....	\$2999
Model 60, w/44 MB and Monitor .....	\$3495
Model 60, w/70 MB and Monitor .....	\$3895
Model 80, w/44 MB and Monitor .....	\$4595
Model 80, w/70 MB and Monitor .....	\$5249
Model 80, w/115 MB and Monitor .....	\$6795

w/Color Monitor add \$250  
IBM XT & AT .... Call for Custom Configurations

## COMPAQ 286

DESKTOP — 1 Drive	
640K, 40 MB, Monitor .....	\$2295
PORTABLE II MOD. 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) .....	\$3795
Model w/60 MB-20 MHZ .....	\$5099
Model w/130 MB-20 MHZ .....	\$6499
Model w/300 MB-20 MHZ .....	\$8795
Model w/110 MB-25 MHZ .....	\$7399

## COMPAQ PORT. 386

Model 40 .....	\$5649
Model 100 .....	\$6995

## AST PREMIUM 286

10 MHZ, 512K, 1 floppy, 40 MB, serial and parallel ports, monochrome graphics adaptor, monochrome monitor.

**\$2099**

## MULTIFUNCTION BOARDS

Everex Magicard 384K .....	\$199
AST 6 Pack w/384K .....	\$229
AST Rampage PC w/64K .....	\$239
AST Rampage AT w/512K .....	\$389
Orchid Tiny Turbo .....	\$279
Intel Above Board PC .....	\$239
Intel Above Board 286 .....	\$369
Intel Above Board PSII .....	\$269
Irma Board .....	\$695
AST 5251-11 .....	\$529
AST 5251-11 Plus Enhanced ...	\$589

## CHIPS

64K Ram Chips .....	9 for \$25
256K Chips .....	each \$11
8087-3/-2 .....	\$109/\$149
80287-6MHZ .....	\$159
80287-8MHZ .....	\$239
80287-10MHZ .....	\$279
80387-16 .....	\$429
80387-20 .....	\$639
80387-25 .....	\$659

## SOFTWARE

D Base III Plus .....	\$379
Framework .....	\$399
IBM Displaywrite IV .....	\$299
Lotus 123 .....	\$299
Managing Your Money .....	\$125
Microsoft Word .....	\$219
Multimate Adv. II .....	\$259
R Base for DOS .....	\$439
Smartcom .....	\$59
Symphony .....	\$429
Ventura Desktop Publ. ....	\$499
Word Perfect 5.0 .....	\$219

## MODEMS & FAXES

Hayes 1200/2400 .....	\$289/\$419
Everex 1200/2400 .....	\$79/\$149
Everex 2400 External .....	\$249
Mouse Systems .....	\$99
Microsoft .....	\$109
Logitech .....	\$74
Sharp FO-300 Fax .....	\$1219
Sharp FO-420 Fax .....	\$1339

## PRINTERS

### EPSON

LX 800 ....	\$189	LQ 500 ....	\$299
DFX 5000 ..	\$1349	LQ 850 ....	\$519
FX 850 ....	\$339	LQ 1050 ...	\$719
FX 1050 ...	\$479	LQ 950 ....	\$589
EX 800 ....	\$429	LQ 2550 ...	\$919

### OKIDATA

ML 320 ....	\$339	ML 321 ....	\$469
ML 390 ....	\$469	ML 391 ....	\$639
393 .....	\$929		

### TOSHIBA

321 S/L/341 S/L .....	\$489/\$609
351 SX .....	\$989

### NEC

P5200 .....	\$539	P5300 .....	\$699
3550 .....	\$749	P9XL .....	\$1049
P5XL .....	\$859	P2200 .....	\$349

### IBM

Quietwriter III .....	\$1199
Proprinter II .....	\$389
Proprinter X24 .....	\$549
Proprinter XL .....	\$549
Proprinter XL24 .....	\$719

### HEWLETT-PACKARD

Laserjet II .....	\$1699
1 MG Upgrade .....	\$319
2 MG Upgrade .....	\$599
4 MG Upgrade .....	\$1199
25 in 1 Font .....	\$299

## DRIVES & TAPES

Ext. 5 1/4" for PSII ..	\$239	<b>SEAGATE HARD DISKS</b>	
Toshiba 3 1/2" 720K ..	\$109	20 MB for XT (ST225) ..	\$269
Toshiba 3 1/2" 1.44 ..	\$125	30 MB for XT (ST238) ..	\$289
20 MB Tape .....	\$339	40 MB for AT (ST251) ..	\$359
40 MB Tape for AT ..		40 MB for AT (ST251-1) ..	\$479
or Compaq 386 .....	\$459	80 MB for AT .....	\$599

### IOMEGA

Bernoulli Box II 5 1/4" 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 ..	\$649
--------------------	-------	--------------------	-------

## VIDEO BOARDS

ATI EGA Wonder .....	\$189
ATI VIP VGA .....	\$269
Compaq VGA .....	\$449
Everex EGA Autoswitch ..	\$139
Everex ZGA .....	\$239
Hercules Graphics Plus ..	\$179
NEC MVA 1024 .....	\$799
Orchid VGA .....	\$289
Paradise Autoswitch 480 ..	\$169
Paradise VGA .....	\$279
Paradise Professional ...	\$389
Vega VRAM VGA .....	\$499
Vega VGA .....	\$269

## MONITORS

### NEC

Multisync .....	\$579
Multisync Plus .....	\$889
Multisync XL, 19" .....	\$2075

### AMDEK

310A/410A .....	\$129/\$149
-----------------	-------------

### PRINCETON

HX12E ...	\$449	Ultrasync	\$519
-----------	-------	-----------	-------

### SAMSUNG

Color .....	\$239
EGA .....	\$349
Multisync .....	\$439

**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

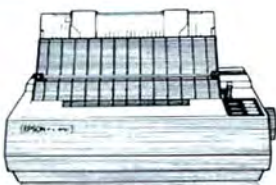
Prices and Availability Subject To Change Without Notice



# America's choice and **Arlington Computer** Products choice is **EPSON®**

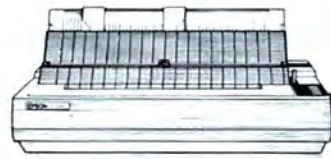
**It's not hard to understand why. Care in design, engineering and manufacturing have made Epson an industry leader and the industry standard. And to back their reputation, a one year warranty stands behind every Epson product.**

**Arlington Computer Products is an authorized Epson® dealer. Please call for immediate delivery at very competitive prices.**



## Epson FX-850

- Narrow-carriage 9-pin, dot-matrix printer.
- SmartPark™, a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper.
- With a standard push feed tractor and single sheet friction feed, the FX-850 can handle virtually any type of paper as well as envelopes.
- Exclusive SelectType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-850 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).



## Epson FX-1050

- Wide-carriage 9-pin, dot-matrix printer.
- SmartPark™, a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper.
- With a standard push feed tractor and single sheet friction feed, the FX-1050 can handle virtually any type of paper as well as envelopes.
- Exclusive SelectType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-1050 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).



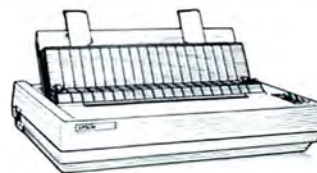
## Epson LQ-500

- Epson's 24-pin, dot-matrix technology creates true letter quality characters and high-resolution graphics
- Prints 180 characters per second (CPS) in draft mode; 60 CPS in letter quality (12 CPI)
- Automatic single sheet loading, standard pull tractor and friction feed for versatile paper handling
- Exclusive SelectType front control panel offers quick, easy selection of popular typescripts, fonts and pitch
- Two resident, letter quality fonts — Roman and Sans Serif
- New "shadow" and "outline" print modes for use with desktop publishing applications



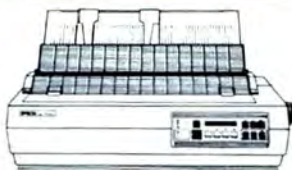
## Epson LQ-850

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- Epson's SmartPark™
- Exclusive SelectType front control panel offers quick, easy selection of popular typescripts, fonts and pitch
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or Letter Quality mode, the LQ-850 runs at a surprisingly quiet 55 dB noise level



## Epson LQ-1050

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- Epson's SmartPark™
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or letter quality mode, the LQ-1050 runs at a surprisingly quiet 55 dB noise level
- Exclusive SelectType front control panel offers quick, easy selection of popular typescripts, fonts and pitch



## Epson LQ-2550

- 24-Pin technology creates superior Letter Quality characters and high-resolution graphics up to 360 dpi.

- 7-Color printing capability is standard.
- Epson's SmartPark™
- Exclusive LCD SelectType front control panel for easy selection of pre-sets, fonts and printer functions.
- 133 Characters per second print speed in Letter Quality mode (12 CPI).
- 400 Characters per second print speed in draft mode (12 CPI).
- Epson LQ ESC/P™ assures software compatibility.

# EPSON®

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

Epson is a registered trademark of Seiko

**Arlington  
Computer  
Products, inc.**

3025-E S. MALMO  
ARLINGTON HEIGHTS, IL 60005



Call: **800-548-5105**

In Illinois 1-312-228-6333

Fax: 312-228-0516



## Leprecard Hard Disk Cards

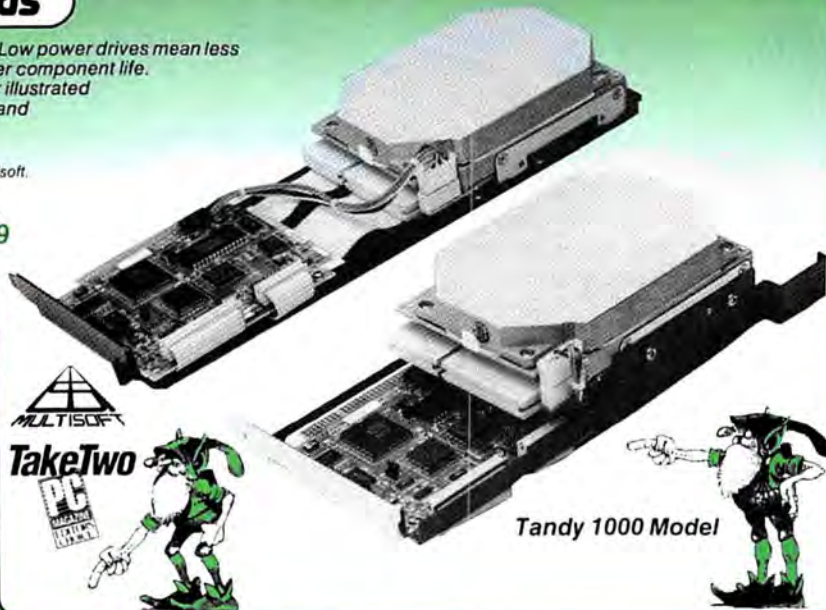
Leprecards feature components utilizing the latest technology. Low power drives mean less strain on your systems, lower operating temperature, and longer component life. You get a 1 year warranty, unlimited technical support, and our illustrated installation and user's guide. Models available for IBM PC/XT and compatibles, as well as TANDY 1000/A/SX/XT/TL/SL.

**FREE SOFTWARE** Including TakeTwo, the backup utility PC MAGAZINE named Editors Choice in 1986 & 1987, and PC-KWIK disk caching from Multisoft.

21MB 48ms <b>\$299</b>	32MB 48ms <b>\$339</b>	32MB 40ms <b>\$389</b>	49MB 28ms* <b>\$549</b>	65MB 16ms* <b>\$649</b>
------------------------------	------------------------------	------------------------------	-------------------------------	-------------------------------

\* Average access speed per partition

Tandy 1000/A/SX/XT/TL/SL Leprecards add \$20



## 3.5" Floppy Kits

Internal kits for PC/XT/AT computers include 5 1/4" mounting brackets, black & gray face plates, and AT rails. 1.44MB for PC/XT includes high speed Western Digital controller.

**FREE TAKE TWO** floppy backup software.

720 Kit <b>\$109</b>	1.44MB for AT <b>\$139</b>	1.44MB for PC/XT <b>\$199</b>
-------------------------	-------------------------------	----------------------------------



## PC/XT Disk Kits

- Pretested & formatted
- Western Digital short slot controller
- 30 page installation guide & reference manual
- Cables, mounting screws, full & half-height face plates
- 1 year Warranty, 30 Day Money Back Guarantee
- Optional: 150 watt, UL/FCC approved power supply for IBM PC's \$69

<b>20MB KIT \$279</b>
• Seagate ST225 - 21.4MB/65ms. Half-Height/14.8 watts
<b>30MB KIT \$299</b>
• Seagate ST238 - 32.7MB/65ms. Half-Height/14.8 watts
<b>40MB KIT \$459</b>
• Seagate ST251 42.8MB - Half-Height - 11 watt • pre formatted into a pair of 21MB/28ms partitions.
<b>65MB KIT \$549</b>
• Seagate ST277R 65.5MB - Half-Height - 11 watts • pre formatted into a pair of 32MB/28ms partitions.

**FREE SOFTWARE** Including TakeTwo, the backup utility PC MAGAZINE named Editors Choice in 1986 & 1987, & PC-KWIK disk caching from Multisoft



Tandy  
1000 kits  
add \$20

## Laser Printer

"One of the Laserjet's strongest competitors"  
INFOWORLD October 5, 1987

- Printer utility software
- Serial and Parallel Interfaces
- 120 day TRW on site maintenance
- 1 year Warranty
- 100% HP Laserjet & Laserjet + compatible
- 9 resident & 5 downloadable soft fonts standard
- Options: All HP style font cartridges

512K <b>\$1495</b>	1.5MB <b>\$1595</b>
-----------------------	------------------------



Toner Cartridge \$29

## AT Hard Disk Kits

- Includes IBM AT rails, and cables.
- SpeedStor or Ontrack large drive software.
- Formatted, Partitioned & Tested.

SIZE	MODEL	SPEED	CAPACITY	PRICE
HH	Seagate ST251	40ms	42MB	<b>\$359</b>
HH	Seagate ST251-1	30ms	42MB	<b>\$449</b>
HH	Toshiba Drive MK134	25ms	44MB	<b>\$499</b>
FH	Seagate ST4096	28ms	80MB	<b>\$599</b>
FH	Maxtor 1140	27ms	117MB	<b>\$1669</b>
FH	Maxtor 2190	30ms	150MB	<b>\$1999</b>

## LepreFAX Modems

- Easy to use POP-up Menus
- Sends ASCII or word processing files
- Internal 4800bps, \$289 9600bps \$559
- Prints on standard dot-matrix or laser printers
- Sends/Receives from any Group 3 fax machine
- Automated sending during low phone rate periods
- Portable external plugs into PC/XT/AT serial port. \$359

4" Hand Scanner with HALO DPE software \$269

External  
**\$359**

Internal  
**\$289**



## 2400 Modems

with MNP

External Internal  
**\$239 \$229**

Hayes Compatible,  
300/1200/2400

MNP Level 4 error correction

**FREE MIRROR II** Software, a \$69 value  
Internal model \$229, fits in a short slot

2400 without MNP **\$159 Ext \$109 Int**



## Orchid

Designer VGA 512K	<b>\$299</b>
Orchid VGA 256K	<b>\$249</b>
Tiny Turbo 286	<b>\$289</b>
Ramquest II 1MB	<b>\$799</b>



**\$895**

## 286<sup>10</sup> Computer

80286 processor running at 6/10 Mhz with 0 wait states provides a Norton SI rating of 11.5. 8 slots - Room for 1 full and 3 half-height drives-220 watt power supply - clock/calendar - Choice of 1.2 or 1.44MB floppy drive-Genuine Western Digital combination Hard disk/floppy controller-American made Maxiswitch 84 or 101 key keyboard - 512K RAM standard expandable to 1MB Award BIOS- 1 year warranty - 30 day money back guarantee.

Complete systems with serial & printer ports:

Mono/Graphics Card & Monitor	<b>\$1095</b>	Orchid VGA Card & Multiscan Monitor	<b>\$1595</b>
VGA Card & Mono Monitor	<b>\$1295</b>	Orchid Designer VGA Card &	
EGA Card & EGA Monitor	<b>\$1495</b>	NEC Multisync II Monitor	<b>\$1895</b>



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**  
FAX  
**805-379-9345**

- 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



# ACP's PINK SHEET

**LATEST  
PRICES AND  
PRODUCTS!**

**the Complete FAX!**

**NEW 349.**



**CFAX/CFAX 4800 PC FAX Card**  
48,000bps CFAX/CFAX 4800 with a 4,800bps facsimile modem and an optional 2,400bps Hayes compatible modem. Fax to any Group III. Card + software included.

**CHS 200dpi Hand Scanner 179.**

Scans any image up to 2.5"x10" at 200 dpi resolution. Software allows edit and merge...use like a mouse.

## • LOW COST COMPATIBLE CARDS •

<b>ACP Advanced Cards/IBM</b>		
Monographs/HGA w/print port	55.	
Colorpages w/print port	149.	
SuperEGA, Genoa Compatible	149.	
SuperVGA 1024x768	269.	
Diamond Multi I/O 2.5 p.c./XT	139.	
XT Six-Pak compatible/OK	89.	
XT 286 Accelerator card	269.	
XT Multi I/O w/floppy card	69.	
XT dual Floppy controller	29.	
XT Serial I/O card	29.	
XT/AT Parallel I/O card	29.	
XT/AT Game adapter port	39.	
XT/AT EPROM programmer	149.	
XT Floppy controller, 1.44Mb	89.	
AT 3.0Mb w/Multi I/O, OK	199.	
AT SuperMULTI I/O w/floppy	119.	
PS/2 Multi I/O	99.	
PS/2 Floppy controller 1.4Mb	89.	
HP LaserJet 1Mb Ram card	399.	
<b>MOTHERBOARDS</b>		
XT Turbo w/BIOS, 8MHz	89.	
XT Turbo w/BIOS, 10MHz	99.	
AT 286 w/BIOS, 10 MHz	279.	
AT Baby w/BIOS, 12MHz	299.	
AT 386 w/BIOS, 16MHz	1499.	
<b>Special Buy!!</b>		
DFI Hand Scanner (*)	229.	

**AST Research Inc. Your Choice... Advantage AT or Rampage AT 99.**

**QUADRAM Silver Quad 89.**

• Liberty XT, EMS... 89.  
• Quadpoint Accelerator... 89.

## • EXPANSION CARDS •

<b>AST Research</b>		
Xtormer/286, 512K, 10MHz	call.	
Advantage 2/286, mod. 80, 1Mb	725.	
Advantage 2/286, PS/2, 2.0K	349.	
Advantage Premium 286/512K	389.	
Rampage 2/286, PS/2, 512K	499.	
Rampage 286, 512K	489.	
AST Sixpack, OK	119.	
<b>ATI Technologies</b>		
EGA W/VR	199.	
2400x16 int. Modem w/MNP-3	199.	
<b>GENOA</b>		
Super EGA/H-Ras	199.	
Super VGA/1024x768	349.	
Super VGA/H-Ras	449.	
<b>INTEL</b>		
Intelcard 386/PC to 386	975.	
Intelcard 386/AT with cable	1175.	
Above Board 286/512K	475.	
Above Board 286/AT, 512K	379.	
Above Board 2, 512, PS/2	475.	
8087 (5MHz)	102.	
8087-1 (10MHz)	205.	
8087-2 (8MHz)	159.	
80287-6 (6MHz)	185.	
80287-8 (8MHz)	255.	
80287-10 (10MHz)	309.	
80387-16 (16MHz)	549.	
80387-20 (20MHz)	799.	
<b>ORCHID Technology</b>		
Trity Turbo 286 - REDUCED!	299.	
Designer VGA Board	319.	
Designer VGA-2, PS/2 Board	499.	
RAMOUSE 50 PS/2, 2Mb	699.	
<b>PARADISE</b>		
Quadpoint 480	199.	
VGA Plus	299.	
<b>QUADRAM</b>		
Quad386XT	799.	
Prosync 640x480, 752x410 EGA	269.	
Quad VGA	299.	
Microchannel buffer w/844	269.	
Quadpoint XT accelerator	99.	
Liberty EMS XT card, OK	89.	
Silver Quadboard, Sixpak comp.	89.	
<b>VIDEO 7</b>		
VEGA Deluxe	219.	
Vega VGA	299.	
V-RAM VGA/AT	549.	

## • MICE • JOYSTICK • KEYBOARDS •

<b>Advanced PC Keyboards</b>		
5160 84key XT/AT switcheable	59.	
5161 101key XT/AT switcheable	79.	
<b>CH Products</b>		
Mach II Joystick-IBM	30.	
Mach III Joystick-IBM	44.	
Gamecard II/IBM	44.	
<b>KEYTECH</b>		
KB101 101 key/AT	97.	
KB5151 99 key deluxe	135.	
<b>KRAFT</b>		
IBM PC/XT/AT Joystick/3 button	24.	
<b>LOGITECH</b>		
Bus Mouse PC/XT/AT	95.	
Serial Mouse PC/XT/AT	99.	
Serial Mouse PS/2	79.	
<b>MICROSOFT</b>		
Bus Mouse w/PC Paintbrush	105.	
Bus Mouse w/PC Paintbrush	105.	
Serial PS/2 w/PC Paintbrush	109.	
<b>MSK Technologies</b>		
PC Mouse serial PC/XT/AT	98.	
PS/2 Mouse serial	98.	
PC Mouse bus PC/XT/AT	98.	
<b>SUMMAGRAPHICS</b>		
SummaSketch Plus/IBM	449.	

## • TAPE BACKUP/VIDEO •

<b>ALPHAMICRO</b>		
VCR Video tape backup card	349.	
<b>IOEMGA</b>		
Bernoulli 20Mb 51/4" internal	945.	
Bernoulli 20Mb 51/4" ext.	1189.	
Tri-pak 20Mb cartridge 51/4"	189.	
Tri-pak 20Mb cartridge, 8"	255.	
PCSB Adapter card PC/XT/AT	189.	
PS4 Adapter/PS/2 mod 50,60,80	299.	
<b>IRWIN</b>		
1100 XT/AT 10Mb backup(int)	199.	
1200 AT 20Mb backup(int)	369.	
<b>Toshiba Laptops</b>		
The Complete Toshiba family of Laptops from ACP - L.A.'s #1 Source!		
Toshiba T-1000 Laptop	779.	

## • MONITORS •

<b>AMDEK</b>		
VIDEO 316A 12" amber TTL	89.	
410A 12" amber g/n or white	153.	
1280 13" graphics (1280x800)	799.	
LaserDrive CD ROM/Mic soft	899.	
<b>IBM MONITORS</b>		
8533 12" Monochrome (40x480)	226.	
8512 14" Color analog	527.	
8513 12" EGA (640x480)	595.	
8514 16" Hi-res (1024x768)	1395.	
<b>MAGNAVOX</b>		
Multisync 14" EGA	399.	
CGA 13" color	288.	
TTL Mono 12" gm or amber	89.	
<b>NEC</b>		
Multisync II 13" TTL/Analog	595.	
Multisync Plus 15" VGA/EGA	945.	
Multisync XL 20" (1024x768)	2275.	
Monograph sys (1024x1024)	1559.	
<b>SAMSUNG/LTI/INTEC</b>		
14" Multisync (NEC Compat.)	439.	
Mono 12" amber TTL	88.	
CGA 14" RGB Color	288.	
EGA 14" EGA/CGA Color	389.	
VGA 14" Color	419.	
<b>WYSE</b>		
WY30 14" terminal	349.	
WY50 14" terminal	419.	
WY60 14" terminal ASCII	519.	

## • SOFTWARE SPECIALS!!

<b>Lotus 1-2-3</b>	325.	
<b>Ventura</b>	499.	
<b>PageMaker</b>	499.	
<b>Word Perfect</b>	239.	
<b>Excel</b>	299.	

**Toshiba Floppy Drives**

**ACP Super Sale Priced! 99.95**

**3.5" 720K Floppy Drive**  
Gray or black, 5.25" mount kit, P/N FDD4403

**ACP Super Sale Priced! 110.**

**1.2Mb AT Floppy Drive**  
Gray bezel, P/N ND-08DE-G

## • FLOPPY DISC DRIVES •

<b>SONY</b>		
31/2" Micro Floppy 1.44Mb	149.	
<b>TEAC</b>		
558V 360K Floppy/PC/XT/AT	89.	
<b>TOSHIBA AMERICA</b>		
FDD4403 31/2" Micro 720K	99.	
31/2" Micro 1.44Mb w/kit	139.	
ND040 360K Floppy/PC/XT	84.	
ND040-G 360K Floppy AT gray	84.	
ND08DE-G 1.2Mb AT gray	110.	
<b>ADVANCED</b>		
360K Floppy-Black Bezel	79.	
1.2Mb Floppy-Black Bezel	89.	
3.5" 1.44Mb Floppy w/kit	119.	
3.5" 720K Floppy w/kit	89.	

## • HARD DISK DRIVES •

**85Mb Hard Drive**  
Includes EDSI AT Controller...  
**795.** ACP's Special Year-End Sale

**20 Mb Hard Drive Kit 249.**

**20 Mb Hard Card 288.**

At this low low price, you can't afford not to buy one...

## • HARD DISK DRIVES •

<b>MICROPOLIS</b>		
1333A/50Mb Full ht. 30ms.	649.	
1335/85Mb Full ht. 65ms.	849.	
80387-16 16Mb	449.	
<b>MAXTOR</b>		
XT 1085/65Mb, MFM	849.	
XT 1140/120Mb, MFM	1495.	
XT 1350/80Mb, ESDI	2995.	
<b>PLUS Development</b>		
Plus20 Hardcard, 20Mb, 49ms	549.	
Plus40 Hardcard, 40Mb, 39ms	699.	
<b>SEAGATE</b>		
ST225 25Mb 65ms. w/WO ctrl	299.	
ST138 38Mb New! 31/2"	call.	
ST238 38Mb 65ms w/WO RLL	349.	
ST251 51Mb 40ms.	449.	
ST251-1 51Mb 28ms.	499.	
ST403B 38Mb 40ms - REDUCED!	469.	
ST4096 96Mb 28ms - REDUCED!	799.	
<b>WESTERN DIGITAL</b>		
Ficard/PS30 PS/2 mod 25/30	389.	
Ficard/30	399.	
1006RAH Contr. 1-Interface	199.	
1003RAH Controller RLL/AT	187.	
1003WAZ Floppy/Hard/AT	149.	
1002-27X Controller RLL/XT	98.	
1002-WAX Controller XT	98.	

## • TAPE BACKUP/VIDEO •

**New! Tallgrass Technologies**  
**NEW! 40Mb TAPE BACKUP!!**  
Backup your data with removable cassettes... your choice Model 1040i XT/AT, 1040 PS/2.  
**338.**

## • TAPE BACKUP/VIDEO •

<b>ALPHAMICRO</b>		
VCR Video tape backup card	349.	
<b>IOEMGA</b>		
Bernoulli 20Mb 51/4" internal	945.	
Bernoulli 20Mb 51/4" ext.	1189.	
Tri-pak 20Mb cartridge 51/4"	189.	
Tri-pak 20Mb cartridge, 8"	255.	
PCSB Adapter card PC/XT/AT	189.	
PS4 Adapter/PS/2 mod 50,60,80	299.	
<b>IRWIN</b>		
1100 XT/AT 10Mb backup(int)	199.	
1200 AT 20Mb backup(int)	369.	
<b>Toshiba Laptops</b>		
The Complete Toshiba family of Laptops from ACP - L.A.'s #1 Source!		
Toshiba T-1000 Laptop	779.	

## • MONITORS •

<b>AMDEK</b>		
VIDEO 316A 12" amber TTL	89.	
410A 12" amber g/n or white	153.	
1280 13" graphics (1280x800)	799.	
LaserDrive CD ROM/Mic soft	899.	
<b>IBM MONITORS</b>		
8533 12" Monochrome (40x480)	226.	
8512 14" Color analog	527.	
8513 12" EGA (640x480)	595.	
8514 16" Hi-res (1024x768)	1395.	
<b>MAGNAVOX</b>		
Multisync 14" EGA	399.	
CGA 13" color	288.	
TTL Mono 12" gm or amber	89.	
<b>NEC</b>		
Multisync II 13" TTL/Analog	595.	
Multisync Plus 15" VGA/EGA	945.	
Multisync XL 20" (1024x768)	2275.	
Monograph sys (1024x1024)	1559.	
<b>SAMSUNG/LTI/INTEC</b>		
14" Multisync (NEC Compat.)	439.	
Mono 12" amber TTL	88.	
CGA 14" RGB Color	288.	
EGA 14" EGA/CGA Color	389.	
VGA 14" Color	419.	
<b>WYSE</b>		
WY30 14" terminal	349.	
WY50 14" terminal	419.	
WY60 14" terminal ASCII	519.	

**MMC MICROCOMPUTER MARKETING COUNCIL**

**799.**

**AMAX/Advanced 286/10 MHz BareBones**

Includes 101-key keyboard, 1.2Mb floppy, floppy/HD controller card, OK expands to 1 Meg.  
**Call for Custom Configurations...**

## • PRINTERS •

<b>DICONICS/KODAK</b>		
150P Portable printer(par)	339.	
300P w/ride carriage(par)	539.	
<b>EPSON</b>		
LX800 80column, 180cps	209.	
EX800 FX286e FX86e LD850	call.	
LQ105C LQ500, etc	call.	
<b>ACP is your full line Epson dealer</b>		
<b>HEWLETT PACKARD</b>		
LaserJet Series II	call.	
Deskjet w/laser quality	895.	
Scanjet flatbed scanner	call.	
<b>IBM PRINTERS</b>		
Proprinter II, 240cps	435.	
Proprinter X24, 240cps 24pin	635.	
Proprinter XL24, 240cps 24pin	835.	
<b>NEC</b>		
P2200, 24pin/360x260dpi	399.	
LC890 Silentwriter Laser	3395.	
<b>OKIDATA</b>		
ML393, 180cps/10	995.	
Laserline 6 (int. IBM int.)	1399.	
<b>PANASONIC</b>		
KX-P1091, 150cps draft pr	198.	
KX-P1092, 240cps draft, 132	339.	
KX-P1524, 24pin, 80cps/NLQ	549.	
<b>TOSHIBA</b>		
P221SL, 24pin, 216cps	499.	
P341SL, 24pin, 216cps	699.	
PS15X3516	999/1099.	
Pagesizer 12, High volume	2299.	

## • MODEMS •

<b>Advanced MODEMS</b>		
1200baud w/software(int)	79.	
1200baud External	89.	
2400baud w/software(int)	109.	
2400baud External	149.	
2400B/2 w/software(int)	188.	
2400B/2 w/software(int)	149.	
2400PS/2 w/software(int)	288.	
Smartmodem 2400B w/psw(int)	447.	
Smartmodem 2400 External	447.	
<b>MIGENT</b>		
Pocket MODEM 1200	sale 88.	
<b>PROMETHEUS</b>		
2400G External	188.	
2400B/2 w/software(int)	149.	
2400PS/2 w/software(int)	288.	
1200B/2 w/software(int) sale!	89.	

## • MONITORS •

<b>Advanced MODEMS</b>		<b>MIGENT</b>	
1200baud software(ent)	79.	Pocket MODEM 1200	<b>sale 88.</b>
1200baud External	89.		
2400baud software(ent)	109.	<b>PROMETHEUS</b>	
2400baud External	149.	2400G External	188.
		2400B2 software(ent)	149.
<b>HAYES</b>		2400S PS2? software(ent)	288.
Smartmodem 2400B power(ent)	149.	1200B/2 software?(nt) sale	89.
Smartmodem 2400 External	447.		

• MONITORS •

<b>AMDEK</b>		<b>NEC</b>	
VIDEO 316A 12" amber TTL	89.	Multisync II 13" TTL/Analog	595.
410A 12" amber g/n or white	153.	Multisync Plus 15" VGA/EGA	945.
1280 13" graphics (1280x800)	799.	Multisync XL 20" (1024x768)	2275.
LaserDrive CD ROM/Mic soft	899.	Monograph sys (1024x1024)	1555.
<b>IBM MONITORS</b>		<b>SAMSUNG LTI/INTEC</b>	
8533 12" Mono(g)40x480	226.	14" Multisync (NEC Compat.)	439.
8512 14" Color analog	527.	Mono 12" TTL Color	88.
8513 12" EGA(640x480)	595.	CGA 14" color	288.
8514 16" Hi-res(1024x768)	1395.	EGA 14" EGA/CGA Color	419.
		VGA 14" Color	419.
<b>MAGNAVOX</b>		<b>WYSE</b>	
Multisync 14" EGA	399.	WY30 14" Terminal	349.
CGA 13" color	288.	WY30 14" terminal	419.
TTL Mono 12" gm or amber	89.	WY82 14" terminal ASCII	519.



# Buy Direct from Augusta Warehouse & Save \$\$\$



**SAMSUNG**



**Brand-Name  
Quality!**  
S-300  
S-500  
S-800

**Call for Warehouse Price!**

**Announcing the first fully IBM<sup>®</sup> compatible computer that will bring out the genius in you!**

**HEADSTART**

• 486SX processor  
• 1MB RAM (expandable to 640K)  
• 20MB hard drive  
• 3.5" floppy disk drive  
• 16-bit color graphics  
• 100% IBM compatible  
• 1 year warranty

• 486SX processor  
• 1MB RAM (expandable to 640K)  
• 20MB hard drive  
• 3.5" floppy disk drive  
• 16-bit color graphics  
• 100% IBM compatible  
• 1 year warranty



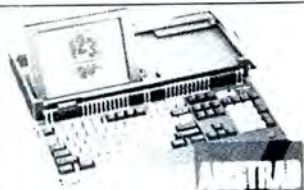
**Call for Unbelievably Low Price!**

## SHARP LAPTOP COMPUTERS

PC4501 ..... \$669  
PC4502 ..... \$1,189  
PC4521 ..... \$1,995

## THE ACER COMPUTER LINE

Model 710 XT Compatible  
Models 900, 910 AT Compatibles  
Model 1100, 16 MHz AT Compatible  
System 32, 20 MHz 80386 System  
**CALL FOR OUR LOW, LOW PRICES!**



## AMSTRAD PPC640 PORTABLE

640K hard drive, 100K drives, 200 baud modem, ports, 101 key enhanced keyboard, super hi-res screen, 3 power modes, battery equipped

**Priced too low to advertise!**

**FREE**

**\$500**

**WORTH OF  
SOFTWARE**

**ABILITY  
PLUS  
\$79**  
with Amstrad  
Purchase



**PC1640**

Loaded for so little. Includes dual disk drives, Mouse, 360K drive, CGA & EGA Graphics built-in desktop and paint software, pop-up clock/calendar/alarm, complete manuals, expandable, 8086 processor, monitor of your choice. The list goes on & on.

**Call for Price too low to publish**

## MODEM & PRINTER SPECIALS

Star NX1000 Printer ..... \$169  
Panasonic 1080i Printer ..... \$169  
Practical Peripheral 1200 Baud Modem ..... \$85  
Practical Peripheral 2400 Baud Modem ..... \$165

## UPS SYSTEMS

Minuteman UPS 250/ 1XL ..... \$289  
Minuteman UPS 300 ..... \$349  
Minuteman UPS 500 ..... \$469  
Minuteman UPS 600 ..... \$599

## SOFTWARE

Ability Plus ..... \$119  
Aldus Pagemaker ..... \$459  
Borland Procomm Plus ..... \$129  
Borland Turbo C ..... \$69  
Borland Turbo Pascal 4.0 ..... \$69  
Clipper ..... \$379  
CorelDraw ..... \$99  
Crosstalk XVI ..... \$99  
dBase III Plus ..... \$379  
dBase III ..... \$125  
Enable 200 HT Perspective ..... \$379  
Fastback Plus ..... \$105  
Fox Base Plus ..... \$199  
Framework II ..... \$379  
Harvard Graphics ..... \$279  
IBM DisplayWrite IV ..... \$289  
In-House Accountant ..... \$129  
Managing Your Money 4.0 ..... \$125  
Microsoft Word 4.0 ..... \$229  
Microsoft Excel ..... \$329  
Microsoft Windows 386 ..... \$135  
Multimate Advantage II ..... \$269  
Multiplan ..... \$135  
Office Writer 6.0 ..... \$239  
Peachtree II Complete ..... \$149  
PC Anywhere III ..... \$89  
PFS Professional Write ..... \$119  
PFS Professional File ..... \$145  
PFS First Choice ..... \$89  
Quattro ..... \$149  
R-Base for DOS ..... \$439  
Revelation ..... \$469  
SuperCalc IV 1.0 ..... \$269  
Symphony 1.2 ..... \$439  
Ventura Desktop Publishing ..... \$499  
Volkswriter III ..... \$149  
WordPerfect 5.0 ..... \$219  
Wordstar 2000 Plus 3.0 ..... \$239

# 1-800-338-8956

VISA • MasterCard • American Express

**Monday-Friday, 9 a.m. until 7 p.m. (EST)**

**Open Most Saturdays 10 a.m. to 3 p.m.**

**Tech Support Open 9:30 until 5:30, 404-868-7428**



**BOYD SIMMONS**  
President  
404-738-5587

"We have built and are continuing to build our reputation based on customer service, product quality and integrity. We are not the run-of-the-mill mail order shop, we want you to know who we are. Should you ever receive unsatisfactory service from our sales or technical support staff, please let me know about it. My telephone number is 404-738-5587"

**Boyd Simmons, President & CEO**



**CHUCK SCALES**  
Technical Support Manager  
404-868-7428

# Augusta Warehouse!



# CHEAP!



**ZENITH**

SUPERSPORT 2 Drive \$ 1498  
SUPERSPORT 20MB HD \$ 2197  
SUPERSPORT 286 20M \$ 3034  
SUPERSPORT 286 40M \$ 3376



CALL FOR THE CHEAPEST  
PRICES ON ALL POPULAR  
LASER PRINTERS.



NEC MULTISYNC II  
**\$559**



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  
386/16 \$ 2585  
386/20 \$ 3299

All Original NEC  
Components  
All Models Include  
Keyboard

**NEC**



Powermate Portable 20M \$ 2358  
Powermate Portable 40M \$ 2744  
Powermate Port. SX 42M \$ 3768  
Multisync EL II \$ 1419  
Multisync HD \$ 2248

**TOSHIBA**



T1000 \$ 777  
T1100 PLUS \$ 1388  
T1200I \$ 1579  
T1200H 20M \$ 2259  
T3100 20 \$ 2957  
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	\$ 748
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 Autoview 480	\$ 172
Paradise VGA Plus	\$ 269
PGS Laserpage	\$ 532
PGS PG-1600	\$ 532
Video-7 Vega VGA	\$ 269

## SAMSUNG

S-300	\$ 649
8 MHzXT Compatible	
360K Drive, 6 Exp Slots	
S-500	\$ 1098
10 MHz AT Compatible	
1.2M Drive, 8 Exp Slots	
S-800	\$ 2598
20 MHz 80386	
1.2M Drive, 8 Exp Slots	
EGA Video Adapter	

## AST COMPUTER SYSTEMS

286 Model 80	\$ 1539
286 Model 90	\$ 2039
286 Model 120	\$ 2355
286 Model 140	\$ 2677
286 Model 170	\$ 3089
386 Model 300	\$ 2699
386 Model 340	\$ 3999
386 Model 390	\$ 5349
386 Model 3150	\$ 6149
386 Model 3320	\$ 6788

## P R I N T E R S

### NEC PRINTERS

P6 10" wide	\$ 463
CP6 10" Color	\$ 549
P7 16" wide	\$ 644
CP7 16" Color	\$ 733
P2200 10" wide	\$ 359
PSXL 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
LQ-500	\$ 328
LQ-850	\$ 519
LQ-950	\$ 597
LQ-1050	\$ 737
LQ-2550 Color	\$ 939

### 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
OTC 850XL	\$ 1644
XEROX 4020 Color	\$ 1088

## P R I N T E R S

## SOFTWARE

Aldus Pagemaker 3.0	\$ 488
Carbon Copy	\$ 109
Clipper	\$ 395
Crosstalk 16	\$ 98
DBXL Diamond Rel.	\$ 118
Deskview 2.0	\$ 77
Disk Optimizer	\$ 44
Eureka	\$ 98
Foxback Plus	\$ 94
Foxbase Plus	\$ 196
Foxbase Plus 386	\$ 288
Generic CADD	\$ 78
Kings Quest	\$ 34
Managing Money	\$ 119
Microsoft C5.1	\$ 281
MS QuickBasic	\$ 64

## SOFTWARE

Microsoft EXCEL	\$ 296
Microsoft Word 4	\$ 209
Microsoft Works	\$ 114
Microsoft Write	\$ 119
MS Windows 2	\$ 68
MS Windows 386	\$ 123
MS Flight Simulator	\$ 34
Windows Toolkit 2	\$ 329
MS Macro Asm 5.1	\$ 98
Newroom	\$ 36
Paradox 1.1	\$ 282
Paradox 2.0	\$ 429
PFS: Pro Write	\$ 139
PFS: First Choice	\$ 88
Q & A	\$ 189
Quattro	\$ 144

## SOFTWARE

Xerox Ventura 2.0	\$ 474
Quickallver Diam Rel.	\$ 337
Reflex	\$ 87
Sideways	\$ 43
Smart Notes	\$ 52
SOZ Plus	\$ 62
Supercalc 4	\$ 259
Turbo Basic	\$ 59
Turbo C	\$ 59
Turbo Lighting	\$ 59
Turbo Pascal 4.0	\$ 59
Turbo Prolog	\$ 84
VP Planner	\$ 58
Word Perfect 5.0	\$ 235
Wordstar Prof.	\$ 218
Yeager Adv Flight	\$ 29

## MOUSE DEVICES

MICROSOFT	
Mouse	\$ 97
With Windows 2.0	\$ 138
LOGITECH	
Mouse	\$ 74
With LogiCADD	\$ 118
Publisher Mouse	\$ 113
Hilfax Mouse	\$ 86

Note: Specify either  
Serial or Bus Version

## SCANNERS

AST TurboScan	\$ 1233
DEST Scan Plus	\$ 1798
Panasonic OCR	\$ 1798
PGS LS300 w/int	\$ 698
PGS LS300 OCR	\$ 939

## MONITORS

Amdk 410A	\$ 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 VGA Color	\$ 368
Genius Disp Sys	\$ 1288
NEC Monograph	\$ 1244
NEC Multisync XL	\$ 2075

## MONITORS

NEC Multisync II	\$ 559
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.)  
9-7 Monday-Friday  
12-5 Saturday

**NITRO MICRO**

120 West Main Street • CARMEL, IN 46032

**800-382-3888**

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



CELEBRATING  
OUR  
20TH  
YEAR  
1968-1988

# MONTGOMERY GRANT

PC WORLD  
12/88

**OUTSIDE USA---CALL  
(718)692-0071**

**FOR CUSTOMER SERVICE**  
Call Mon-Fri: 9:30am-4:30pm  
(718) 692-1148

Retail Outlet: Penn Station, Main Concourse  
(Beneath Madison Square Garden) NYC, N.Y. 10001  
Store Hours: Mon-Fri 8:30am-8pm/Sat-Sun 9:30am-7pm

**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**

**EXTENDED HOLIDAY SEASON ORDER HOURS: Monday-Friday, 8:30am-8:30pm/ Saturday & Sunday, 9:30am-7pm (EST)**  
**NO SURCHARGE FOR CREDIT CARD ORDERS / WE INVITE CORPORATE & EDUCATIONAL CUSTOMERS**  
**CORPORATE LEASING AVAILABLE**

## LAPTOPS



**AMSTRAD  
PPC-640 SD**

- 640K
- 720K Floppy Drive
- Built-in 2400 Baud Modem

**\$799**

**AMSTRAD PPC 640**

- With Two Drives.....\$899
- NEC MULTISPEED EL.II.....\$1399
- NEC MULTISPEED HD.....\$2179
- TOSHIBA 1000.....\$749
- TOSHIBA 120 F.....\$1549
- TOSHIBA 1200 H.....\$2199
- TOSHIBA 1200 HB.....\$2399
- TOSHIBA 3100/20.....\$2929
- TOSHIBA 3200.....\$3669
- TOSHIBA 5100.....\$4649
- ZENITH 184 w/ 2 FLOPPYS.....\$1469
- ZENITH 184-2 w/ 20MB.....\$2199
- ZENITH 286 w/20 MB.....\$3299
- ZENITH 286 w/ 40 MB.....\$3969
- SPARK EL.....\$1099
- EPSON EQUITY LT.....\$1099

MODEMS, EXTERNAL DRIVES & ACCESSORIES available for all laptops

## EPSON

**EPSON EQUITY I+  
IBM XT COMPATIBLE PKG.**

- 640K RAM w/Clock Calendar
- 360K Drive-KeyBoard-Serial & Parallel Ports-12" High Resolution Monitor - MS DOS/GW Basic

**\$769**



- Same w/20 MB Hard Drive.....\$1029
- Same w/30 MB Hard Drive.....\$1079
- Same w/40 MB Hard Drive.....\$1179
- Same w/Two 360K Floppies.....\$849

**EPSON EQUITY II+  
IBM AT COMPATIBLE  
HARD DRIVE PACKAGE**

- Keyboard • 640K RAM • 80286 Microprocessor • 1.2 MB Floppy Drive • 20 MB Hard Drive • 12" Monitor • MS DOS/GW Basic

**\$1399**



- Same w/30 MB Hard Drive.....\$1449
- Same w/40 MB Hard Drive.....\$1549

**LOGITECH MOUSE M-7.....\$59.95**



**EPSON EQUITY III+  
IBM AT COMPATIBLE 20 MB  
HARD DRIVE PACKAGE**

- Keyboard • 80286 Processor • 640K RAM • 6/8/12 Mhz • 1.2 MB Floppy Drive • 20 MB Hard Drive • 12" Monitor • 8 Expansion Slots • Serial & Parallel Ports • MS DOS/GW Basic

**\$1749**

- SAME w/30 MB HARD DRIVE.....\$1799
- SAME w/40 MB HARD DRIVE.....\$1899

## NEC® PowerMate 1+



**IBM AT COMPATIBLE  
PACKAGE**

- Enhanced Keyboard • 80286 Microprocessor • 12 Mhz • 1.2 MB Disk Drive • Serial & Parallel Ports • 12" Monitor • MS DOS • GW BASIC

**\$1499**

- Same w/ 20 MB Hard Drive.....\$1749
- Same w/ 30 MB Hard Drive.....\$1799
- Same w/ 40 MB Hard Drive.....\$1899

**NEC POWERMATE 386**



**IBM AT COMPATIBLE  
40 MB  
HARD DRIVE  
PACKAGE**

- Keyboard • 80386 Processor • 1 MB RAM • 1.2 MB Floppy Drive • 40 MB Hard Drive • Serial & Parallel Ports • 12" Monitor • MS DOS • GW BASIC

**\$3499**

## III LASER XT PACKAGE

- 512K • IBM XT Comp atible • 4.77-8 Mhz • 360K Floppy Drive • Serial & Parallel Ports • Game Port/RGB Port • 12" Monitor

**\$489**



## IBM® PERSONAL SYSTEM 2

**MODEL 50**

- 1 MB RAM • 1.44 MB Floppy Drive • 20 MB Hard Drive

**\$2499**

Monitor Optional



- PS/II Model 30.....\$1299
- PS/II Model 30 w/ 20 MB.....\$1699
- PS/II Model 50 w/ 30 MB & 1.44 MB Floppy.....\$2849
- PS/II Model 60 w/ 44 MB & 1.44 MB Floppy.....\$3299
- PS/II Model 60 w/ 70 MB & 1.44 MB Floppy.....\$3619
- PS/II Model 70 w/ 60 MB & 1.44 MB Floppy.....\$4299
- PS/II Model 80 w/ 44 MB & 1.44 MB Floppy.....\$4295
- PS/II Model 80 w/ 70 MB & 1.44 MB Floppy.....\$4795
- AMTECH 5.25" 360K External Drive for IBM PS/II 30.....\$169
- PACIFIC RIM 5.25" 1.2 MB External Drive for IBM PS/II 50/60/70/80.....\$259
- IBM PERSONAL SYSTEM II MONITORS
- 8503 Monochrome Monitor.....\$249
- 8512 Color Monitor.....\$449
- 8513 Color Monitor.....\$559
- IBM Proprinter II.....\$369

## AMIGA 2000



**IBM XT COMPAT. RGB COLOR PKG**

- A 2000 Computer w/Keyboard • 1 MB Expandable to 9 MB • Built-in 3.5" Disk Drive • RGB Color Monitor • 2088 IBM Compatible Bridge Card w/ 5.25" Floppy Disk Drive

**\$2049**

FREE MOUSE AND SOFTWARE

## AMIGA 500

**RGB COLOR PACKAGE**

- Amiga 500 w/512 K • Built-in 3.5" Disk Drive • Mouse • RGB Color Monitor • All Power Supplies and Cables • FREE Software

**\$759**



**RGB COLOR SYSTEM**

- Amiga 500 with 1084S RGB Color Monitor

**\$829**

Amiga 500 Computer w/1084S Mon & 1010 3.5" Floppy Drive

**\$1029**

**ALL AMIGA COMPUTER PERIPHERALS IN STOCK!**

## Commodore

**128D PACKAGE**

- Commodore 128D Computer w/Built-in Disk Drive
- Commodore 1902 Color RGB Monitor
- Commodore Color Printer
- 64 c PACKAGE

**\$699**

- Commodore 64 c Computer, Commodore 1541C Disk Drive, Commodore Color Printer, 12" Computer Monitor

**\$389**

## SANYO

**PR 3000**

Daisy Wheel Printer

**\$59.95**

**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.**

**SEAGATE 20, 30, 40, 60, 80,**

**MB HARD DRIVES**

**IN STOCK!**

## LEADING EDGE

**MODEL D2**

**IBM AT COMPATIBLE 20 MB  
HARD DRIVE PACKAGE**

- Keyboard • 1.2 MB Floppy Drive • 20 MB Hard Drive • 12" Monitor • MS DOS • GW BASIC

**\$1399**



- SAME w/30 MB HARD DRIVE.....\$1449
- SAME w/40 MB HARD DRIVE.....\$1549

## LEADING EDGE

**MODEL D**

**IBM XT COMPATIBLE PKG.**

- 512 K RAM Computer • Keyboard • 360K Floppy Drive • 4.77-7.16 Mhz • 12" Monitor • 8088 2 Processor • MS DOS/GW Basic

**\$689**



- SAME w/TWO 360K FLOPPIES.....\$769
- SAME w/20 MB HARD DRIVE.....\$949
- SAME w/30 MB HARD DRIVE.....\$999
- SAME w/40 MB HARD DRIVE.....\$1089

## AMSTRAD PC1640

- Keyboard • 640K RAM Turbospeed • One 360K Drive • 12" Monitor • FREE Mouse & Software • MS DOS • GW Basic

**\$649**



w/20 MB Hard Card.....\$949

## Commodore COLT

**IBM XT COMPATIBLE PACKAGE**

- Keyboard • Two 360K Floppy Drives • Serial & Parallel Ports • 12" Monitor • MS DOS/GW Basic

**\$699**



## Apple

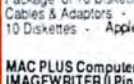
## PACKAGES

**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

**\$1499**



- MAC PLUS Computer Package.....\$1279
- IMAGEWRITER II Printer.....\$149
- MAC SE Computer w/ Dual Drive.....\$2299
- MAC SE Computer w/20MB APPLE Hard Drive.....\$749
- APPLE MAC II w/ Keyboard.....\$3569

## PRINTERS

### EPSON

- FX-1050.....\$489.95
- FX-650.....\$339.95
- LO-500.....\$315.95
- LO-850.....\$309.95
- LO-1050.....\$309.95
- EX-800.....\$419.95
- EX-800.....\$199.95

### STAR

- NX-1000.....\$219.95
- RAINBOW.....\$169.95
- NX-1000.....\$169.95
- NX-15.....\$229.95
- NX-2400.....\$304.95
- NB-2410.....\$409.95

### OKIDATA

- OKI-120.....\$189.95
- Okimate 20.....\$119.95
- Okimate 160.....\$219.95

### Citizen Printers IN STOCK

- 1080I.....\$159.95
- 1092L.....\$299.95
- 1091I.....\$189.95
- KXP-1524.....\$499.95
- KXP-1595.....\$409.95
- KXP-4450 Laser.....\$1549

### TOSHIBA

- 321-SL.....\$449.95

### Dixie Printer For Laptops.....\$309.95

### HEWLETT PACKARD

**Laserjet Series II \$1629**

1 MB Expander \$349 HP DESKJET PRINTER \$689

## 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.....\$569
- NEC MULTISYNC II.....\$579



**Rush Service Available**  
**Call For Details**

**NO ADDITIONAL SURCHARGE FOR CREDIT CARD ORDERS WE WELCOME CORPORATE & EDUCATIONAL ACCOUNTS**

Circle 65 on reader service card



# THE \$29 MONEY MANAGEMENT SOLUTION.

"An exceptional value."

Tom Badgett, PC Clones

**MONEYCOUNTS 5.0**

"I was impressed.  
It wins the cost-effective award."

John Dvorak, PC Magazine

"This is a great program: logical, easy  
to learn, and fast and easy to use."

Lloyd Edwards, Palmetto PC Chronicles

"This program has all the features  
and capabilities of money management  
programs costing 10 times as much."

Leonard Hyre, PCM Magazine

## GUARANTEED.

If you're looking for a complete money management/  
accounting program that offers outstanding value, we  
invite you to examine the evidence on MONEYCOUNTS.  
**It's the clear choice for home and business.**

**MONEYCOUNTS is CPA designed**, easy to use, menu-driven  
with on-line help, and requires no accounting experi-  
ence. You'll appreciate the ease with which MONEY-  
COUNTS 5.0. . . .

- Manages your cash, checking, savings, & credit cards
- Prepares your budget
- Balances your checkbook
- Prints 5 types of financial statements (including net worth)
- Prints 6 types of inquiry reports
- Prints any type of pin-feed check & updates your records automatically
- Prints general ledger & accountant's trial balance
- Handles up to 999 accounts & 100,000 transactions a year with its fast financial data base
- Estimates your 1988 personal income tax
- Analyzes financing options & savings programs — computes interest rates & loan payments — prints amortization and accumulation schedules
- Manages mail lists — zip and alpha sorts — prints labels and index cards
- Displays and prints three-dimensional graphics — works with monochrome or color monitors
- Provides password protection, fiscal year support, pop-up notepad, and much more!

Hard to believe the low price? Don't worry! There's no catch. MONEYCOUNTS has a proven track record, has been on the market over four years, and is continuously receiving rave reviews. **If you're not 100% satisfied, return MONEYCOUNTS within 30 days for a full refund** (excluding shipping). Over 50,000 users have decided in favor of MONEYCOUNTS! Order today and judge for yourself!

### For Same Day Shipping

VISA, MASTERCARD & C.O.D. ORDERS CALL

**1-800-223-6925**

(In Canada, call 319/395-7300)

Weekdays 8:30 a.m. to 9:00 p.m. CST

Saturdays 9:00 a.m. to 5:00 p.m.

Or send check or money order  
payable to Parsons Technology.



375 Collins Road N.E.  
Cedar Rapids, Iowa 52402

Circle 130 on reader service card



Dept. W  
375 Collins Road NE  
Cedar Rapids, Iowa 52402

**MONEYCOUNTS®**  
**Version 5.0**  
**\$29 + \$5 shipping**

NOT COPY PROTECTED  
INCLUDES PRINTED MANUAL

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE/ZIP \_\_\_\_\_ PHONE \_\_\_\_\_

CHECK ☐ MONEY ORDER ☐ VISA ☐ MASTERCARD ☐

CARD # \_\_\_\_\_ EXP. DATE \_\_\_\_\_

MONEYCOUNTS 5.0 requires an IBM or compatible computer, 256K or more RAM, DOS 2.0 or higher, 2 disk drives (or a hard disk). Add \$5 shipping/handling — \$10 outside North America. Iowa residents, please add 4% sales tax.



# HARD DRIVES



**Seagate**

**40Mb ST251**

Includes drive, AT mounting hardware & "Disk Manager" partitioning software

**\$339**

Also available for XT.

**40Mb ST251  
PC/XT KIT**

**\$389**

Includes drive, controller, cables, How-To manual, mounting hardware & partitioning software.

Drives and Kits are available for PS/2 models 25 & 30!

**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 • Autopark

**\$409**

Available for XT or AT  
Includes drive, AT mounting hardware & "Disk Manager" partitioning software

**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



Help is just a phone call away with our Technical Assistance Department!

**65Mb ST277R**

40ms access • Half Height  
Autoparking heads

This drive requires an RLL controller

**\$379**

Includes drive, mounting hardware & "Disk Manager" partitioning software

**150Mb Kits**

These complete kits include Seagate drive, cables, Perstor ADRT controller, How-To Manual, mounting hardware and "Disk Manager" partitioning software. Full Height, 28ms.

**\$788**

With XT Dual Hard Drive Controller.

**\$899**

With AT & 386 Dual Hard/Floppy Controller. Supports 360K, 720K, 1.2Mb & 1.44 Mb Floppies!

**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 & Order Status: (800) 541-8387

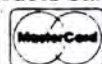
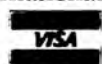
Hard Drives International is a division of Insight Distribution Network, Inc.

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.

PCW1288

**(800) 234-DISK**

International orders call (602) 784-1038



1208 E. Broadway Road #110 • Tempe, AZ 85282

(602) 784-1038 FAX: (602) 829-9193

Circle 313 on reader service card



# The New PC NETWORK

JOIN THE #1 "COMPUTER WAREHOUSE CLUB" FOR BUSINESS

## LASER PRINTERS

NEC LC 890 ..... \$2,950\*

MEMBERSHIP  
SPECIAL BUY

- 35 Resident Fonts
- 4 Standard Interfaces
- 3MB of Internal Memory



LC 890 Toner Cartridge (6PK.) ..... 85.00\*

## MODEMS

THE™ 9600 INTERNAL  
BAUD MODEM

\$399\*



- 1200, 2400 & 9600 Baud • Internal Card • Hayes Compatible • Auto Answer, dial
- External add \$50

## SYSTEMS

THE™ 286 Complete  
\$1,745\*

- 512K Expandable to 1024K RAM • 1.2 MHz Switchable Speed • 101 Key Keyboard • Serial/Parallel/Clock • Designer VGA Graphics Card • Supports CGA, EGA, VGA & Super VGA • High Speed Segate ST-251-1 Hard Drive



BUY NOW AT DISCOUNT WHOLESALE + 8% PRICES!

Panasonic  
Office Automation

IMAGE  
SCANNER  
\$829\*



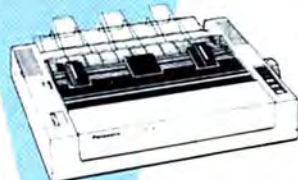
- HOUSTON INSTRUMENTS All models ..... CALL  
HEWLETT PACKARD Scanjet ..... 929.00\*  
PANASONIC FX-RS506 Scanner ..... 1099.00\*  
IOLINE PLOTTERS ..... CALL  
SUMMAGRAPHICS (12x12) ..... CALL

Panasonic  
Office Automation

1091 MDL.2

192/32 CPS,  
10" Per w/tractor

\$165\*



WordPerfect  
Word Processing Software

\$205\*



- Advanced word processing functions
- 100,000 word phonetic dictionary
- Split screen editing
- Use up to 5 different fields at once

## BUSINESS SOFTWARE

- ALDUS Pagemaker 3.0 ..... 479.75\*  
ASHTON TATE dBase III+ ..... 358.00\*  
ASHTON TATE Multimate Adv. II ..... 235.00\*  
BORLAND Paradox 2.0 ..... 379.00\*  
BORLAND Quattro ..... 131.00\*  
BORLAND SideKick Plus ..... 112.11\*  
BORLAND 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 ..... 271.00\*  
MERIDIAN TECH Carbon Copy Plus ..... 100.49\*  
MICROSOFT Excel 2.0 ..... 251.00\*  
MICROSOFT BASIC or Windows 4.0 ..... 60.55\*  
MICROSOFT Word 4.0 ..... 189.00\*  
PEACHTREE Accounting System II ..... 146.45\*  
PETER NORTON Utilities, Advanced ..... 68.75\*  
SYMANTEC Q&A 3.0 ..... 186.85\*  
WORDPERFECT Wordperfect 5.0 ..... 205.00\*

## MONO & COLOR CARDS

- HERCULES Graphics Card Plus ..... 172.00\*  
THE™ Color Card or Mono ..... 105.00\*  
A.T.I. EGA Wonder 800 x 560 ..... 205.00\*  
ORCHID Designer VGA (IBM PC/XT) ..... 287.31\*  
PARADISE Auto Switch 480 ..... 162.00\*  
PARADISE VGA Plus Card ..... 249.00\*  
VIDEO 7 Vega Deluxe 640 x 480 ..... 189.00\*  
VIDEO 7 VGA ..... 249.00\*

MITSUBISHI  
DIAMOND  
SCAN

\$435\*

MEMBERSHIP  
SPECIAL BUY



13" Color Monitor

## MODEMS

- HAYES Smartmodem 2400 ..... 392.89\*  
HAYES Smartmodem 1200 ..... 263.56\*  
THE™ 2400 baud Modem ..... 99.99\*  
THE™ 1200 Baud Modem ..... 79.00\*  
THE™ 2400 Baud modem ..... 129.00\*  
U.S. ROBOTICS HST 9600 ..... 579.00\*

## FLOPPIES & DRIVES

- CMS 360K Ext. PS/2 Floppy ..... 231.29\*  
IOMEGA Bernoulli II 20MB Int ..... 738.00\*  
IRWIN 64MB Internal tape for IBM PS/2 ..... 451.00\*  
IRWIN 145 40MB Internal Tape ..... 419.65\*  
MINISCRIBE 3650 40MB Kit ..... 349.00\*  
MINISCRIBE 3675 60MB HD Kit ..... 389.00\*  
MINISCRIBE 6128110MB RLL Full Ht. .... 659.00\*  
MITSUBISHI 360K 1/2 Ht. Drive ..... 79.79\*  
MITSUBISHI 1MB 3.5" FD ..... 79.79\*  
MITSUBISHI 1.2 MB Floppy 1/2 Ht. .... 85.62\*  
PLUS DEVELOPMENT Hardcard 20 ..... 489.87\*  
PLUS DEVELOPMENT Hardcard 40 ..... 601.82\*  
SEGATE ST-225 20MB Kit ..... 249.00\*  
SEGATE ST-251-1 42MB/40MS HD ..... 399.00\*  
SEGATE ST-4096 80MB Full Ht. .... 529.00\*  
SYSGEN Bridge File 3.5" Ext. Drive ..... 205.00\*

## PRINTERS

### PANASONIC

- 10801 ..... 170.69\*  
1592 ..... 365.00\*  
KX-P4450 Laser ..... 1,469.00\*

### CITIZEN

- 180D ..... 166.65\*  
MSP-45 ..... 425.67\*  
Tribute 224 ..... 551.00\*  
Premier 35 ..... 459.00\*

### EPSON

- LX800 ..... 176.00\*  
LQ500 ..... CALL  
LQ1050 ..... CALL  
FX1050 ..... CALL  
FX850 ..... CALL

### NEC

- P5200 ..... 489.00\*  
P5300 ..... 639.00\*  
P2200 Dot Matrix ..... 317.14\*

### OKIDATA

- ML 393 ..... 865.00\*  
ML 321 ..... 435.00\*  
ML 320 ..... 315.00\*

### HEWLETT PACKARD

- Laserjet II ..... 1,585.00\*  
Deskjet ..... 651.45\*

## COMPUTER SYSTEMS

- AST Premium 286 Model 80 ..... 1,399.00\*  
APPLE Macintosh Plus, SE, MAC II ..... CALL  
COMPAQ Deskpro 286/40MB ..... 2,295.00\*  
COMPAQ Deskpro 386/60MB ..... 4,565.00\*  
COMPAQ Portable III MDL 40 ..... 3,850.00\*  
IBM PS/2 Model 30 CMS 20MB ..... 1,495.00\*  
IBM PS/2 Model 50 ..... 2,290.00\*  
NEC HD, 640L, 2MB, backlit ..... 2,175.00\*  
TOSHIBA T-1000 Laptop w/512K ..... 719.00\*  
TOSHIBA T-1200 DA w/20MB, backlit ..... 2,193.00\*  
TOSHIBA T-5100 w/2MB RAM, 40MB ..... 4,375.00\*  
TOSHIBA T-3200 Laptop ..... 3,395.00\*

1-800-621-SAVE

Corporate & Export  
Order Hotline 1-312-205-1300

Monday-Friday  
8:30AM-6:00PM

Saturday  
10:00AM-4:00PM

All Major Credit Cards Accepted

Tech Support 1-312-205-1410  
Customer Service 1-312-205-1510  
Fax 1-312-205-1525

PW1288

## MULTIFUNCTION

- AST Advantage Premium ..... 295.00\*  
INTEL Above board 286 w/512K ..... 341.00\*  
ORCHID Twin Turbo 286 ..... 241.39\*  
ORCHID Tiny Turbo12 ..... 342.39\*  
THE Multi I/O w/P/S/G/CLK/CAL ..... 50.40\*

REAL BUYING CLOUT-Call now & 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) • Optional software rental library • FREE Wholesale Buyers Guide • FREE UPDATES • Price Protection • Fully Insured 48-hour shipping • 10-day Return policy • FREE Technical Support • FREE Bulletin Board • Products subject to change • All products subject to availability. Join Today For As Little As \$10.

\* All Prices Shown are Wholesale Prices

625 Academy Drive Northbrook, IL 60062



# WE OFFER YOU ABSOLUTELY NOTHING! EXCEPT THE LOWEST PRICES ON COMPUTER PRODUCTS...EVER!



CALL 707 COMPUTER WHOLESALERS **BEFORE** YOU BUY  
**1-800-426-2489**

## DESKTOP COMPUTERS

<b>IBM PERSONAL SYSTEM 2™</b>	
<b>8086 SYSTEMS - 8MHz</b>	
MODEL 25 MONO, 512K, 720 DR	\$1,045.00
MODEL 25 COLOR, 512K, 720 DR	\$1,339.00
MODEL 30-002, 640K, 2-720 DR, MCGA	\$1,259.00
MODEL 30-021, 720 DR, 20MB, MCGA	\$1,699.00
<b>80286 SYSTEMS - 10MHz</b>	
MODEL 30-286, 512K, 720 DR	\$1,499.00
MODEL 50-021, 1MB, 1.4 DR, 20MB, VGA	\$2,609.00
MODEL 50Z-031, 1MB, 1.4 DR, 30MB, VGA	\$2,943.00
MODEL 60-041, 1MB, 1.4 DR, 44MB, VGA	\$3,799.00
<b>80386 SYSTEMS - 16 &amp; 20MHz</b>	
MODEL 70-E61, 1MB, 1.4 DR, 60MB VGA	\$4,400.00
MODEL 70-121, 2MB, 1.4 DR, 121MB, VGA	\$5,799.00
MODEL 80-071, 2MB, 1.4 DR, 70MB, VGA	\$5,330.00
<b>IBM PERSONAL SYSTEM 2™ DISPLAYS</b>	
<b>MONOCHROME 8503</b>	
COLOR-8512 (14")	\$206.00
COLOR 8513 (12")	\$432.00
COLOR 8514 (16")	\$550.00
COLOR 8514 (16")	\$1,150.00

<b>COMPAQ™</b>	
DESKPRO 286/12, MOD 1, 640K, 1.2 DR	\$1,750.00
DESKPRO 286, AS ABOVE W/40MB	\$2,489.00
DESKPRO 286, AS ABOVE W/80MB	\$2,889.00
DESKPRO 386-20E, 1MB, 1.2 DR	\$3,899.00
DESKPRO 386 MODEL 60, 20MHz	\$5,479.00
COMPAQ 386S/16 MODEL 1, 1MB, 1 DR	\$2,900.00
COMPAQ 386S/16 MODEL 20 W/20MB	\$3,424.75
COMPAQ 386S/16 MODEL 40 W/40MB	\$3,900.00
COMPAQ DESKPRO 386/25 MODEL 110	\$7,699.00
COMPAQ DESKPRO 386/25 MODEL 300	\$9,899.00

<b>APPLE™</b>	
APPLE MAC PLUS 1 DR, 1MB, 9" B&W	\$1,349.00
APPLE MAC SE, 1 SLOTT, 2 DR	\$2,379.00
APPLE MAC SE, 1 SLOTT, 1 DR, 20MB	\$2,829.00
APPLE MAC II 80020, 1MB, W/KYBD	\$3,652.00

<b>AST</b>	
AST MODEL 80/90/120/140/170	CALL
AST MODEL 300, 340 & 390	CALL

<b>EVEREX</b>	
EVEREX 286/10 512K, 1.2 DR	\$1,119.00
EVEREX 386/16, 1MB, 1.2 DR	\$1,999.00
EVEREX 386/20, 1MB, 1.2 DR	\$2,295.00

<b>LASER</b>	
LASER XT TURBO 10 MHz W/640K, 20MB	\$1,099.00
2 360 DR, SER-PR, CLK/CAL, TTL MONO	
<b>PACKARD BELL W/NATIONWIDE 1 YEAR SERVICE</b>	
P888 XT TURBO, 512K, 1 360 DR, DOS,	\$639.00
GW-BASIC, SER-PR, COLOR/MONO CARD	
VT286 10 MHz, 0 WAIT, 640K, 1.2 DR	\$1,125.00

<b>WYSE COMPUTERS</b>	
MODEL 2108	\$1,164.90
MODEL 2112	\$1,725.90
MODEL 2200	\$1,391.50
MODEL 2214	\$1,563.50
MODEL 3216	\$2,825.90

<b>LAPTOP COMPUTERS</b>	
MITSUBISHI 286/12, 640K, 2 DR, BKLT	\$1,959.00
MITSUBISHI 286/12, 1 DR, 20MB, BKLT	\$2,459.00
NEC MULTISPEED EL2, 640K, 2 DR, BKLT	\$1,449.00
NEC MULTISPEED HD, V30, 1 DR, 20MB	\$2,279.00
TOSHIBA 1000 80C86/5, 512K, 1 DR	\$789.00
TOSHIBA 1200F 80C86/10, 1MB, 2 DR	\$1,625.00
TOSHIBA 1200FB AS ABOVE W/BKLT	\$1,789.00
TOSHIBA 1200H 80C86, 1MB, 1 DR, 20MB	\$2,237.00
TOSHIBA 1200HB AS ABOVE W/BKLT	\$2,499.00
TOSHIBA 3100-20 286/5, 640K, 20MB	\$2,979.00
TOSHIBA 3100 286/12, 1MB, 1 DR, 40MB	\$3,699.00
TOSHIBA 5100 386/16, 2MB, 1 DR, 40MB	\$4,799.00
ZENITH SUPERSPORT 2 8088, 640K, 2 DR	\$1,589.00
ZENITH SUPERSPORT 286/12, 1MB, 20MB	\$3,499.00

## MONOCHROME MONITORS

AMDEK 410, AMBR/GRN, 12", 720 X 350	\$149.00
AST, B&W, 14", 740 X 350	\$179.50
COMPAQ AMBER, 12", 720 X 400	\$191.00
GOLDSTAR GREEN, 12", 720 X 350	\$75.00
LI, AMBR/GRN, 12", 720 X 350	\$85.00
NEC MONOGRAPH, B&W, 16", 1024 X 1024	\$1,279.00
NEC MULTISYNC GS, B&W, 14", 720 X 480	199.00
PACKARD BELL, AMBR/GRN, 12", 720 X 350	\$79.99
PACKARD BELL, A/B&W, 14", FLAT SCR, T/S	\$129.00
WYSE 530, AMBR/GRN, 14", 720 X 350	\$175.36
WYSE 700, B&W, 15", 1280 X 800	\$699.00

## COLOR MONITORS

AMDEK 600, 13", 640 X 240, .43	\$339.00
AMDEK 722, 13", 720 X 350, .31	\$444.00
GOLDSTAR, 14", 640 X 200, .43	\$239.00
LI, COLOR, 14", 640 X 200, .43	\$269.00
MAGNAVOX CM8762, 14", 640 X 240, .42	\$259.00
SAMSUNG COLOR, 12", 640 X 200, .43	\$259.00
TAXAN 720, 14", 640 X 200, .43	\$299.50

## MONO/COLOR BOARDS

COLOR GRAPHICS, 640 X 200	\$69.00
COLOR GRAPHICS W/PAR, 640 X 200	\$89.00
HERCULES GRAPHICS PLUS, 720 X 348, 64K	\$179.00
HERCULES COLOR W/PAR, 640 X 200, 16K	\$146.00
HERCULES INCOLOR, 720 X 348, 64K BY 4	\$249.00
MONOCHROME GRAPHICS W/PAR, 720 X 348	\$69.85

## EGA/VGA MONITORS

AST EGA, 14", 640 X 350, .31	\$489.00
COMPAQ VGA, 14", 720 X 400, .31	\$524.25
GOLDSTAR EGA, 14", 640 X 350, .31	\$369.00
LI, APPLE VGA, 14", 640 X 480, .31	\$469.00
IMTEC VGA MULTI-MODE, 14", 800 X 560, T/S	\$469.00
MAGNAVOX EGA 9CM043, 14", 640 X 350, .39	\$385.00
MAGNAVOX EGA 9CM062, 14", 640 X 480, .39	\$449.00
NEC MULTISYNC II, 19", 1024 X 768, .31	\$579.00
NEC MULTISYNC PLUS, 14", 960 X 720, .31	\$879.00
NEC MULTISYNC XL, 19", 1024 X 768, .31	\$1,939.00
SAMSUNG EGA, 14", 640 X 480, .31	\$389.00
SONY MULTISCAN 1303, 13", 800 X 600, .31	\$649.00
SPECTRASYN 1437, 14", 800 X 600, T/S	\$499.00
TAXAN 770 MULTISYNC, 14", 800 X 600, .31	\$539.00
TEKNIKA MULTI-MODE-VGA, 13" 900 X 680	\$499.00
ZENITH FTM ZCM-1490, 14", 640 X 480, .28	\$669.00

## EGA/VGA BOARDS

AST VGA, 800 X 600, 256K, 256 COLOR	\$314.50
ATI WONDERBOARD, EGA, VGA, CGA	\$249.00
ATI VGA VIP	\$307.00
BOCA EGA, 640 X 350	\$159.00
COMPAQ VGA, 640 X 480, 256 COLOR	\$449.00
EPIC, 480, EGA, CGA, MDA, HERC, 640 X 480	\$189.00
GENDIA SUPER EGA, HI-RES 640 X 480, 256K	\$215.00
GENDIA SUPER VGA, 800 X 600, 256K	\$275.00
GENDIA SUPER VGA, 768 X 1024, HI-RES	\$389.00
NEC MVA 1024, 384K	\$949.00
NEC MVA 1024 ENHANCED, 768K	\$1,049.00
ORCHID DESIGNER VGA, 640 X 480, 256K	\$289.00
PARADISE VGA, 800 X 600, 256K	\$296.00
PARADISE VGA PROFESSIONAL, 800 X 600, 256K	CALL
PARADISE AUTOSWITCH EGA, 640 X 480	\$199.00
STB AUTOEGA, 640 X 350, 768K, 64 COLOR	\$149.00
STB VGA EXTRA, 640 X 480, 256K, 256 COLOR	\$259.00
VIDEO 7 VEGA DELUXE, 640 X 480, 256K	\$239.00
VIDEO 7 VEGA, 640 X 480, 256K, 256 COLOR	\$299.00

## TERMINALS

WYSE MODEL 30 AMBER OR GREEN	\$299.00
WYSE MODEL 50 AMBER OR GREEN	\$369.00
WYSE MODEL 60 AMBER, GREEN, B&W	\$309.00
WYSE MODEL 60 KEYBOARD	\$100.00
WYSE MODEL 85 AMBER OR GREEN	\$375.00

## NOVELL NETWORKING

<b>TURNKEY NETWORK SYSTEM</b>	
10MHz 286 FILE SERVER, ARCNET PC TERMINALS, LOADED NETWORK, CABLES, TERMINATORS AND TEES. EVERYTHING - PLUG IN & TURN ON!	
4-USER (40MB)	\$6,699.14
6-USER (80MB)	\$8,988.75
8-USER (80MB)	\$11,999.25
<b>OPERATING SYSTEMS</b>	
ADV. NETWORK 286 V2.12	\$1,999.49
ADV. NETWORK 286 V2.12 SFT	\$2,999.20
ELS 4-USER SOFTWARE	\$499.89
ELS 8-USER SOFTWARE	\$1,074.69
<b>CARDS</b>	
ARCNET (8 BIT) PC/XT	\$165.09
** NOVELL TRAINED SERVICE PERSONNEL ON STAFF TO HANDLE YOUR INQUIRIES **	

## DISK DRIVES

BERNOULLI BOX 10 + 10	\$1,395.10
BERNOULLI BOX 20 + 20	\$1,599.70
BERNOULLI NON BOOTABLE CONTROLLER	\$159.85
BERNOULLI BOOTABLE CONTROLLER	\$209.49
COMPAQ 360K F.H. FDD PC/XT	\$47.72
FUJITSU 360K, H.H. FDD PC/XT	\$69.79
MAXTOR 1140 116MB, F.H., 27MS FOR AT	\$1,129.08
MAXTOR 4380S 320MB, F.H., 27MS W/SCSI	\$2,999.14
MINISCRIBE 20MB, H/H, 68MS W/MFM	\$299.55
MINISCRIBE 60MB, H/H, 61MS W/MFM	\$450.79
MINISCRIBE HARD DISK CARD 20MB	\$399.22
MINISCRIBE HARD DISK CARD 30MB	\$419.90
MINISCRIBE 40MB, H/H FOR AT	\$350.35
PLUS HARDCARD 20MB, PC/XT	\$550.99
PLUS HARDCARD 40MB, PC/XT	\$670.05
PRIMA 130MB, F.H., 20MS FOR AT	\$159.88
SEAGATE ST225 20MB, H/H, 65MS W/MFM	\$259.25
SEAGATE ST238 30MB, H/H, 65MS W/RLL	\$299.11
SEAGATE ST251 40MB, H/H, 40MS FOR AT	\$399.71
SEAGATE ST251-1 40MB, H/H, 28MS FOR AT	\$449.05
SEAGATE ST1251-PS2 20MB, H/H, FOR PS/2 MODELS 25 & 30	\$359.99
SEAGATE ST4096 80MB, F.H., 28MS W/WS	\$699.90
TAXAN EXT, 360K FDD FOR PS/2	\$239.25

## TAPE DRIVES

ARCHIVE 40MB INT XT/AT	\$339.59
ARCHIVE 60MB INT XT/AT	\$599.42
IRWIN 10MB INT XT/AT	\$259.93
IRWIN 20MB INT XT/AT	\$319.56
IRWIN 40MB INT XT/AT	\$449.47
MOUNTAIN 40MB INT/EXT	IN STOCK
MOUNTAIN 150MB EXT	\$1,699.17
WANGTEK 60MB INT XT/AT	\$599.00

## MODEMS

EVEREX 1200 BAUD INT	\$109.77
EVEREX 2400 BAUD INT	\$199.89
EVEREX 2400 BAUD EXT	\$289.19
HAYES SMARTMODEM 1200B INT W/SW	\$289.30
HAYES SMARTMODEM 1200B INT	\$250.72
HAYES SMARTMODEM 1200 EXT	\$289.66
HAYES SMARTMODEM 2400B INT W/SW	\$424.09
HAYES SMARTMODEM 2400B INT	\$379.88
HAYES SMARTMODEM 2400 EXT	\$424.61
PACKARD BELL 2400 BAUD INT	\$169.10
MODEM W/ (PRO COM) SW	
PACKARD BELL 2400 BAUD EXT	\$199.49
USR SPORTSTER 1200 HALF CARD INT	\$108.52
USR SPORTSTER 1200 EXT	\$128.30
USR SPORTSTER 2400 INT W/SW	\$179.18
USR COURIER 2400 EXT W/ERROR-CORR	\$329.73
USR COURIER HT59600 EXT	\$649.00
IBM S250 EMULATION 2.12 CONV. KIT	\$633.75
EXTERNAL MODEM CABLES	\$15.99

ARCNET (16 BIT) 286/386	\$359.20
ETHERNET	\$259.88
ETHERLINK PLUS AT	\$699.10
MICROCHANNEL CARDS PS/2	\$399.99
<b>WORK STATIONS</b>	
ARCNET PC TERMINAL 10MHz, 256K	\$799.03
ETHERNET PC TERMINAL 8MHz, 256K	\$799.79
ESPIRIT LANTERN 8MHz, 768K	\$1,149.92
<b>MISC. NETWORKING ITEMS</b>	
WANGTEK 60MB TAPE BACKUP (F-5)	\$699.59
ARCNET ACTIVE HUB	\$499.75
ARCNET PASSIVE HUB	\$85.14
ELGAR MONITOR 1000 WATT UPS	\$899.72
NOVELL UPS MONITOR BOARD	\$75.89
NOVELL COMPUTER-BASED TRAINING	CALL
DISK CO-PROCESSOR BOARD	\$349.00
NETWORK FOR MACINTOSH SOFTWARE	\$200.00

## PRINTERS W/ FREE CABLE

IBM PROPRINTER II, 9 PIN, 80 COL, 240 CPS	\$439.25
IBM PROPRINTER XL, 132 COL, 240 CPS	\$799.00
IBM QUIETWRITER III, 132 COL, 274 CPS	\$1,249.00
CITIZEN 120 D, 9 PIN, 132 COL, 120 CPS	\$149.00
CITIZEN 160 D, 9 PIN, 80 COL, 180 CPS	\$169.00
CITIZEN MSP 50, 8 PIN, 80 COL, 300 CPS	\$399.00
CITIZEN MSP 55, 132 COL, 300 CPS	\$499.00
DICOMEX 150P - BATTERY POWERED PORT	\$319.00
DICOMEX 300 INKJET, 132 COL, 150 CPS	\$529.00
EPSON EX 800, 9 PIN, 80 COL, 300 CPS	\$459.00
EPSON FX 1050, 9 PIN, 132 COL, 264 CPS	\$539.00
EPSON LQ 500, 24 PIN, 80 COL, 180 CPS	\$369.00
EPSON LQ 850, 24 PIN, 80 COL, 264 CPS	\$549.00
EPSON LQ 1050, 24 PIN, 132 COL, 264 CPS	\$765.00
EPSON LQ 2550, 24 PIN, 132 COL, 324 CPS	\$979.00
EPSON LX-800, 9 PIN, 80 COL, 180 CPS	\$219.00
HP LASERJET SERIES II, 8 PG/MIN	\$1,699.00
HP DESKJET INKJET, 4 PG/MIN	\$695.00
NEC LC-890 LASER, 8 PG/MIN	\$3,399.00
NEC P2200, 24 PIN, 80 COL, 170 CPS	\$359.00
NEC P5200, 24 PIN, 80 COL, 265 CPS	\$529.00
NEC P5300, 24 PIN, 136 COL, 265 CPS	\$679.00
NEC P960 XL, 24 PIN, 136 COL, 400 CPS	\$1,025.00
NEC 3550 SPINWRITER, 136 COL, 35 CPS	\$799.00
NEC 8850 SPINWRITER, 136 COL, 65 CPS	\$1,169.00
OKIDATA ML182 +, 9 PIN, 80 COL, 240 CPS	\$243.49
OKIDATA ML292E, 18 PIN, 80 COL, 240 CPS	\$377.44
OKIDATA ML293E, 18 PIN, 136 COL, 240 CPS	\$515.50
INTERFACE MODULE FOR 292/293	\$94.99
OKIDATA ML320, 9 PIN, 80 COL, 300 CPS	\$369.00
OKIDATA ML321, 9 PIN, 136 COL, 300 CPS	\$470.00
OKIDATA ML390, 24 PIN, 80 COL, 270 CPS	\$469.00
OKIDATA ML391, 24 PIN, 136 COL, 270 CPS	\$538.00
OKIDATA ML393, 24 PIN, 136 COL, 450 CPS	\$949.00
PANASONIC 1080i, 9 PIN, 80 COL, 144 CPS	\$159.00
PANASONIC 1091i, 9 PIN, 80 COL, 192 CPS	\$189.00
PANASONIC KX-P1524, 130 COL, 240 CPS	\$579.00
PANASONIC KX-P1595, 130 COL, 240 CPS	\$475.00
PANASONIC LASER PARTNER, 12 PG/MIN	\$1,599.00
STAR MICRONIX NX-15, 130 COL, 120 CPS	\$332.00
STAR MICRONIX NX-1000C, 80 COL, 144 CPS	\$195.00
TOSHIBA P321 SL, 24 PIN, 80 COL, 216 CPS	\$482.00
TOSHIBA P341 SL, 24 PIN, 132 COL, 216 CPS	\$699.00
TOSHIBA P351 SX, 24 PIN, 132 COL, 360 CPS	\$1,019.00

## FAX MACHINES

CANON FAXPHONE 8, G3, 40 SEC/PG	\$999.00
MURATA M1200, G2/G3, 18 SEC/PG	\$775.00
MURATA M1600, G2/G3, 18 SEC/PG	\$975.00
SHARP FO-300, G2/G3, 18 SEC/PG	\$1,220.00
SHARP FO-420, G2/G3, 18 SEC/PG	\$1,379.00
SHARP FO-500, G2/G3, 15 SEC/PG	\$1,649.00
TOSHIBA T3000, G3/G3, 1PG, 15 SEC/PG	\$1,055.00
TOSHIBA T3300, G2/G3, 5 PG, 15 SEC/PG	\$1,225.00
TOSHIBA T3700, G2/G3, 15 SEC/PG, AUTO	\$1,555.00



# 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.*

## WHY BUY FROM CDW™?

Because **Computer Discount Warehouse™** has a well-recognized commitment to customer satisfaction.

In a survey of a random sampling of over 40,000 customers:

- ✓ nearly 95% responded that they would recommend us to a friend.
- ✓ 95% said that our product selection was better than average
- ✓ 97% approved of the product knowledge of our salespeople.

James Martin, Publisher of *PC World Magazine* wrote to **CDW™**,

*"Thank you for your customer orientation and excellent service record. . . I do not know how you do it, but I hope you keep it up."*

✓ **Because we are so well recommended.**

### Continuing Commitment

To improve on our obligation to serve our customers well, **CDW™** has:

- ✓ on-line computerization with automated tracking
- ✓ **\$5,000,000.00**, in inventory
- ✓ Founding members of the Micro-computer Marketing Council.

### For The Long Term

And our dedication to you is long term. Founded in March, 1984, **CDW™** has grown from a small local computer dealer to a nationwide supplier of computers, peripherals and software. Our growth is testimony to how well we treat our customers. We would like to thank our current customers for their interest, and invite everyone else to find out why **CDW™** comes so well recommended.



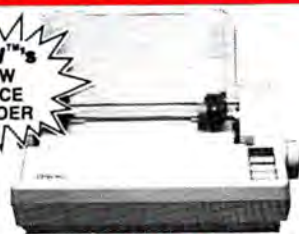
# COMPUTER DISCOUNT WAREHOUSE

**OVER  
\$4,000,000.00  
INVENTORY  
IN STOCK**

**ALL EPSON®  
Printers  
in Stock for  
Immediate Shipment**

**WHY PAY  
RETAIL?**  
*Nobody Sells*  
**EPSON® For Less**

CDW's  
LOW  
PRICE  
LEADER



**LX-800**

from **\$199<sup>00</sup>**

**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



**BRAND  
NEW  
MODEL**

**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.



**EX-800**

- 300 cps (12 CPI) in draft mode
- 54 cps in Near Letter Quality
- 8K buffer
- 8 typesets
- 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



**BEST  
SELLING  
9-PIN  
PRINTERS**

**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!**

Nationwide Toll Free

**CDW™ stocks a full line  
of products to  
support every  
computer need.**

**(800) 233-4426**

In Illinois  
(312) 498-1426

FAX  
(312) 291-1737

Credit card charges  
are not submitted  
prior to time of  
shipment



CHARTER MEMBER  
**MMC**  
MICROCOMPUTER  
MARKETING COUNCIL  
of the Direct Marketing Association, Inc.  
MEMBER



# COMPUTER DISCOUNT WAREHOUSE™

## PACKARD BELL with Seagate

PB88 w/20 MByte Seagate	.....\$897.66
PB88 w/30 MByte Seagate	.....\$916.63
PB88 w/40 MByte Seagate MByte	.....\$984.31
VT286 w/40 MByte Seagate	.....\$1688.30
VT286 w/40 MByte (28 ms) Seagate	.....\$1779.75
VT286 w/70 MByte Seagate	.....\$2041.90



## WHY PAY RETAIL?

**Nobody Sells For Less**

CALL FOR LOWEST CUSTOM QUOTES

## TOSHIBA

3100 w/20 Meg	.....\$2998.50
1000	.....\$779.41
1200	.....\$2355.55
1200, 2 Floppy	.....\$1612.35
3200	.....\$3675.65
5100	.....\$4698.82



## SAMSUNG



S-300 4/8 MHz, 512K, 6 Slots S/P/C, Monographics board, DOS, Keyboard	.....\$749.50
S-300, 1 Floppy	.....\$989.95
S-300, 20 Meg	.....\$1117.82
S-500 AT Compatible 8/10 MHz, 8 Slots, S/P/C, Monographics Board, DOS, Keyboard	.....\$1095.45
S-500, 1.2M Floppy	.....\$1469.80
S-500, 20 Meg	.....\$1624.45



## 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

# HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

## COMPUTERS

MDL 70	.....\$1335.20
MDL 80	.....\$1639.70
MDL 90	.....\$1936.15
MDL 120	.....\$2280.05
MDL 140	.....\$2649.55

MDL 30, 2 dr	.....\$1272.20
MDL 30, 20 Meg	.....\$1699.70
MDL 60, 40 Meg	.....\$3440.15
MDL 60, 70 Meg	.....\$3567.50
MDL 80, 111 Meg	.....\$5960.80
MDL 30286	.....\$1980.80

286 Mdl 1	.....\$1795.55
286 Mdl 2	.....\$2495.20
286 Mdl 3	.....\$2798.20
386 Mdl 60	.....\$4853.30
386 Mdl 130	.....\$6945.92
386 Mdl 20	.....\$4095.35
386 Mdl 25MHz	.....\$6995.95
386 Mdl 30	.....\$8995.80

T3100 20 Meg	.....\$2998.50
T3200	.....\$3575.65
T1000	.....\$779.41

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

MDL 2108	.....\$1170.50
MDL 2112	.....\$1695.20

Supersport Model 2	.....\$689.00
Supersport Model 20	.....\$1199.00
Supersport 286 Model 20	.....\$1599.00
Supersport 286 Model 40	.....\$1999.00

## DRIVES, TAPES & HARDCARDS

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
GENOA 60 Meg int. tape / ext. tape	.....\$734.60 / \$895.10
GENOA 150 Meg int. tape	.....\$1078.85
IOEGA 20 + 20 External 5 1/4	.....\$1795.73
IRWIN 20 M / 40 M Internal Tape	.....\$399.10 / \$399.20
MINISCRIBE 40M / 80Meg 28ms	.....\$619.40 / \$795.45
MOUNTAIN 4440 int. / ext.	.....\$385.80 / \$557.75
MOUNTAIN 150M Filesafe	.....\$1144.62
PLUS Passport 20	.....\$479.10
PLUS Passport 40	.....\$599.88
PLUS 20 & 40 System Kit	.....\$489.75
PLUS P52 MC System Kit	.....\$585.58
PRIM 40 Meg 80 Meg	.....\$695.55 / \$895.95
SEAGATE 30 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
SEAGATE 4096 80 Meg hard disk	.....\$645.10

HARDCARDS	.....\$569.55
PLUS DEVELOPMENT 20 Meg	.....\$569.55
PLUS DEVELOPMENT 40 Meg	.....\$749.80
WESTERN DIGITAL 30 Meg	.....\$416.30

## PRINTERS

DFX5000	.....\$1050.00
EX800	.....\$500.00
FX86	.....\$1050.00
FX850	.....\$1050.00
FX1050	.....\$1050.00
FX1050	.....\$1050.00

Pro Printer II	.....\$429.95
Pro Printer X24	.....\$529.80

P560XL	.....\$914.75
P2200	.....\$369.65
3550	.....\$158.12
P950XL	.....\$1067.70

ML 182S	.....\$279.76
ML 182P	.....\$232.50
LASERLINE 6	.....\$1268.69
ML 294	.....\$737.10
ML 320	.....\$346.63

10801	.....\$179.60
1124	.....\$344.97
10921	.....\$324.28
1595	.....\$459.45
3151	.....\$446.52

120D	.....\$199.55
MSP40	.....\$299.80
MSP50	.....\$352.10

P321SL	.....\$485.85
P341SL	.....\$619.17

H-P Laser Jet Model 2	.....\$1719.40
AST Turbolaser P/S	.....\$689.00
NEC LC890	.....\$1999.60
PANASONIC Laser	.....\$1599.35
TOSHIBA PageLaser	.....\$2530.20

1023	.....\$3838.38
1042	.....\$7539.95

DXY-885	.....\$1149.79
DXY-990	.....\$1457.82

12x12	.....\$376.30
12x18	.....\$632.50

HEWLETT PACKARD HP7440A	.....\$968.30
HP7475A	.....\$1417.44
HP7550	.....\$2926.56
HP7570 - LOWEST PRICE	.....\$2926.56
HP SCANJET	.....\$1417.44

SHARP FO-220	.....\$985.40
SHARP FO-300	.....\$1225.10
SHARP FO-420	.....\$1399.95

HOUSTON INSTRUMENTS HI DMP-41/42	.....\$99.99
HI DMP-52/52MP	.....\$99.99
HI DMP-56A	.....\$99.99
HI DMP-61/62	.....\$99.99

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

## NOVELL NETWORKING

SANTA CLARA Diskless Workstation	.....\$640.40
WESTERN DIGITAL 3 Node LAN kit	.....\$720.34
Entry-level 286 Starter Kit, 4 Users	.....\$489.90
Entry-level 286 Starter Kit, 8 Users	.....\$1676.34
NOVELL 286 Software V. 2.11	.....\$1676.34
NOVELL SFT Netware Level II V2.1	.....\$2757.60

ARCNET PC110 LANBoard PS2	.....\$539.40
ARCNET PC110 LANBoard	.....\$179.27
ARCNET PC210 LANBoard	.....\$219.50
ETHERNET Interface Connector	.....\$329.80
ETHERNET Plus Board (for 286)	.....\$698.74
G-NET Interface Card w/cable	.....\$296.52
TIARA 110 Lan Board	.....\$149.80
WESTERN DIGITAL Ethernet Cards	.....\$269.10

ARCNET Passive Hub	.....\$74.00
ARCNET Active Hub	.....\$419.98
Ethernet Terminators	.....\$39.50
Novell Keyboard 2.11	.....\$78.40

WYSE 50, Amber or Green	.....\$373.40
WYSE 60, Amber or Green	.....\$299.10
WYSE 85	.....\$399.20

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 1200	.....\$289.60
1200B	.....\$269.20
2400	.....\$424.68

Courier 1200	.....\$179.80
Courier 2400	.....\$299.80
1200B	.....\$108.45

1200 Int.	.....\$194.50
1200 Plus	.....\$228.88

BC-450	.....\$419.78
BC-1200	.....\$765.55
BC-2000	.....\$1179.80

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

500 Watt	.....\$560.05
800 Watt	.....\$638.50

## SOFTWARE

WORDPERFECT 5.0 5 1/4 / 3 1/4	.....\$219.90 / \$228.90
dBase III+ 5 1/4 / 3 1/4	.....\$399.00 / \$424.00
LOTUS 1-2-3 5 1/4 / 3 1/4	.....\$305.00 / \$327.00
Paradox Version 2.0	.....\$424.00
Ventura Software Version 1.1	.....\$499.00
MICROSOFT Word V.4 / Excell	.....\$243.50 / \$319.30

CDW™ color/mono cards w/p	.....\$99.00 / \$89.00
HERCULES color/mono cards w/p	.....\$146.14 / \$179.84
TAXAN mono card w/p	.....\$89.00
AT&T Monochrome Monitor	.....\$189.40
AMDEK 410A	.....\$149.99
AMDEK 1280	.....\$679.78
COMPAQ Mono / VGA Mono	.....\$193.10 / \$209.95
IBM PS2 8503	.....\$209.95
IBM PS2 8512 / 8513	.....\$436.40 / \$519.20
NEC Multisync GS	.....\$224.52
NEC Monograph	.....\$1297.25
PGS MAX 12E	.....\$139.40
PACKARD BELL Green or Amber	.....\$89.95
TAXAN 123 Green / 124 Amber	.....\$CALL

AMDEK color 600T / 722	.....\$349.24 / \$444.49
SAMSUNG RGB Comp	.....\$248.60
TAXAN 720	.....\$299.80
MAGNAVOX 8762	.....\$259.05

COMPAG VEGA monitor	.....\$548.68
MAGNAVOX 943EGA	.....\$365.40
MITSUBISHI Diamond Scan	.....\$522.20
NEC Multisync II / PLUS	.....\$599.76 / \$888.10
NEC Multisync XL 19 inch	.....\$1989.46
PACKARD BELL VEGA Monitor	.....\$389.95
PGS Ultrasync	.....\$525.33
SONY Multiscan 1303 / 130P	.....\$599.45 / \$685.25
TAXAN 770 + / 765	.....\$IN STOCK
ZENITH Z-1490	.....\$679.31

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.15

ATI Wonder Card	.....\$289.24
GENOA 5100 / 5200	.....\$234.34 / \$330.55
PARADISE VGA	.....\$297.68
ORCHID VEGA	.....\$278.14
VIDEO-7 VGA	.....\$299.1



## WordPerfect 5.0



**\$215**

List \$495

The most popular word processor is now even better than ever! Version 5.0 adds multiple font support, graphics integration, page preview and much more. WordPerfect 5.0, still retains its feel and ease of use that made it #1. Combine this with the best support in the industry and you can't lose.

## SPECIALS

**TOSHIBA T1000 \$749**



The Toshiba T1000 is the perfect second PC! It comes with 512K of ram, a 720K floppy drive, a supertwist LCD screen and MS-DOS in rom! All this in a battery-powered 7 pound package. A 768K ram card is just \$269 and can be set as base, expanded, or a non-volatile ram disk.

## TOSHIBA Printers



These 24 pin models are loaded with features and are priced right. You can select multiple fonts and pitches right from the menu-driven front control panel. With paper parking, you can insert a single sheet without removing the continuous form paper. All this and multiple emulations with no dip switches.

**P321SL Narrow \$459**  
**P341SL Wide \$629**

## HARDWARE

### PRINTERS

Citizen	LIST	FAST
120D	229	145
180D	259	165
MSP40-55		Call
Tribute 124	699	449
Tribute 224	949	599
Diconix 150P	499	299
Epson		Call
Fujitsu DL3400	995	549
NEC		
P2200	569	339
P5200	799	509
P5300	1049	669
P5XL	1295	Call
LC890	4799	Call
Okidata		
182 Plus	319	219
292 (Req. Interface)	539	349
320	499	329
390	699	469
393 (Req. Interface)	1399	915
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	185
KXP1592	699	389
KXP1595	749	419
KXP1524	949	519
Star		
NX1000	289	169
NX2400	499	339
NB2410	699	449
Toshiba		
P321SL	749	459
P341SL	999	629
P351SX	1499	929

### BOARDS

AST	LIST	FAST
Hot Shot 286	645	339
Six Pak Plus 64K	210	119
Everex		
1200B Int Modem	149	73
2400B Int Modem	249	149
Genoa		
Super EGA Hi-Res+	399	175
Super VGA #5100	445	239
VGA Hi-Res #5200	645	359
Hercules		
Graphic Card +	299	169
Intel		
8087-2	250	149
80287-8	410	239
80287-10	480	269
Above Board 286	645	Call
Orchid		
VGA	399	229
Designer VGA	545	299
Tiny Turbo 286	445	269
Twin Turbo 12mhz	645	369
Paradise		
Basic EGA	199	Call
Autoswitch 480	349	169
VGA Plus	399	259
VGA Professional	599	369
5 Pack OK	129	59
Practical Peripherals		
1200B Int Modem	99	65
2400B Int Modem	199	149
Prometheus		
Promodem 2400B	199	129
Promodem 2400G	249	159

### The Complete PC

Answering Machine	349
Fax	499
Hand Scanner	249
USRobotics	
1200 Baud Internal	149
1200 Baud External	179
2400 Baud External	249
2400 Baud External	279
Video 7	
Fast Write VGA	549
Vega Deluxe	379
Vega VGA	499
V-RAM VGA	799

### LAPTOPS

Mitsubishi	
MP-286L Dual	3195
MP-286L 20mb	4595
NEC	
Multispeed EL II	2295
Multispeed HD	3695
Sharp	
Toshiba	
T1000	1249
T1200F	2099
T1200FB Backlit	2399
T1200H	3499
T1200HB Backlit	3599
T3200	5799
T5100	7499
Zenith	
SuperSport Dual	2399
SuperSport 20mb	3599
SuperSport 286	4999

### MONITORS

Amdek	LIST	FAST
1280	999	669
210A	129	89
310A Limited Offer!	230	75
Magnavox		Call
Mitsubishi		
1409 RGB	399	259
1410 EGA	599	399
Diamond Scan 1381	799	489
NEC		
Multisync II	899	575
Multisync GS	279	189
Multisync Plus	1399	869
Princeton		
Max15	389	Call
Ultrasync	849	479
Sony		
1302 Multiscan	995	659
1303 Multiscan	825	499
Zenith 1490	999	599

### DISK DRIVES

Miniscribe	
40MB AT #3650	499
Mitsubishi	
40MB AT MR535 22ms	825
Seagate	
20MB XT Kit #225	599
30MB XT Kit #238	699
30MB AT #138	599
40MB AT #251	899
80MB AT #4096	1199
Toshiba	
360K Floppy	119
720K 3.5" Floppy	149
1.2MB 5.25" Floppy	149

**Call On Non-Listed Items**

## SOFTWARE

### Database

Clipper	LIST	FAST
Clipper	699	379
DataEase	600	379
dBase III+	699	359
dBXL Diamond	199	105
Foxbase Plus	395	185
Paradox	725	399
Quartz	795	449
RapidFile	295	179
Rbase for DOS	700	419
Reflex	150	84
Q & A	349	179
Desktop Publishing		
Byline	295	175
GEM Desktop Pub.	299	169
Pagemaker 3.0	795	Call
PFS:First Publisher	129	69
Publisher's Paintbrush	285	149
Ventura 2.0	895	459
Financial		
Bedford Integr. Acct.	249	149
BPI	Call	Call
Computer Associates	Call	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 II	199	149

### Graphics

Boeing Graph	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	49
Graph Plus	495	299
Harvard Graphics	495	Call
PrintMaster Plus	60	27
Integrated		
First Choice	159	85
Works	149	89
Windows 286	99	59
Windows 386	195	117
Mice		
Logitech C7 Serial/Bus	119	65
Logitech HiRes Bus	150	83
Microsoft Serial/Bus	150	95
Microsoft W/ Windows	200	129
PC Mouse II Serial/Bus	149	84
Power Protection		
Curtis Ruby Plus	115	59
Datasheild 85	90	50
Datasheild 100	99	57
Isobar 4-6	80	42

### Programming

Macro Assembler	LIST	FAST
Macro Assembler	150	89
Norton Guides (Specity)	100	58
Turbo Basic	99	58
Turbo C 2.0 New!	149	87
Turbo Pascal 5.0 New!	149	87
Quick Basic	99	59
Quick C	99	59
Spreadsheets		
Excel	495	Call
Lotus	495	Call
Lucid 3-D	149	79
Plan Perfect	395	189
Quattro	248	139
Worksheet Utilities	100	55
Utilities		
CoreFast	149	87
Desklink	170	95
Desqview	130	73
Fastback Plus	189	87
Formtool	95	54
Laplink Plus	140	77
Norton Advanced	149	74
PC Tools Deluxe	80	36
Sidekick Plus	195	119
XTree	70	34

### Word Processors

Easy Extra	LIST	FAST
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	60	47
Word	450	Call
Word Perfect	495	Call
Word Perfect Library	129	59
WordStar Prof. 5.0	495	219
XyWrite III Plus	445	299

**Call On Non-Listed Items**

**TERMS:** Most Orders Ship Within 48 hours. 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. No returns on used items. COD's add 5%, restrictions apply. Personal/company checks delay shipping. Compatibility not guaranteed. Prices/availability 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.





# COMPUTERS FROM IOWA SURPASS ALL OTHERS!

Gateway 2000 has unsurpassed systems, at incredible prices, backed with our excellent service.  
As noted by our customers:



*"We are very happy that our system is at the top of the stack in both price and performance, but it is your courteous service that is uncontested by the competition."*

— Pierce Haviland — Kingston, NY

*"Overall, I feel that your product is outstanding and your service has been excellent."*

— Eric Shogren — Stonington, CT



## 12 Mhz 286 EGA

512K 80NS Ram  
Expandable to 4 Megs on MB  
1.2 Meg 5 1/4" Drive  
1.44 Meg 3.5" Drive  
40 Meg Hard Drive  
1 to 1 Interleave  
14" EGA Monitor  
EVEREX EGA CARD  
1 Parallel / 2 Serial Ports  
101 Key Keyboard  
MS DOS w/GW Basic

**\$1895.00**

## 16 Mhz 286 VGA

1 Meg 70NS Ram  
0 Wait State S.I. 17.3  
1.2 Meg 5 1/4" Drive  
1.44 Meg 3.5" Drive  
40 Meg Hard Drive  
1 to 1 Interleave  
EVEREX VGA Board  
Paper White VGA Mon.  
1 Parallel / 2 Serial Ports  
101 Key Keyboard  
MS DOS w/GW Basic

**\$2295.00**



## 20 Mhz 386 VGA

1 Meg 60NS Ram  
1.2 Meg 5 1/4" Drive  
1.44 Meg 3.5" Drive  
80 Meg Hard Drive  
1 to 1 Interleave  
EVEREX VGA Board  
14" Multisynch Monitor  
800 x 600 Resolution  
1 Parallel / 2 Serial Ports  
101 Key Keyboard  
MS DOS w/GW Basic  
80287 and 80387 Sockets  
Tower Case

**\$3795.00**

Call for 25 Mhz option

Same 386 as shown  
but mono desktop.

**\$2995.00**



Steve Apiki & Stanford Diehl  
Oct. 1988, **BYTE**  
Review of 20 386

- "Emerging as truly exceptional..."
- "The Gateway delivers speed without sacrificing features."
- "The system ran without a glitch."
- "We were truly surprised to see a system of this caliber selling for less than \$3000."
- "When evaluating the whole package, The GATEWAY 386 surpasses all the others!"



Gateway 2000 • P.O. Box 2000 • Sgt. Bluff, IA. 51054

**800-233-8472 / 712-943-2000**

All systems have a 30 day Money Back Guarantee and 1 Year Warranty.  
Due to the Volatility in the DRAM Market all prices subject to change.

Circle 227 on reader service card



**BULLDOG  
EXERCISES  
LOW PRICES!**

# COMPAQ

386 Desk Pro 40/60/130  
**\$3950/4895/6289**

286 Desk Pro 12 mhz.....**1695**

Compaq II Model IV.....**2879**

Compaq Port. 386  
Model 40/100.....**5649/7199**

Compaq III  
20mb/40mb.....**3595/4150**

Compaq 386-S model  
1/20/40.....**2925/3465/4150**

Compaq 386-25 110/300  
.....**7195/9395**

*90 day warranty through Bulldog*

**IBM**

## PERSONAL SYSTEM/2

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

## MATH COPROCESSORS

80387-20 .....	<b>\$689</b>
80387-25 .....	<b>839</b>
803-87-16 .....	<b>449</b>
802-87-8 .....	<b>229</b>
80287-10 .....	<b>269</b>
8087-3/8081-2 .....	<b>104/149</b>
256K Chips/64K Chips .....	<b>Call</b>

## COMPATIBLE

## 8 MHZ TURBO

1 floppy, 640K, AT style keyboard,  
game port, clock/calendar, monograph-  
ics card, mono monitor .....**\$799**  
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.....	<b>\$1150</b>
<b>Bulldog 386</b> 16 mhz, 1 mb Ram, 1.2 floppy.....	<b>\$1850</b>

## 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.....	<b>1549</b>
NEC Multispeed HD .....	<b>2299</b>
Toshiba 1000 .....	<b>780</b>
Toshiba 1200.....	<b>2299</b>
Toshiba 1200F.....	<b>1395</b>
Toshiba 3100.....	<b>3095</b>
T3200.....	<b>3745</b>
T5100.....	<b>4795</b>
Zenith Super Sport 20 mb.....	<b>2325</b>
Zenith Super Sport 286 20 mb.....	<b>3449</b>

## GRAPHICS CARDS

ATI VGA.....	\$269
EVEREX MICRO ENHANCER.....	135
GENOA SUPER HI RES.....	199
GENOA VGA 5100/5200.....	300/429
HERCULES GRAPHICS .....	181
HERCULES IN COLOR .....	289
ORCHID DESIGNER VGA.....	299
PARADISE Auto Switch 480 .....	179
PARADISE VGA Plus.....	265
PARADISE VGA Professional.....	399
QUADRAM EGA PLUS .....	179
w/mouse .....	239
STB CHAUFFEUR HT.....	135
STB Multi Res. II .....	169
VEGA DELUXE.....	189
VEGA VGA.....	265

## MULTI FUNCTION BOARDS

AST Advantage w/128K.....	<b>\$229</b>
AST Advantage Premium w/512K.....	<b>319</b>
AST 6 PACK PLUS w/384K.....	<b>245</b>
AST 5251-11 PLUS Enhanced .....	<b>589</b>
AST RAMPAGE 286 .....	<b>383</b>
AST RAMPAGE 286-2	
for MODEL 50/60 .....	<b>549</b>
AST HOTSHOT .....	<b>355</b>
EVEREX MINI MAGIC w/o K.....	<b>59</b>
FAST 88/V20 w/Switch .....	<b>89</b>
INTEL Above Board 286 w/512K.....	<b>379</b>
INTEL Above Board PS286 w/512K.....	<b>409</b>
INTEL Inboard 386 w/Adapter .....	<b>1075</b>
INTEL Inboard 386 for PC w/1 mb.....	<b>925</b>
INTEL Above Board II	
for PS/2 w/o K .....	<b>259</b>
IRMA BOARD II.....	<b>699</b>
LOGICAL Connection	
256K/512K .....	<b>379/419</b>
ORCHID JET 386 w/adaptor.....	<b>975</b>
ORCHID PC Net Starter Kit .....	<b>735</b>
ORCHID Tiny Turbo 286 .....	<b>259</b>
ORCHID Ramquest w/1 mb.....	<b>479</b>
ORCHID Twin Turbo .....	<b>349</b>

## 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/Hi Res	74/99
LOGITECH Scan Man	199
2-NIX Supermouse w/Dr. Halo III	59
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 information, technical, shipping or returns call:

(404) 860-7364 or (404) 860-6905



## PRINTERS

### EPSON

LX 800 180 CPS, 30 NLQ	\$189
FX 850 264 CPS, 54 NLQ	339
FX 1050 264 CPS, 54 NLQ	479
LQ 500 180 CPS, 60 NLQ	299
LQ 850 330 CPS, 88 NLQ	519
LQ950 <b>New!</b>	589
LQ 1050 330 CPS, 88 NLQ	719
LQ 2550 400 CPS, 108 NLQ	929

### OKIDATA

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

### TOSHIBA

321 SL 216 CPS, 72 NLQ	469
351 SX 350 CPS, 100 NLQ	895
341SL 216 CPS, 72 NLQ	599

### NEC

2200	349
5200 <b>New!</b>	519
5300 <b>New!</b>	699
3550/8850	825/1175

### PANASONIC

1080i Model II	189
1091/1092 Model II	199/339
1524	565
1592/1595	415/459
3131/3151	285/459

### HEWLETT-PACKARD

Laser Series II	1695
Desk Jet	749

OTC 850 CPS	1725
-------------	------

### IBM

Proprinter II	389
Proprinter X24	559
Proprinter XL	559
Proprinter XL24	725

6 foot parallel cable	\$19
-----------------------	------

**We also carry printer  
ribbons for all of the  
above printers.  
Call for pricing**

## 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	349
Seagate 80 mb ST4096	575
CMS 5¼" ext. 360K for PS/2	215
CMS 5¼" ext. 1.2 mb for PS/2	239
Pacific Rim 5¼ ext. 360K for PS2	179
Pacific Rim 5¼ ext. 1.2 for PS2	199
Toshiba 3½" 720K int.	89
Toshiba 3½" 1.44 mb int.	105
Toshiba 5¼" 360K int.	85
Toshiba 5¼" 1.2 mb int.	99
Bernoulli Box II 5¼" 20 mb int.	955
20 mb external w/card	1195
dual 20 mb external w/card	1769
Plus Hard Card 40	669
Plus Hard Card 20	525
Priam 60 mb AT	629
Priam 43 mb AT	469

## MODEMS

Everex 1200 int./ext.	79/115
Everex 2400 int./ext.	139/249
Hayes 1200/2400	279/419
Migent Pocket Modem	99
Practical Peripherals half card	
2400 w/Procomm	159
US Robotics 2400 direct internal	169
Supra Modem 2400 ext.	169
Vental Half Card 2400 w/Crosstalk	359
Vental 1200/2400 Plus	239/359

## MONITORS

### NEC

NEC Multisync II	\$589
NEC Multisync Plus	879
NEC Multisync GS	199
NEC Multisync XL 19"	2199

### IBM

Mono 8503	\$199
Color Display 8512	469
Color Display 8513	569
Color 8514	1195

### PRINCETON

MAX12	\$149
HX12	419
HX12E	449
Ultrasync	529
Magnavox Amber 776	474
Magnavox RGB80	\$259
Magnavox EGA 9CM053	\$369
AMDEK 410	\$145



## SOFTWARE

Aldus Pagemaker 3.0	\$529
Chartmaster	205
Clipper	419
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	399
Harvard Graphics	265
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 Works	99
Microsoft Windows 386	135
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
Quatro	149
R Base for DOS	439
Revelation	469
Super Calc IV 1.0	285
Symphony 1.2	439
Ventura Desktop Publishing	499
Volkswriter III	149
Word Perfect 5.0	219
Wordstar 2000 + 3.0	239
Wordstar Pro 5.0	239

## TAPE DRIVES

Everex 60 m.b.	
Teac int/ext	\$550/645
CMS 60 m.b. int/ext	539/645
Achives 40 mb internal	299
Sysgen Quic 60 internal	705
external	755
Maynstream 60 PS/2 w/card	
for model 50 60 & 80	869

Prices Subject To Change

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



# BULLDOG

COMPUTER PRODUCTS



For information, technical, shipping or returns call **(404) 860-7364** Or **(404) 860-6905**

Circle 24 on reader service card



## BOARDS

Adv. Dig. Slave	545	Orchid Designer	329
Alloy Slave 286	919	Panasonic Fax	642
AST 5251-11E	545	Paradise VGA+	249
AST Hot Shot 286	369	Paradise VGA Pro	375
ATI VGA Wonder	CALL	STB VGA EM 512K	299
ATI EGA Wonder	225	Sigma VGA H	242
BOCA RAM AT	142	Video 7 Fastwrite VGA	365
Genoa VGA HiRes	345	Video 7 V RAM	482
Intel Above Board	Call	Video 7 Vega VGA	259
Adaptec/Artist/Hercules/Metheus/Number 9	CALL		
Quadram/Talltree/West	Digital/Verticon/VMI	CALL	

## DISK DRIVES

CDC 150 Mb	1,445	PlusCard 40Mb	655
Miniscribe 40Mb	299	Seagate 20Mb Kit	262
Miniscribe 6053	539	Seagate 30M bKit	279
Miniscribe 71 Mb	635	Seagate ST251-1	429
Moutain TD 4440	379	Toshiba 720 K, 3.5" Kit	89
PlusCard 20Mb	518	WORM Drives	CALL
AST/Archive/Alloy/Bernoulli/Genoa/Micropolis	CALL		
Maynard/Maxtor/Tallgrass/Tecmar	CALL		

## SOFTWARE

Carbon Copy+ 5.0	107	Multimate Advan. II	257
DBase III Plus	389	Peachtree Complete 145	
Fastback Plus	104	Quattro	139
First Publisher 2.0	75	R:Base for OS2	545
Harvard Graph 2.1	299	Sprint	119
LOTUS 123	295	Symphony	CALL
Microsoft Excel-PC	289	Top for DOS	105
Microsoft Works	96	Ventura Publisher	495
Microsoft Word 4.0	209	WordPerfect 5.0	225

## COMPUTERS

Acer 20 Mhz	CALL	Sharp 4502	1135
AST Model 80	1525	Toshiba 1000	769
AST Model 300	2777	Toshiba T1200F	1465
AST Model 340	3999	Toshiba T1200HB	2455
Intel 25 Mhz	3899	Toshiba 3100/20	2995
NEC EL II	1450	Toshiba 3200	3750
NEC 386: 2 Mb	2995	Toshiba 5100	4899
Packard Bell 12 Mhz	1265	Zenith Supersport	1625
Samsung 20 Mhz	2899	Zenith Supersport 286	3395
Acer 80386: 16 Mhz / 0 Wait / 1 Mb Ram / 40 Mb	3250		
Mitsubishi 286: 12 Mhz / 40 Mb Hard Drive	1925		
Mitsubishi MP286 Laptop: 20 Mb	2337		
NEC Powermate Portables	CALL		
Sperry PC IT: 512kb / 44Mb HD / Keyboard	2795		
Samsung S500 AT: 10Mhz / 40Mb Drive	1565		
Televideo 386: 16 Mhz / 2Mb / 1.2Mb Drive	2595		
Wyse 2108: 8 Mhz / 512Kb / 1.2Mb Drive	1195		
Wyse 2112: 12.5 Mhz / 1Mb / 1.2Mb Drive	1659		
Wyse 2214: 12.5 Mhz / 0 Wait / 1.2Mb Drive	1895		
Wyse 3216: 16 Mhz / 1Mb / 1.2Mb Drive / 0 Wait	2795		
Unisys 386: 16 Mhz / 1Mb / 1.2Mb Drive / 0 Wait	2695		
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
Link MC-5	409	Wyse 85G	379
Televideo 955	375	Wyse 99GT	469
Visual/CIE/Link/Qume/Falco	CALL		

## PLOTTERS

Calcomp 1023GT	3785	HP 7475 A	1395
Calcomp 1043 GT	5645	HP 7550 A	2895
Calcomp 1044GT	10,245	HP 7595	7795
Houston DMP 52	2399	Ioline 3700	3065
Houston 41/42	2110	Ioline 4000	3995
Houston 56A	3850	JDL 850 GL	2799
Houston 61	3025	Roland 980	1195
Houston 62	4495	Roland GRX	CALL
Numonics/Taxan/Versatec/JDL/Other Models	CALL		

## DIGITIZERS

Calcomp 12 x12	348	Logitech HiRes Mouse	92
Calcomp 44 x 60	3745	Kurta IS 3	CALL
Calcomp 36 x 48	3195	Kurta IS 8.5 x 11	249
GTCC 24 x36	1945	Kurta IS 12 x 12	309
GTCC 36 x 48	2395	Kurta IS 12 x 17	535
Hitachi 11 x 11	439	Summa 12 x 12 +	348
Logitech C7 Mouse	79	Summa 12 x 18	579

## MODEMS

ATI ETC.	155	Practical 1200I	65
Anchor 2400E	145	Prometheus 2400B/2	129
Avatec 1200 Ext.	95	Prometheus 2400G	149
Cardinal 2400 Ext	139	Racal-Vadic 2400VP	388
Cardinal 2400 Int.	109	USR 2400E	345
Hayes 1200	279	USR Courier 2400	299
Hayes 2400	415	USR HST 9600	649
Mgmt Pocket	109	USR Sportster 1200	85
Multitech 224 EH	388	Ven-Tel 18000	939
Multitech 224 EC	305	Zoom 2400 HC	145
Case/Packard Bell/UDS/Other Models	CALL		

## PRINTERS

Alps Allegro 24	349	NEC P5XL	835
Alps 324 E	745	NEC P9XL	1038
Canon BJ 130	665	Panasonic 1080M2	162
Citizen120D	149	Panasonic 1091M2	189
Citizen 180D	162	Panasonic 1524	549
Citizen MSP 40	312	Star NX-1000	171
Fujitsu DL3400	525	Star NX-2400	318
Okidata 391	475	Toshiba 341SL	645
Okidata 393	959	Toshiba P351SX	979
NEC P2200	328	Canon 8II Lazer	1565
NEC 5200	515	NEC LC 890	3165
NEC 5300	679	HP Lazer Jet II	SAVE
Brother/Citro/Data Products/Diconix	CALL		
Epson/Genicom/OMS/OTC/Varityper/TI	CALL		

## MONITORS

Amdek 310A	69	PGS UltraSync 16"	895
Amdek 1280	645	Samsung TTI	79
Gold Star RGB	235	Sigma Laser 19"	1765
Intercolor 19"VGA	1595	Sony Multiscan	CALL
Mitsubishi 1381A	509	Seiko 1430	599
Mitsubishi 20" Auto	CALL	Tatung Multiscan	475
Mitsubishi 6905TK	2375	Taxan 770 +	CALL
Mitsubishi Sync II	565	Thomson 4160 RGB	209
NEC Multisync +	915	Wyse 650 VGA	459
NEC Multisync XL	2089	Wyse 700	678
NEC Multisync GS	189	Zenith 1490	598
PGS Ultra Sync	522	Other Models	CALL


## SCANNERS

Datacopy 830	1725	PGS LS-300+ OCR	965
AST / HP / Taxan / PC Hand Scanner	CALL		

Mail Address: 4207 S. 37th Street - Dept W10 - Phoenix, AZ 85040. HOURS: MON-FRI 7 AM-6 PM, SAT: 9 AM-2 PM. Prices reflect cash discounts and are subject to change without notice. We do not guarantee compatibility. DOA's are repaired or replaced. Any return requires a RMA number. Major credit cards and selected PO's are accepted.

INTERNATIONAL SALES (602)437-4855 - FAX (602)437-9685 - CUSTOMER SERVICE (602)437-4856.

Circle 72 on reader service card



**RIBBONS & DISKS**

3.5" DS 1.0MB #6404107  
**2395** 10x **2295** 5x

3.5" HD 2.0MB #6404078  
**4595** 10x **4495** 5x

**PROPRINTER \$799**  
XL 4202 #1040150

Call for price  
Diskette Connection  
1-800-451-1849  
1-800-654-4058  
P.O. Box 1974, Bethany, OK 73008  
New York, NY 10013-6221  
TELEX-49333362 FAX-405-495-4598



**(100)**  
FOR ONLY

**29¢** ea.  
5 1/4" DS-DD

**With Tyvek Sleeves & Write on Labels**

Call for price  
Diskette Connection  
1-800-451-1849  
1-800-654-4058  
P.O. Box 1974, Bethany, OK 73008  
New York, NY 10013-6221  
Minimum Order 2500 - Visa, MasterCard accepted  
COD add 3.00% UPS delivery \$5.00 for APO, FPO  
AK, HI, IL PR add 5% additional for PAL

Circle 60 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 3 1/2" disk drive, 80386 microprocessor and a 10MHz 16 MHz clock speed. \*\$25,000. Minimum and display adapter not included. ©1991 Tandy Corporation

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



# Compuclassics

WE WELCOME INTERNATIONAL ORDERS

1 818 705-4885 FAX

## SOFTWARE

<b>ALDUS</b>	
Pagemaker 3.0	539.00
<b>AMERICAN SMALL BUSINESS</b>	
Design Cad	159.00
Design Cad 3D	159.00
<b>ASHTON TATE</b>	
Multimate II	279.00
Dbase IV	489.00
Rapidfile	195.00
Framework II	429.00
Chartmaster	229.00
Master Graphics	299.00
<b>ASK SAM SYSTEM</b>	
Ask Sam	235.00
<b>AUTODESK</b>	
Autosketch Enhanced	65.00
<b>BLOC DEVELOPMENT</b>	
Formtool W/Greatest Hits	59.00
<b>BOEING COMPUTER SERVICES</b>	
Boeing Graphics (3D Color)	209.00
<b>BORLAND</b>	
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 2.0x95.00	429.00
Paradox V 2.0	95.00
Turbo Pascal 5.0	95.00
Turbo Tutor 4.0	45.00
<b>BRIDGEWAY PUBLISHING</b>	
Fasttrax	49.00
<b>BRODERBUND</b>	
Print Shop	35.00
Memory Mate	45.00
<b>BUTTONWARE</b>	
PC File +	45.00
<b>CENTRAL POINT</b>	
Copy II PC	25.00
Copy II PC Option Brd Dix	109.00
PC Tools Deluxe	39.00
<b>CHRONOS</b>	
Who What When	149.00
<b>COMPUTER ASSOCIATES</b>	
Supercalc IV	299.00
Superproject Expert	445.00
ACCPAC BPI	275.00
Silverado	99.00
<b>CONCENTRIC DATA SYSTEMS</b>	
R & R Relational Report	109.00
<b>CORE INTERNATIONAL</b>	
Corefast	89.00
<b>DAC</b>	
Easy Accounting 3.0	59.00
Easy Payroll 3.0	59.00
Bonus Pack 3.0	115.00
<b>UTILITIES</b>	
Org Plus	59.00
1 Dir PLUS	55.00
Duel	49.00
Direct Access	55.00
Grammatik III	37.00
X Tree	69.00
X Tree Pro	40.00
Sideways	45.00
Max Think	59.00
Tornado	55.00
Graph-In-The-Box	55.00
Mace Utilities	55.00
Norton Utilities	79.00
Norton Utilities Advanced	49.00
Norton Commander	59.00
Disk Technician	79.00
Disk Technician Plus	79.00
Copywriter/Zerodisk	75.00
Desquive 2.01	59.00
Rightwriter	35.00
Mirror II	49.00
Flash 5.6	85.00
Laplink Plus	49.00
Note-It-Plus	59.00
SQZ Plus	89.00
Cambridge Spreadsheet Analyst	179.00
The Documentor	89.00
dFlow	

<b>DATAFORM</b>	
Procomm Plus	52.00
<b>DBFAST</b>	
Obfast	62.00
<b>DIGITAL RESEARCH</b>	
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
<b>DIGITALK</b>	
Smalltalk V	75.00
Smalltalk V 286	145.00
<b>FIFTH GENERATION</b>	
Fastback	79.00
Fastback Plus	99.00
<b>FORMWORK</b>	
Formwork w/ill & File	89.00
<b>FOX SOFTWARE</b>	
Foxbase Plus	199.00
Foxbase Multi-user	299.00
Foxbase Runtime Unlimited	265.00
<b>FUNK SOFTWARE</b>	
Always	89.00
<b>GENERIC SOFTWARE</b>	
Generic Cad 3.0	55.00
Dot Plot	27.00
Auto Convert	27.00
Auto Dimension	27.00
3D Solid Modeling/Rendering	179.00
<b>GIBSON TECHNOLOGY</b>	
Spinwrite	55.00
<b>GOLDEN BOW</b>	
V Feature Deluxe	85.00
V Cache	45.00
<b>HAVENTREE</b>	
Interactive Easyflow	129.00
<b>HAYES</b>	
Smartcom III	149.00
<b>HILGRAVE</b>	
Hyper Access	89.00
<b>IBM</b>	
Displaywrite IV	299.00
DOS 4.01	95.00
<b>INTUIT</b>	
Quicken	39.00
<b>LATTICE</b>	
Lattice C Compiler	229.00
<b>LEADING EDGE</b>	
Word Processor W/Spell/Merge	59.00
Word Processor V1.5	89.00
<b>LOTUS DEVELOPMENT</b>	
ALL PRODUCTS	CALL
<b>MATHSOFT</b>	
Mathcad 2.0	225.00
<b>MECA</b>	
Managing Your Money 4.0	125.00
<b>MERIDIAN TECHNOLOGY</b>	
Carbon Copy Plus	109.00
<b>MICROGRAFX</b>	
Designer	465.00
<b>MICROLYTICS</b>	
Gofor	42.00
<b>MICROPRO</b>	
Wordstar Professional 5.0	249.00
Wordstar 2000 Plus	239.00
<b>MICROSIM</b>	
Rbase for Dos	475.00
<b>MICROSOFT</b>	
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
<b>MICROSTUF</b>	
Crosstalk XVI	99.00
Crosstalk Mark 4	125.00
<b>NANTUCKET</b>	
Cipper	439.00
<b>NASHOBA</b>	
Nutshell Plus	185.00
<b>NORTH EDGE SOFTWARE</b>	
Timeslips III	115.00
<b>PAPERBACK SOFTWARE</b>	
VP Info	65.00
VP Planner	55.00
VP Planner Plus	129.00

<b>PATTON &amp; PATTON</b>	
Flowcharting II Plus	145.00
<b>PC SUPPORT GROUP</b>	
Lightning	55.00
Lucid 3D V 2.0	89.00
<b>PEACHTREE</b>	
Complete Accounting II	159.00
Complete Accounting with Data Query	239.00
<b>PERSOFT</b>	
Smartterm 240	209.00
Referee	45.00
<b>SANTA CRUZ OPERATION</b>	
Xenix 286 Operating Sys	469.00
Xenix 286 Development Sys	469.00
Xenix 386 Operating Sys	539.00
Xenix 386 Development Sys	539.00
<b>SCITOR</b>	
Project Scheduler Network 4.0	449.00
<b>SIMON &amp; SCHUSTER</b>	
New World Writer II	99.00
Typing Tutor IV	32.00
<b>SOFTLOGIC SOLUTIONS</b>	
Disk Optimizer	42.00
Cubit	42.00
Double DOS	42.00
@ Liberty	115.00
Magic Mirror	59.00
<b>SOFTWARE PUBLISHING</b>	
PFS First Publisher	79.00
Professional Write	119.00
Professional File 2.0	179.00
PFS Professional Plan	59.00
PFS First Choice	89.00
Harvard Total Project II	379.00
Harvard Graphics	299.00
<b>STORAGE DIMENSIONS</b>	
Speedstor	49.00
<b>SYMANTEC</b>	
Timeline V 3	329.00
Grandview	159.00
<b>TRANSIX SYSTEMS</b>	
Masterkey Unlock	109.00
dAnalyst	135.00
<b>TURBO POWER</b>	
TDebug	35.00
Turbo Professional	65.00
<b>UNISON WORLD</b>	
Printmaster Plus	32.00
Art Gallery I & II & III (Each)	19.00
Newsmaster II	49.00
<b>WISEWARE</b>	
Prime Time	65.00
<b>WORD PERFECT CORPORATION</b>	
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
<b>WORD TECH</b>	
DBXL Diamond	115.00
QuickSilver Diamond	345.00
<b>XEROX</b>	
Ventura Publisher 2.0	519.00

## HARDWARE

<b>ARRAY TECHNOLOGIES (ATI)</b>	
VIP VGA	279.00
EGAWonder 800	249.00
<b>AST RESEARCH</b>	
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
<b>ATD ZUCKER</b>	
Monographics Short Card	79.00
Memory Expansion 384K	219.00
Modular I/O Bare P/S/Clock	75.00
Clock Board Standalone	42.00
<b>CITIZEN</b>	
1200	159.00
MSP 40	349.00
MSP 15E	359.00
MSP 50	445.00
<b>COMPUTER ACCESSORIES</b>	
P15 Power Director	99.00
<b>EVEREX</b>	
EV 1800 8MHz AT System	969.00
EV 1800 10MHz AT 0 Wait	1179.00
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

<b>FIFTH GENERATION</b>	
Logical Connection 256K	429.00
<b>HAYES</b>	
Smartmodem 1200	299.00
Smartmodem 1200B W/Software	299.00
Smartmodem 2400	465.00
Smartmodem 2400B W/Software	465.00
<b>HERCULES</b>	
Hercules Monochrome Plus	189.00
<b>HEWLETT PACKARD</b>	
Laserjet II	1849.00
Fonts/Cartridges for Laserjet II	CALL
<b>INTEL</b>	
Above Board 286 W/512K	429.00
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	899.00
1 MB Exp for 386 Inboard	675.00
<b>INTERNATIONAL BATTERY</b>	
AT Replacement Battery	19.50
AST Six Pack Battery	3.50
<b>INTEL</b>	
Inboard 386 PC or 386 AT	1099.00
1 MB Exp for 386 Inboard	675.00
<b>IRWIN MAGNETICS</b>	
120 XT 20MB Internal	339.00
125 AT 20 MB Internal	339.00
<b>KENSINGTON</b>	
Masterpiece	89.00
Masterpiece Plus	105.00
Masterpiece Remote	115.00
<b>LOGITECH</b>	
Logimouse C7	75.00
Logimouse Hi Rez	99.00
Logimouse C7 + Paintbrush	95.00
Logimouse W/Cad/Paint	125.00
Publisher Mouse	125.00
Scan Man	199.00
<b>MICROSOFT</b>	
BUS Mouse W/Paintbrush	109.00
BUS Mouse W/Windows	145.00
Serial Mouse W/Paintbrush	109.00
Serial Mouse W/Windows	145.00
<b>MICROSPED</b>	
Fast Trap	95.00
<b>MIGENT</b>	
Pocket Modem	115.00
<b>MOUSE SYSTEMS</b>	
PC Mouse BUS Plus	95.00
PC Mouse Serial Plus	95.00
<b>NEC HOME ELECTRONICS</b>	
Multisync II	629.00
<b>NEC INFORMATION SYSTEMS</b>	
P2200 80 COL	379.00
P5200	589.00
P5300	769.00
<b>PANASONIC</b>	
KX-P10911	209.00
KX-P1595	479.00
KX-P1524	649.00
KX-10921	365.00
<b>PARADISE</b>	
Autoswitch 480	189.00
VGA Plus	279.00
<b>PLUS DEVELOPMENT</b>	
Hardcard 20 MB	569.00
Hardcard 40 MB	709.00
<b>POLAROID</b>	
Polaroid Palette	1499.00
Polaroid Palette Plus	2399.00
<b>PRACTICAL PERIPHERALS</b>	
Practical Modem 1200 Internal	69.00
Practical Modem 1200 SA	109.00
Practical Modem 2400 INT	155.00
Practical Modem 2400 SA	185.00
<b>SAMSUNG</b>	
Amber Monitor	85.00
<b>SEAGATE TECHNOLOGY</b>	
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
<b>SUMMAGRAPHICS</b>	
Summasketch 1201 Plus	389.00
<b>SYSGEN</b>	
Ext 5 1/4" Drive	289.00
<b>TOUCHBASE</b>	
Worldport 2400 Modem	269.00
Worldport 1200 Modem	159.00
<b>TOSHIBA</b>	
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

- We welcome corporate accounts
- Immediate replacement of defective goods.
- Bulk discounts
- Immediate shipment on purchase orders from qualified government institutions

- (schools and universities included)
- No hidden charges.
- No minimum.

## 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 RMA. Short shipments must be notified within 48 hours. 15% restocking fee on non-defective goods. \$3.50 C.O.D. charge. Shipping \$4.50 minimum per item, less on bulk orders. (\$8.50 Blue Label.) (Higher for some software or hardware items.)

Call for prices for any software item not included in this price list.

Order desk & technical support open 7 a.m. to 6 p.m. Monday-Friday (PST) 10 a.m. to 2 p.m. Saturday (PST)  
P.O. BOX 1588  
6934 Canby St., Suite #109-110  
Reseda, CA 91335  
Telex 999415COMP UR/Fax 818-705-4885

WE WELCOME INTERNATIONAL ORDERS

1 818 705-1895 US

1 800 231-6603 CA

1 800 328-4473 US

Circle 4 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.**IBM-NOVELL  
Network Support  
\$85/Hour  
1-800-634-8215****COMPAQ  
Deskpro 386s  
40 Mb  
\$3640****IBM PS/2  
Model 80  
115 Mb  
\$5900****5.25" Drive  
for IBM PS/2  
\$290****1% Consultant  
and Reseller  
Accrual Program****IBM PS/2**

Model 30-286 20 Mb Disk	\$1810
Model 30-20 Mb Disk	\$1585
Model 50-20 Mb Disk	\$2390
Model 50-30 Mb Disk	\$2700
Model 50-60 Mb Disk	\$3120
Model 60-44 Mb Disk	\$3200
Model 70-60 Mb Disk	\$4175
Model 70-120 Mb Disk	\$5400
Model 80-44 Mb Disk	\$4250
Model 80-70 Mb Disk	\$4800
Model 80-115 Mb Disk	\$5900
Model 80-314 Mb Disk	\$8750

**COMPAQ**

286 Mod 1/640 K	\$1670
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	\$8500
386 Deskpro 20E 40 Mb/110 Mb	\$4475/5400
286S Deskpro	\$2660
386S Deskpro 20Mb/40Mb	\$3150/3640
386/25 110Mb/300Mb	\$6800/8900
Portable II Model 4	\$2700
Portable III Model 20	\$3400
Portable III Model 40	\$4050
Portable 386 Model 40	\$5400
Portable 386 Model 100	\$6800

**TOSHIBA LAPTOPS**

T1000	\$775
T1200F	\$1585
T1200HB	\$2399
T3100/20	\$2950
T3200	\$3600
T5100	\$4700
T5200 (Yes a 5200)	\$6090
Battery Backup	\$325
Modem	\$Call

**ZENITH LAPTOPS**

286/20 Turbo Sport	\$3300
386/40 Turbo Sport	\$5600

**PACKARD-BELL**

386 System	\$2600
286 System	\$1200
8088 System	\$640

**DISC DRIVES**

SEAGATE 20 Mb Kit	\$259
SEAGATE 30 Mb Kit	\$295
SEAGATE 40 Mb	\$366
SEAGATE 40 Mb Kit	\$449
SEAGATE 80 Mb	\$639
TOSHIBA 1.44 Mb Floppy	\$125
PROCOM Ext 5.25" for PS/2	\$290

**Hardcards**

MINISCRIBE 20 Mb Hard Card	\$379
PLUS 20 Mb/40 Mb Hard Card	\$535/647
PROCOM 30 Mb/40 Mb	\$429/519
PROCOM 45 Mb for PS/2	\$795
MAYNARD 20 Mb	\$Call

**FAX**

SHARP FO220/FO300	\$950/1159
SHARP FO420/FO500	\$1300/1400
TOSHIBA 3010	\$1275

**TAPE**

IBM 6157 for PS/2	\$1350
IRWIN 40 Mb Int/Ext	\$465
MAYNARD 60 Mb XT/AT Int/Ext	\$675/881
MAYNARD 60 Mb for PS/2	\$899
MOUNTAIN 60 Mb	\$1199

**MONOCHROME MONITORS**

IBM PS/2 8503	\$200
COMPAQ Mono Amber/Green	\$189
COMPAQ VGA Mono	\$189
AMDEK 310/410	\$79/145
MULTISYNC GS	\$189
PACKARD BELL Amber/Green	\$85

**COLOR/EGA MONITORS**

AMDEK C600/C722	\$344/435
IBM PS/2 8512	\$435
SAMSUNG RGB Comp	\$245

ZENITH 1390	\$405
PGS UltraSync	\$500

**VGA/CAD MONITORS**

COMPAQ VGA Color	\$520
IBM PS/2 8513	\$515
IBM PS/2 8514	\$1075
ZENITH 1490	\$619
NEC MultiSync XL	\$2070
NEC MultiSync Plus	\$879
NEC MultiSync 2	\$589
MITSUBISHI 6905/6922	\$2330/1934
CSA 1016	\$1779
HITACHI 4119	\$2260

**NETWORK****NOVELL**

SANTA CLARA Diskless Workstation	\$631
WESTERN DIGITAL 3 Node LAN kit	
w/Western Digital software	\$700
Entry-level 286 Starter Kit, 4 Users	\$470
NOVELL 286 Software w/Keycard	\$1500
NOVELL 286 Software V.212	\$1939
NOVELL SFT Netware Level I	\$2120
NOVELL SFT Netware	
Level II V2.1	\$2740
Nondedicated Netware Software 286	
w/Keycard	\$1470

**INTERFACE CARDS**

ARCNET PC110 LANBoard PS2	\$520
ARCNET PC110 LANBoard	\$185
ARCNET PC210 LANBoard	\$235
ETHERNET Interface Connector	\$325
ETHERNET Plus Board (for 286)	\$690
G-NET Interface Card w/cable	\$294
WESTERN DIGITAL	
Ethernet Cards	\$260

**ACCESSORIES**

ARCNET Passive Hub	\$80
ARCNET Active Hub	\$469
Ethernet Terminators	\$38

*Novell trained and authorized  
sales and support.***IBM**

IBM Adapter Card	\$450
IBM 8wk Expander	\$425
PC Lan Program	\$150

**TERMINALS**

WYSE 50 Amber or Green	\$370
WYSE 60 Amber or Green	\$295
WYSE 85	\$394

**SOFTWARE**

Aldus Pagemaker	\$459
COMPAQ DOS 3.31	\$89
dBase IV	\$455
DisplayWrite IV	\$250
IBM DOS 3.3/4.0	\$90/110
IBM OS/2 Standard 1.0	\$235
IBM OS/2 Extended	\$550
Lotus 1-2-3 V 2.01 5 1/4/3 1/2"	\$292/299
Microsoft Excel	\$290
Multimate Advantage 2	\$199
Norton Advanced Utilities	\$75
Paradox 2.0	\$418
Smartcom II/III	\$90/150
Symphony	\$420
Word Perfect 5.0	\$225

**LASER PRINTERS**

HP LaserJet II	\$1675
HP DeskJet	\$675
NEC LC890	\$3244
PANASONIC KX4450	\$1590
TOSHIBA PageLaser	\$2499
HP ScanJet	\$1075

**PRINTERS**

Epson	
FX 286e 200/40 cps	\$409*
FX 850 260/84 cps	\$345*
FX 1050 260/84 cps	\$510*
EX 800 300/60 cps	\$459
LQ 850 264/88 cps	\$510*
LQ 1050 264/88 cps	\$745
LQ 950	\$Call
LQ 2550	\$929*
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 1124 192/48 cps	\$347
KX 1592 180/38 cps	\$379
KX 1595 240/51 cps	\$445
KX 1524 240/80 cps	\$540
KX 3131 17 cps LQ	\$290
KX 3151 22 cps LQ	\$461

**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 III	\$485
Proprinter X24	\$545
Proprinter II XL	\$550
Proprinter XL 24	\$709
Proprinter III XL	\$645

**Toshiba**

321 S/L 216/72 cps	\$499
341 S/L 216/72 cps	\$630
351 SX 350/100 cps	\$1000

**COMMUNICATION/  
EMULATION**

IBM PS/2 50-80 5250 Emulation	\$675
IBM PC XT/AT 5250 Emulation	\$675
AST PC XT/AT 5250 Emulation	\$575
IBM PC XT/AT 3270 Emulation	\$450
IBM PC XT/AT 3278/9 Emulation	\$490
IRMA Board	\$Call
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/SW	\$75
EVEREX 2400 Int	\$137
EVEREX 2400 Ext	\$195
VENTEL 1200/1200+	\$190/228
VENTEL 2400/2400 Ext	\$290/380

**MULTIFUNCTION CARDS**

EVEREX MagicCard OK	\$100
AST 6 Pack w/384K	\$Call
AST Advantage/2 for PS/2	\$Call
COMPAQ 1Mb Memory 386/20	\$650
COMPAQ 4Mb Memory 386/20	\$2200

**VIDEO BOARDS**

COMPAQ VDU	\$Call
COMPAQ VGA	\$Call
GENOA Super Hi Res 800X600	\$175
GENOA Super VGA	\$310
PARADISE Auto Switch-480	\$175
PARADISE VGA	\$275
RP MonoGraphics	\$69
VEGA Deluxe	\$249
VEGA VGA	\$275

**CHIPS**

Intel	
8087-1/2/3	\$220/149/109
80287-6/8/10	\$167/240/289
80387-16/20	\$469/702

**ACCESSORIES**

AB Switchbox	\$40
Keytronics 101 Keyboard	\$100
Printer Cable 6'/10'	\$20/25
6 Outlet Surge	\$25

**MICE**

LOGITECH HiRes	\$95
LOGITECH PS/2	\$69
LOGITECH C7 Serial	\$69
LOGITECH Bus	\$74
DEXXA Mouse	\$69

*"We Will Beat Any Price". . . Dick***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****QUOTE-A-FAX: 1-312-325-4969**

- Corporate and volume purchases invited. Call Dick.
- Lease available.
- 24 hour burn in on all CPUs.
- Terms available.
- Stock orders placed by 3:00 CDT shipped same day.
- Prices subject to availability and change without notice.
- Prices reflect 3% cash discount.
- Allow 10 days for personal checks to clear.
- Wire transfer accepted.
- Minimum \$5.00 shipping/handling charge.
- Returns subject to restocking charge.
- Prepay add 2% shipping/handling

Circle 125 on reader service card





On Site Service  
Contract Available.

# Don't Just Buy a Computer Invest in a SF-286

SF-286 (Hard Drives Optional)	8MHz	10MHz	10MHz (0 WS)	12MHz (0 WS)	16MHz (386)
<b>Mono System</b>	<b>\$995</b>	<b>\$1119</b>	<b>\$1349</b>	<b>\$1499</b>	<b>\$2050</b>
<b>EGA System</b>	<b>\$1369</b>	<b>\$1569</b>	<b>\$1720</b>	<b>\$1870</b>	<b>\$2349</b>

## 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.....\$1839

Basic System features plus: Everex EVGA graphics board ( 640x480, 800x600, up to 256 colors ), Eversion multisync color monitor and Seagate 20Mb hard drive. Add \$60 for upgrade to Mitsubishi Diamond Scan Monitor.

### SF-286-12MHz 20Mb Mono Special.....\$1749

Basic System features plus: Monographics board with printer port, Samsung 12" amber mono monitor and Seagate 20Mb hard drive.

Upgrade to 40Mb Seagate hard drive, Add \$160  
Upgrade to 80Mb Seagate hard drive, Add \$449

## EGA Bundle.....\$479

Everex EGA autoswitch graphics board and Eversion EGA color monitor.

## Super EGA Bundle.....\$579

Everex EGA Deluxe autoswitch graphics board ( 640x480, 752x410 ), and Eversion multisync color monitor. Add \$60 to upgrade to Mitsubishi Diamond Scan Monitor.

## Super VGA Bundle.....\$709

Everex EVGA graphics board ( 460x480, 800x600, up to 256 colors ) and Eversion multisync color monitor. Add \$60 to upgrade to Mitsubishi Diamond Scan Monitor.

## Hard Disk Specials ( for PC )

Seagate ST225 20Mb + Controller.....\$265  
Seagate ST125 20Mb + Controller.....\$329  
Seagate ST238 30Mb + Controller.....\$289  
Seagate ST251 40Mb + Controller.....\$449

## Hard Disk Specials ( for AT )

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

## Everex Modems

Everex Evercom external and internal modems ( fully Hayes compatible ) with Bitcom communications software.

Internal 1200 Baud Modem.....\$80  
External 1200 Baud Pocket Modem.....\$139  
Internal 2400 Baud Modem.....\$149  
External 2400 Baud Modem.....\$199

Circle 233 on reader service card

## Misc. Specials

Mini I/O ( PAR, SER, CLK, CAL ).....\$55  
Mini I/O with Game Port.....\$65  
Mini I/O + Logitech C7 serial mouse.....\$119  
Teac 3.5" 720K floppy drive.....\$99  
Teac 3.5" 1.4Mb floppy drive.....\$129  
150 Watt Power Supply.....\$49  
200 Watt Power Supply.....\$79  
MS Dos 3.3 with GW Basic.....\$90  
3Mb EMS memory board w/ OK ( AT ).....\$99

Seagate, Samsung, Everex, Eversion, Mitsubishi, Hayes, Bitcom, Logitech, are trademarks or registered trademarks of their respective companies.

SFMICROS V.1 10/11/88



**1825 Lombard Street  
San Francisco, CA 94123**

**California Orders, Information  
(415) 929-1505**

National Order Desk (800) 237-5631  
Technical Support (415) 929-1607

Hours: M-F, 9 to 5 (PST)

University P.O.'s and Dealer  
Inquiries are Welcome

TERMS: We accept MasterCard, VISA ( no surcharge ), American Express, COO'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. We are not responsible for typographical errors.





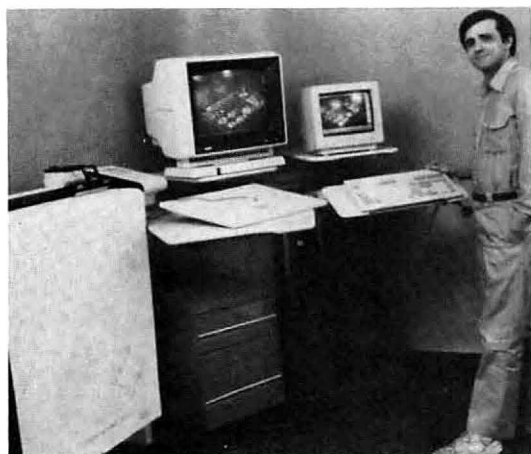
# F&W Communications

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

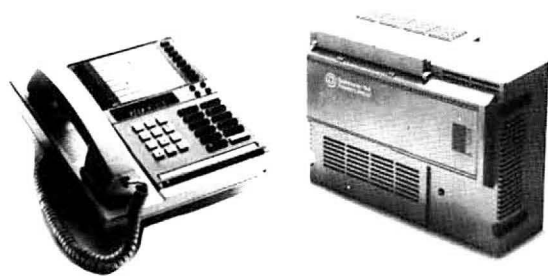
Many other options are available:

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 system 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



# Fill Your Software Stockings

# \$9.95

**Merry Xmas!**

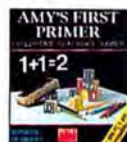
from:

**PC-SIG: America's #1  
Publisher of Affordable  
Software for IBMs & Com-  
patibles - Serving  
Knowledgeable Com-  
puter Owners Since 1983**

We welcome you to order directly  
from our company or from any of the  
many fine computer stores across  
the nation that carry our products.

- Richard Petersen, Pres.

**Satisfaction Guaranteed**



**AMY'S FIRST PRIMER**  
Educational games for younger  
children to teach counting, ABCs,  
pattern recognition & more!  
#7045 C-B



**AUTOMENU**  
With or without a mouse, make  
your own easy access menus.  
Just "point & shoot" to run your  
programs. #7048



**COMPASS**  
"Swiss Army Knife" of software!  
Word processor, data base,  
spread sheet & more—all on one  
disk! #7033 C



**DANCAD 3D**  
Draw mechanical parts in 3d and  
then animate them, for robotics  
and other computer aided design!  
#7051 C or HR-HD



**EQUATOR PC TOUCH**  
Gain skill and speed on the  
keyboard! Also, offers math tutor  
for 7th to 12th grades. #7052 C



**GAME SERIES NO. 18**  
Arcade fun. Flightmare, Brick  
and more! Amusement for all  
ages. #7038 C



**KID GAMES**  
A blast! Educational games for  
ages 2-6. Alphabet, time telling,  
spelling. Makes learning fun!  
#7032 C



**PC-CALC**  
Excellent, easy to use spread-  
sheet comes with its own tutorial.  
Great for the home office. #7036



**PC-CHESS**  
Check! It's your move! Allows for  
several levels of difficulty and  
autoplay. #7047



**PC-DESKTEAM**  
Desktop organizer gives your  
computer instant calculator, alarm  
clock, calendar, phone dialer,  
note pad & more! #7040



**PC-FILE+**  
Button's popular database keeps  
track of all data on customers,  
orders, inventory, etc. & creates  
reports. #7049



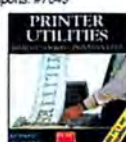
**PC-KEY DRAW**  
Drawing, graphics printing and  
slide capability with or without a  
mouse! #7044 C



**PC-WRITE**  
Wordprocessor that is a joy to  
use and easy to learn. Supports  
laser printers and has all the bells  
& whistles. #7050



**PIANOMAN**  
Turns your computer into a musi-  
cal instrument. Play, edit and  
record your own music. #7042



**PRINTER UTILITIES**  
Print long spreadsheets  
sideways, create banners, and  
more on your dot matrix! #7046



**SPACEWAR**  
Mindless amusement for long  
days at the office. #7041

## ADDITIONAL SELECTIONS

### • AMPLE NOTICE

Calendar and to-do program to or-  
ganize your busy schedule. #7054

### • ARE YOU READY FOR CALCULUS?

Pre-calculus review of algebra &  
trigonometry. #7055

### • BAKER'S DOZEN

13 utilities for the power user.  
Recover erased files & more. #7056

### • BRIDGEPAL

You don't need three other people to  
have a great game of Bridge. #7057

### • CROSSWORD CREATOR

Automatically creates crossword puzzle  
from words and clues you  
provide. #7058

### • DISK NAVIGATOR

Take the work out of using DOS.  
Stronger, faster, simpler. #7059

### • EDRAW

Draw schematics, flowcharts,  
diagrams, even a printed circuit  
board. #7060 C

### • EXPRESSCHECK

Automate your checkbook and never  
be caught off balance. #7061

### • EZ-FORMS EXECUTIVE

Business forms in minutes. #7062

### • FAMILY HISTORY

Software to trace your family tree—  
genealogy. #7063

### • FASTBUCKS

"Do-it-yourself" home accountant is  
menu driven / easy to use! #7063

### • FILE EXPRESS

A good database that is easy to set  
up and use. #7064

### • FUNNELS AND BUCKETS

Fun game teaches kids basic arith-  
metic. Ages 5-11. #7065

### • GALAXY

The fast, powerful but simple to learn  
word processor. #7034

### • HARD DISK UTILITIES

How to manage your hard drive. #7066

### • HGCIBM

Run color programs on your Her-  
cules card. #7067 HR

### • MASTER KEY

Take master control of all disk and file  
manipulation. #7068

### • MINDREADER

The wordprocessor that guesses  
your every thought. A winner! #7069

C - Req. Color B - Req. BASIC HD - Req. Hard Disk HR - Req. Hercules Graphics Card

## \$39 Membership Package

(\$61.80 Value)

### What You Get:

#### • 424 pg book, THE PC-SIG LIBRARY (\$12.95)

Describes over 700 money saving software titles that allow your  
computer to do everything from fighting Martians to balancing a  
spreadsheet.

#### • 224 pg book, THE SUPPLEMENT (\$8.95)

Features over 400 more of the latest software titles now available  
guaranteed to entertain you, increase your productivity, and make  
life with your computer a whole lot easier!

Note: All our programs have instructions on the disk to get you up-and-running! For those programs you find useful, a registration fee sent directly to the  
program's author will provide you with added benefits, such as: printed manuals, updates, etc.

#### • 1 Year Subscription to SHAREWARE MAGAZINE (\$20)

The only publication designed to keep you aware of amazing new  
programs not yet available in stores that you can  
"try-before-you-buy!"

#### • 2 (Two) FREE programs of your choice (\$19.90)

Special Members Only Discounts:  
-Buy 10 programs, Get 1 more Free! -Buy 20 programs, Get 3  
more Free!

☐ Programs \$9.95 ea

Enter program #'s desired:

1. _____	6. _____	11. _____	16. _____
2. _____	7. _____	12. _____	17. _____
3. _____	8. _____	13. _____	18. _____
4. _____	9. _____	14. _____	19. _____
5. _____	10. _____	15. _____	20. _____

☐ Membership Package \$39

2 Free Prgm. #'s \_\_\_\_\_

(For Members Buy 10 get 1 free, Buy 20 get 3 free)

Free Prgm. #'s \_\_\_\_\_

Subtotal \_\_\_\_\_

In CA add 7% state sales tax

Shipping and Handling \$4.00

TOTAL \_\_\_\_\_

Payment by: ☐ Check ☐ Visa ☐ MC

Card No \_\_\_\_\_

Exp. Date \_\_\_\_\_ Sig. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_



1030 D East Duane Ave.  
Sunnyvale, CA 94086  
(408)730-9291

Call 800-245-6717  
(In CA 800-222-2996) dept.2004

Valid in USA Only.

Offer expires December 31, 1988

Specials cannot be combined with any other discounts.  
Dealer inquiries invited.







# KENOSHA



## 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 •  
TRW Warranty Service 1 year warranty

## KENOSHA COMPUTER CENTER

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.....\$3549

### IBM

All Models.....CALL

### COMPAQ

286 Deskpro 640K 40MB...\$2199  
386 Deskpro Model 60...\$4995  
386 Deskpro Model 130...\$6395  
386S Model 1...\$2895  
386S Model 20...\$3395  
386S Model 40...\$3795  
386 25MHz w/110MB...\$7395  
Portable II Model 4...\$2795  
Portable III, 20MB...\$3595  
Portable III, 40MB...\$4195

### LEADING EDGE MODEL D

1 floppy, 20MB hard disk, mono  
graphics card & monitor, DOS &  
Basic...\$1099

### PACKARD BELL

VT286 w/40MB...\$1549

### AST

286 w/512K, 40MB...\$1849

### LAP TOPS

Zenith Supersport 20...\$2439  
NEC Multispeed EL...\$1495  
NEC Multispeed HD...\$2259  
Toshiba T1000...\$809  
Toshiba T1100 Plus...\$1519  
Toshiba T1200...\$2235  
Toshiba T3100...\$3029  
Toshiba T3200...\$3649  
Toshiba T5100...\$4799

### 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...\$349  
40MB for AT ST251-1...\$459  
80MB for AT ST4096...\$575

#### PLUS

Hard Card 20MB...\$525  
Hard Card 40MB...\$669

### 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...\$239  
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...\$425  
AST 5251-II 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...\$249  
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...\$299  
FX 850...\$339 LQ 2550...\$969  
FX 1050...\$479 EX 800...\$429  
LQ 850...\$519 DFX5000...\$1355

#### OKIDATA

ML320...\$339 ML391...\$639  
ML321...\$465 ML393...\$925  
ML390...\$465

#### NEC

P2200...\$339 P5XL...\$849  
P5200...\$539 P9XL...\$1049  
P5300...\$689

### 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/\$139  
Everex 2400 External...\$199  
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...\$189

### 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

# COMPUTER CENTER

Circle 41 on reader service card

Prices and availability  
subject to change



# Lyc0 Computer

## Marketing & Consultants

Since 1981

Air orders processed within 24 hours.

### HEADSTART by Vendex



**\$969<sup>95</sup>**

### Color System

- Ready to plug in and use immediately
- Ultra fast 8 Mhz Intel 8088-2 Processor
- 512K RAM memory expandable to 768K
- 2-360K disk drives standard
- First complete system with clock calendar and built-in ports for printer, RS232, 2 joysticks, mouse and light pen
- Includes \$500 worth FREE software programs
- Hi Res color monitor included!

### LASER

### Turbo XT Model II

- Dual Speed 4.77-8 Mhz
- 640K Std.
- Built-in ColorCard
- 8 Expansion Slots
- Built-in Floppy Drive
- Can Expand to 2 Floppy & 2 Hard Drives
- Green, Amber & Color Monitors Available

**\$629<sup>95</sup>**



### 8088 XT

- 16 Bit 8088 Intel Running at 4.77/10 Mhz
- 640K RAM
- One 360K Floppy, 1 Parallel Port
- Multi I/O (Includes 1 Serial Port, 1 Game Port, Clock Calendar, Disk Controller for Two 360K's)
- (8) Eight Expansion I/O Slots
- Jr. AT Case w/Keylock Turbo, Reset LED

**\$529<sup>95</sup>**



### LASER

### Compact XTE

- 640K RAM
- built-in EMS board for memory expansion to 166 4K
- built-in EGA board

**\$549<sup>95</sup>**



### CITIZEN Mate/12

- Keyboard switchable 12.5/25 Mhz
- 1 M byte memory standard
- 2 serial, 1 parallel and 1 mouse port
- Floppy and hard drive controllers
- MS DOS 3.3, GW Basic and set-up/Diagnostics
- EGA

**\$1349<sup>95</sup>**



### 286 AT

- 16 Bit 80286 Intel Running at 8/12 Mhz
- 640K High Speed RAM (Expandable to 4MB)
- One 5.25" 1.2MB Floppy Drive
- 8 I/O Slots (6/16 Bit and 2/8 Bit)
- 200 Watt Power Supply
- 101 Key Enhanced Keyboard
- High Speed Dual FD/HD Controller

**\$999<sup>95</sup>**



## Seagate

### HARD DRIVES

#### 5.25" Half Heights

ST225 20 meg 65msec MFM ..	\$219.95
ST225N 20 meg SCSI .....	\$289.95
ST238R 30 meg RLL .....	\$229.95
ST251 40 meg 40 msec MFM .	\$339.95
ST251-1 40 meg 28 msec MFM .	\$419.95
ST277R 65 meg 40 msec RLL .	\$379.95

#### Seagate Internal Cards

ST125 20 meg Internal Card ...	\$299.95
ST157R 49 meg Internal Card .	\$485.95

#### 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

#### Controllers

MFM Controller (XT) .....	\$55.95
RLL Controller (XT) .....	\$64.95

### PC COMPATIBLE HARDWARE

Laser Compact XT 640.....	\$54995	Amstrad PPC 640.....	\$77995
Laser Turbo XT II.....	\$62995	Amstrad PC 1640.....	\$83995
Blue Chip Popular.....	\$CALL	Mitsubishi 310/AT.....	\$1,12995
Vendex Head Start Color.....	\$96995	Zucker CGA Color Card.....	\$8995
Vendex Head Start Mono.....	\$80995	BCC CG Color Card.....	\$9499
Vendex Head Start 888 LTD SCALL		ATI Graphics Solution.....	\$12995
Sharp PC-4501.....	\$63995	ATI EGA Wonder.....	\$19995
Sharp PC-4502.....	\$1,16995	ATI VIP.....	\$29995
Sharp PC-4521.....	\$1,94995	Kraft PC Joystick Card.....	\$2495

**1-800-233-8760**





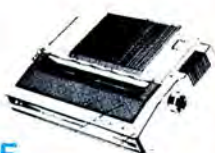
**HOURS: 9 AM-9 PM Mon.- Fri.  
10 AM-6 PM Sat.**

**star**  
MICRONICS

**NX-2400**

- 170 cps LQ
- 57 cps LQ
- 24 pin

**\$309<sup>95</sup>**



## Toll-Free Quality Consultation.

Lyco Computer is one of, if not the largest, and most established firms to provide only quality name brand computer products at prices 30% to 50% below retail. We've set many industry standards, and we are setting the pace for many more in the future.

## Delivery Options.

Send your order to Lyco Computer, P.O. Box 5088, Jersey Shore, PA 17740. Or, call 1-800-233-8760 or (717) 494-1030. We provide free freight on prepaid cash orders over \$50. And UPS C.O.D. services for first-time customers. For freight orders under \$50, please add \$3. Non-certified checks require a 4 week waiting period prior to shipping. For your convenience, we accept VISA and Master Card, but we can't pass along the 4% discount for cash on advertised prices. PA residents please add sales tax. APO, FPO, International please add \$5 plus 3% for priority mail.

**Panasonic**  
KXP4450 Laser Partner

**\$1599<sup>95</sup>**

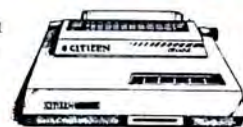
- Incredible 11 Pages per Minute
- 2 Letterize Cassette Std.
- 300 dpi Resolution
- 5 Printer Emulation Modes
- 512K RAM Std.
- 5000 Page per Month



**CITIZEN MSP-40**

- 200 CPS Draft
- 40 CPS NLQ
- Graphics

**\$279<sup>95</sup>**



## PRINTERS

### STAR

NX-1000	\$169.95*
NX-1000 Color	\$225.95
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

### Epson

LX800	\$184.95
FX850	\$339.95
FX1050	\$499.95
EX800	\$434.95
LQ500	\$339.95

### Seiksha

SL 80Ai	\$329.95
MP5420FA	\$999.95
SP Series Ribbon	\$7.95
SK3000 Ai	\$349.95
SK3005 Ai	\$445.95
SPB 10	SCALL
SL 130Ai	\$599.95
SP 1600Ai	SCALL

### Brother

M1109	\$189.95
M1509	\$335.95
M1709	\$439.95
Twinwriter 6 Dot & Daisy	\$899.95
M1724L	\$569.95
HR20	\$345.95

### Panasonic

1080i Model II	\$149.95*
1091i Model II	\$195.95*
1092i	\$309.95
1592	\$375.95
1595	\$439.95
KXP 4450 Laser	\$1599.95
1524 24 Pin	\$559.95
Fax Partner	\$579.95
Optical Scanner	\$859.95
1124	\$319.95

\*quantities limited

### Toshiba

321SL	\$489.95
341 SL	\$659.95
351 SX 400 cps	\$979.95

### Okidata

180	\$219.95
182	\$209.95
182 +	\$225.95
183	\$239.95
292 w/interface	\$449.95
293 w/interface	\$585.95
294 w/interface	\$799.95
393	\$955.95
Laser 6	SCALL
390	\$479.95
391	\$649.95
320	\$345.95
321	\$475.95

Interfacing available

### Citizen

120 D	\$144.95
180 D	\$159.95
MSP-40	\$279.95
MSP-15E	\$309.95
MSP-50	\$369.95
MSP-45	\$349.95
MSP-55	\$469.95
Premiere 35	\$539.95
Tribute 224	\$539.95
Tribute 124	\$439.95

### Educational Institutions:

If you are not currently using our educational service program, please call our representatives for details.

**SEIKOSHA**  
5420 FA

- 420 cps Draft
- 104 cps NLQ
- Friction/tractor feed
- 2-Year Warranty

**\$999<sup>95</sup>**



**Panasonic**  
Office Automation

**KXP 1524**

- 240 cps Draft
- 80 cps LQ
- 24 pin

**\$559<sup>95</sup>**



**Avatex™ 2400**

- Auto/manual Originate or Answer
- Auto Speed Select In Originate/answer Modes
- RS-232C Interface
- 2-Year Warranty

**\$149<sup>95</sup>**



## Monitors

### Thomson:

4120 CGA	\$219.95*
GB 300/301	\$149.95*

\*quantities limited

### NEC

Multisync II	\$589.95
--------------	----------

### Magnavox:

BM7652	\$79.95
BM7622	\$79.95
7BM-613	\$79.95
9CM-053	\$339.95
CM8762	\$239.95
8CM-515	SCALL
9CM-082	\$439.95

### Hayes:

Smartmodem 300	\$139.95
Smartmodem 1200	\$279.95
Smartmodem 2400	\$419.95

### US Robotics:

Courier 1200	\$169.95
Courier 2400	\$299.95

### Avatex:

1200e	\$65.95
1200i PC Card	\$65.95
1200p	\$89.95
1200hc Modem	\$89.95
2400	\$149.95
2400i PC Card	\$139.95

Tac 1 & IBM/AP	\$26.95
Wico IBM/AP	\$29.95
Lipstick Plus	\$14.95
Kraft KC III AP/PC	\$16.95
Kraft PC Joystick	
Card	\$27.95
Kraft Maze Master	\$8.95



**Designer Carry Case for Laptops:** Extra pockets for portable printer, battery pack, pocket modem, manuals & software etc. Comes with handle and shoulder strap. For NEC EL & HD and all Toshiba Laptops. Specify model.

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 chassis. 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	PRINTERS	MONITORS	FAX MACHINES/BOARDS
<b>NEC MultiSpeed EL</b> ..... 1199 <b>MultiSpeed EL II</b> ..... 1429 <b>MultiSpeed HD w/20 MB</b> ..... 2239 <b>Battery Pack-Specify EL or HD</b> ..... 99 <b>Carry Case: EL/HD</b> ..... 99 <b>Floppy 5.25" Ext 360K for HD</b> ..... 339 <b>NEC Modem 1200/2400 Int</b> ..... 269/339 <b>TOSHIBA LAPTOPS</b> <b>T1000 w/out Carry Case</b> ..... 769 <b>T1000 w/Carry Case</b> ..... 829 <b>T1000 w/Case &amp; 768K Card</b> ..... 1119 <b>T1200F, 2 floppy w/out CC</b> ..... 1299 <b>T1200FB, Backlit w/out CC</b> ..... 1499 <b>T1200H, 20MB w/out CC</b> ..... 2189 <b>T1200HB, Backlit w/out CC</b> ..... 2349 <b>T3120 w/out Carry Case</b> ..... 2899 <b>T3200 w/out Carry Case</b> ..... 3599 <b>T5100 w/out Carry Case</b> ..... 4649 <b>ACCESSORIES for Toshiba LAPTOPS</b> <b>With Laptop Use Second Price</b> <b>AC Adapter: T1000/T1100+</b> ..... 75/60 <b>AC Adapter: T1200</b> ..... 99/80 <b>Auto Adapter: T1000/T1100+</b> ..... 65/50 <b>Battery Charger: T1200</b> ..... 239/210 <b>Battery Pack: T1200</b> ..... 85/70 <b>Carry Case for T1000 or T1200</b> ..... 60 <b>Carry Case for T3120</b> ..... 70 <b>Carry Case for T3200 or T5100</b> ..... 90 <b>Designer Carry Case w/pockets for SW, manuals, portable printer etc.</b> <b>Specify model</b> ..... 149/130 <b>Expansion Chassis w/interface for 1100+/1200 or 3100/5100</b> ..... 869/829 <b>WonUnder: Expansion slot for 1100+, 1200 or 3100/5100</b> ..... 299/270 <b>Floppy 5.25" Ext 360K</b> ..... 339/330 <b>Memory 768K: T1000</b> ..... 299/290 <b>Memory 384K: T1100+</b> ..... 359/340 <b>Memory 1MB: T1200/T3100</b> ..... 599/570 <b>Memory 2MB: T3100</b> ..... 869/840 <b>Memory 3MB: T3200</b> ..... 1239/1200 <b>Memory 2MB: T5100</b> ..... 1049/1020 <b>Modem 1200 Int: T1000</b> ..... 319/300 <b>Modem 1200 No Slot: T1200</b> ..... 299 <b>When installed</b> ..... 350 <b>Modems: T1100+/T1200/3120/5100</b> <b>Toshiba 1200 Int</b> ..... 299/280 <b>Megahertz 1200 Int w/sw</b> ..... 169/159 <b>Megahertz 2400 Int w/sw</b> ..... 279/259 <b>Prometheus 1200 Int w/sw</b> ..... 149/139 <b>Prometheus 2400 Int w/sw</b> ..... 329/300 <b>Adaptamodem 2400 Int</b> ..... 329/300 <b>Novation Parrot 1200 Ext</b> ..... 129/120 <b>World Port 1200 Ext</b> ..... 159/150 <b>2400 Ext w/AC Adapter</b> ..... 259/250 <b>Toshiba cable for Ext Modems</b> ..... 20 <b>Numeric Keypad: T1000/1200</b> ..... 99/90 <b>Numeric Keypad: T3100/3120</b> ..... 99/90 <b>Brooklyn Bridge</b> ..... 99/90 <b>Battery Watch by Traveling sw</b> ..... 39 <b>Desk Link by Traveling sw</b> ..... 129/120 <b>Laplink Plus by Traveling sw</b> ..... 109/100	<b>ALPS Allegro 24 pin</b> ..... 359 <b>ALQ 200 Color 18/24 pin</b> ..... 439/469 <b>ALQ 300 Color 18/24 pin</b> ..... 629/669 <b>ALQ 224E Color</b> ..... 599 <b>ALQ 324E Color</b> ..... 749 <b>BiDi Tractor: 200/300</b> ..... 70/90 <b>Ribbon: ALQ Black/Color</b> ..... 15/20 <b>P2000 w/Tractor</b> ..... 679 <b>P2100 w/Tractor</b> ..... 1079 <b>P2400 Color, w/Tractor 24 pin</b> ..... 969 <b>★ DICONIX Inkjet 150 parallel</b> <b>with 3' or 6' cable</b> ..... 329 <b>With any Laptop</b> ..... 299 <b>NEC P2200</b> ..... 329 <b>5200/5300</b> ..... 515/689 <b>Color Kit 5200/5300</b> ..... 109 <b>Cut Sht Fdr 5200/5300</b> ..... 169/199 <b>★ TOSHIBA 321SL</b> ..... 489 ★ <b>★ TOSHIBA 341SL</b> ..... 639 ★ <b>KENSINGTON Printer Stand</b> ..... 20 <b>★ With Printer</b> ..... 10 ★ <b>FREE With Prepaid Printer Order</b>	<b>LOGITECH AutoSync with EGA Card, LogiMouse &amp; Paint Show</b> ..... 629 <b>MITSUBISHI D Scan 1371</b> ..... 479 <b>With Tilt &amp; Swivel</b> ..... 495 <b>Diamond Scan Tilt &amp; Swivel</b> ..... 30 <b>NEC MultiSync II-1402</b> ..... 589 <b>NEC MultiSync PLUS</b> ..... 879 <b>SONY 1311CR-13" Trinitron Color</b> <b>Remote TV &amp; RGB Monitor</b> ..... 449 <b>Sony 1311 to IBM Cable</b> ..... 20 <b>SONY Multiscan 1303</b> ..... 529 <b>SONY Multiscan 1302</b> ..... 649 <b>Sony 1303/2 to IBM Cable</b> ..... 20 <b>Sony 1303/2 to MAC II Cable</b> ..... 30 <b>TAXAN 770 MultiVision plus</b> ..... 499 <b>ZENITH ZCM-1490 Flat Screen</b> ..... 599 <b>With Zenith Tilt &amp; Swivel</b> ..... 620 <b>Zenith Tilt &amp; Swivel</b> ..... 30 <b>UNIVERSAL Tilt &amp; Swivel</b> ..... 35 <b>MATH/RAM CHIPS</b> <b>64K RAM 120ns Set of 9</b> ..... 30 <b>256K RAM 120ns Set of 9</b> ..... CALL <b>8087-3 PC/XT 5 Mhz</b> ..... 115 <b>8087-2 PC/XT 8 Mhz</b> ..... 145 <b>80287-6 AT 6 Mhz</b> ..... 169 <b>80287-8 AT 8 Mhz</b> ..... 239 <b>80287-10 AT 10 Mhz</b> ..... 279 <b>80387-16 for 386 Machines</b> ..... 449 <b>80387-20 for 386 Machines</b> ..... 649 <b>MODEMS</b> <b>LAP TOP Modems See SYSTEMS</b> <b>EVEREX 1200 Int w/BitCom</b> ..... 89 <b>2400 w BitCom Int/Ext</b> ..... 169/199 <b>HAYES 1200B Internal-No SW</b> ..... 219 <b>1200B with SmartCom II</b> ..... 269 <b>NOVATION Parrot 1200 Ext. Size of Cassette. Needs no pwr/battery</b> ..... 129 <b>PROMETHEUS 2400G Ext</b> ..... 179 <b>TOUCHBASE SYSTEMS</b> <b>World Port 1200 Ext</b> ..... 159 <b>2400 Ext w/AC Adapter</b> ..... 259 <b>U S ROBOTICS Direct</b> <b>1200 Int/Ext</b> ..... 79/99 <b>2400 Int/Ext</b> ..... 149/179 <b>ZOOM HC 2400 Int w/ProComm</b> ..... 129	<b>SHARP UX-80 for Books/Mags</b> ..... 969 <b>SHARP UX-140/UX-160</b> ..... 919/1119 <b>SHARP FO-300</b> ..... 1149 <b>SHARP FO-420/500</b> ..... 1319/1499 <b>TOSHIBA 30100/3700</b> ..... 1079/1499 <b>FAX BOARDS</b> <b>PANASONIC FX-B88/89 Fax Partner769</b> <b>QUADRAM JT Fax 4800/9600</b> ..... 299/599 <b>JT Fax Portable</b> ..... 369 <b>THE COMPLETE PC Fax Board</b> ..... 349 <b>LOGITECH Handheld SCANMAN</b> ..... 200 <b>DISPLAY CARDS</b> <b>With Monitor Use Second Price</b> <b>ATI VIP</b> ..... 299/270 <b>GENOA SuperEGA HiRes+</b> ..... 179/160 <b>SuperVGA HiRes 5200-10</b> ..... 379/350 <b>ORCHID Designer VGA</b> ..... 329/300 <b>PARADISE AutoSwitch 480</b> ..... 199/170 <b>Paradise VGA Plus</b> ..... 289/250 <b>Paradise VGA Plus 16</b> ..... 339/310 <b>Paradise VGA Professional</b> ..... 449/400 <b>Vega VGA</b> ..... 299/270 <b>Vega V-RAM VGA (256k)</b> ..... 489/460 <b>ZENITH Z-449</b> ..... 279/250 <b>9 to 15 Pin Connector-Required for some Monitor/Card combinations</b> ..... 20 <b>Gem Graph</b> ..... 50 <b>KEYBOARD/MOUSE</b> <b>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</b> ..... 109 <b>OEM Version: Identical Keyboard w/90 day warranty from us</b> ..... 79 <b>LOGITECH with Plus software</b> <b>PS/2 Mouse</b> ..... 79 <b>C-7 Serial or Bus</b> ..... 85 <b>HiRez Bus</b> ..... 89 <b>Logitech Publisher</b> ..... 50 <b>LogiPaint/LogiCadd</b> ..... 25/50 <b>MICROSOFT Mouse: Bus or Ser</b> ..... 119 <b>With Windows: Bus or Serial</b> ..... 149 <b>MOUSE SYSTEMS PC Mouse:</b> <b>Bus with PC Paint Plus</b> ..... 119 <b>POWER</b> <b>REPLACEMENT POWER SUPPLIES</b> <b>For PC XT 150 Watts</b> ..... 69 <b>For AT 200 Watts</b> ..... 89 <b>DATASHIELD Surge Pro 100</b> ..... 79 <b>300 Watts Turbo Backup</b> ..... 399 <b>450 Watts Turbo Backup</b> ..... 469 <b>625 Watts Turbo Backup</b> ..... 569 <b>SOLID STATE UPS 3" High</b> <b>SS400/SS700</b> ..... 699/829 <b>KENSINGTON Masterpiece</b> ..... 99 <b>Masterpiece Plus</b> ..... 109 <b>Masterpiece Remote</b> ..... 109

★ **TOSHIBA T1000** ..... 769 ★ **TOSHIBA 321SL/341SL** ..... 489/639 ★

★ PREPAID BY CHECK ONLY ★ ★ POSTMARKED BY DECEMBER 20, 1988 ★	★ SUPER SPECIALS ★	★ PREPAID BY CHECK ONLY ★ ★ POSTMARKED BY DECEMBER 20, 1988 ★
<b>TOSHIBA 321SL/341SL</b> ..... 475/620 <b>T1000 w/out Carry Case</b> ..... 749 <b>T1000 w/Carry Case</b> ..... 799 <b>T1000 w/Designer Carry Case</b> ..... 849 <b>T1000 w/Toshiba CC &amp; 768K Card</b> ..... 1079 <b>T1000 w/Designer CC &amp; 768K Card</b> ..... 1129 <b>T1200F w/Toshiba Carry Case</b> ..... 1339 <b>T1200F w/Designer Carry Case</b> ..... 1399 <b>T1200FB w/Toshiba Carry Case</b> ..... 1539 <b>T1200FB w/Designer Carry Case</b> ..... 1599	<b>PLUS Hard Card 40 MB</b> ..... 630 <b>HAYES 1200B Internal-No SW</b> ..... 199 <b>HAYES 1200B with SmartCom II</b> ..... 249 <b>PROMETHEUS 2400G Ext</b> ..... 160 <b>MOUSE SYSTEMS PC Mouse: Bus</b> ..... 99 <b>LOGITECH HiRez Bus</b> ..... 80 <b>LOTUS symphony 3.5" Ver 1.2</b> ..... 199 <b>LOTUS Metro 3.5" Ver 1.0</b> ..... 29 <b>BORLAND Sidekick: Specify 5.25 or 3.5</b> ..... 29 <b>PC Paint Plus/Gem Graph</b> ..... 25/40	<b>NEC MultiSpeed EL II</b> ..... 1399 <b>NEC MultiSpeed HD</b> ..... 2199 <b>NEC P2200 Par w/Cable</b> ..... 340 <b>MITSUBISHI 1371 w/Tilt &amp; Swivel</b> ..... 470 <b>TAXAN 770 Plus w/Genoa HiRes+</b> ..... 640 <b>SHARP FO-420</b> ..... 1299 <b>SONY 1303 w/cable: IBM or Apple</b> ..... 545 <b>SONY 1302 w/cable: IBM or Apple</b> ..... 665 <b>LOGITECH AutoSync with EGA Card, LogiMouse &amp; Paint Show</b> ..... 599

★ FOREIGN ORDERS ★	★ PLUS HARD CARD 20/40 ... 499/649 ★	★ APO ★ FPO ★
<b>For foreign orders add special handling charge of \$30 per order. Air shipments add 10% (Min. \$50). For Printers &amp; Monitors 30% (Min. \$150). Some items may be more. Credit card orders, add 5% to amount owed.</b> <b>FAX: 714-891-2364</b>	<b>POLICY: Min. order \$100 for COD/Credit Cards. Prepaid orders Min. \$50. Prices &amp; 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 &amp; Discover, 3% for MC/Visa and 5% for Amex &amp; Optima. COD requires cash or cashier check. No showroom or walk-in 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.</b> <b>★ PICKUP HOURS: Mon-Fri: 3 to 5 pm. PLEASE CALL FIRST FOR WORKORDER #.</b>	<b>For APO/FPO orders, add special handling charge \$30 per order. Shipping charges add 5% (Min. \$20). For Printers &amp; Monitors 10% (Min. \$40). Some items may be more. No COD orders. Credit Card orders, add 5% to amount owed.</b>

**MICROBEST 714-897-2100**

12605 HOOVER STREET, GARDEN GROVE, CA 92641

PLEASE REFER TO AD # 8W-49



## Scottsdale Systems



### Scottsdale Systems 386

- 80386 32-Bit 16/20 MHz
- 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

### 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

### LASER PRINTERS

CITIZEN OVERTURE 110	\$1499
PANASONIC 4450	1599
NEC - LC 860	1899
NEC - LC 890	3099
TOSHIBA PAGE LASER 12	CALL
HEWLETT PACKARD Laser Jet 2	1734
CANON LPB-8 II	1695

### PRINTERS

FAÇIT 3000	CALL
Barcodes, Forms & Labels	CALL
OTC Trimatrix	CALL

### CITIZEN

120 D	120 CPS	\$145
180D	180 CPS	165
MSP 40	200 CPS	290
MSP 45	200 CPS	389
MSP 50	250 CPS	325
MSP 55	250 CPS	440
Premier	35 CPS	442

### PANASONIC

KXP-1080 I	140 CPS	\$162
KXP-1091 I	192 CPS	185
KXP-1092	240 CPS	316
KXP-1524	240 CPS	506
KXP-1592	180 CPS	377
KXP-1595	240 CPS	419
KXP-3131	17 CPS	313
KXP-3151	22 CPS	490

### Toshiba... CALL Okidata... CALL

### NEC... CALL Alps... CALL

Allegro	180 CPS	\$359
324 E	240 CPS	735
224 E	240 CPS	589

## HAPPY HOLIDAYS



### MULTI USER SYSTEMS

WITH XENIX

Altos 386 Series 1000/2000	CALL	2086	CALL
Altos 386	CALL	3086	CALL
Altos 686	CALL	Altos Software	CALL
686	CALL		
886	CALL		
1086	CALL		

### UNISYS

Series-5000  
Series-7000

### PLOTTERS

#### HOUSTON INSTRUMENTS

DMP-29/40	\$1695/895
DMP-52/52 MP	2478/2795
DMP-61/62	CALL
Ioline	CALL
JDL Plotter	CALL

#### ROLAND DESKTOP PLOTTERS

1 Year Warranty	
DXY-880 8 Pen	\$929
DXY-885 8 Pen	999
DXY-980 8 Pen	1034
DXY-990 8 Pen with	
Electrostatic Paper Hold	1322

#### ROLAND DRAFTING PLOTTERS

1 Year Warranty	
GRX-300 A-D Size	\$3579
GRX-400 A-E Size	4999

#### CAD SOFTWARE

VERSA CAD	CALL
DESIGN CAD	\$ 220
EZ CAD	139
FAST CAD	1459

#### AST RESEARCH

TurboScan w/Software	\$1816
----------------------	--------

#### ROLAND CAMM MACHINES

Software & Accessories	CALL
------------------------	------

### PLOTTERS

#### ROLAND FLATBED PLOTTERS

1 Year Warranty	
DPX-2000 8 Pen w/Stand	\$3399
DPX-2200 8 Pen w/Stand	3675
DPX-3300 8 Pen w/Stand	4539

#### CALCOMP

1023 Artisan Pen Plotter	\$3785
1042 GT W/Plot Mgr	7499
1043 GT W/Plot Mgr	5375
1044 GT W/Plot Mgr	10,245

#### CalComp Electrostatic Plotter

Series - 5700	CALL
Series - 5800	CALL

#### HEWLETT PACKARD

H.P.-7440 A	\$ 965
H.P.-7475 A	1415
H.P.-7550 A	2925
H.P.-7570 A	2999
H.P.-7595 A Draftmaster I	7795
H.P.-7596 A Draftmaster II	9369

#### PLOTTER PENS & PAPER

#### OPTICAL SCANNER & SOFTWARE

Princeton Graphics	
LS-300 Scanner	\$ 755
Data Copy	CALL
Panasonic	1050

### DIGITIZERS

Hitachi	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

#### Cal Comp 23120-12x12

Cal Comp 23120-12x12	\$ 365
----------------------	--------

#### Hewlett Packard

Hewlett Packard	CALL
-----------------	------

#### SUMMAGRAPHICS

12x12	\$ 355
12x18	599
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 3151 G/A	CALL
Altos IV	379
Altos V	513
Wyse Monitors	
Wyse 450	\$277
Wyse 530	189
Wyse 550	180
Wyse 650	445
Wyse 700	678
Zenith 1490	599
Link MC 5	395
Amdek 310A	\$ 79
Amdek All Models	CALL
Packard Bell	79
Taxan All Models	CALL
Sigma Laser View Plus	CALL
Princeton Graphics LM300	CALL
Portrait Monitor	525
Princeton Ultrasync	CALL
NEC II/Plus/XL	1529
NEC Monograph	CALL
19" CAD Monitors & Boards	1175
Genius 420 w/Card	2140
Genius 2 19" w/Card	1499
Monograph 16" Full Page White	1 Year Warranty
Mitsubishi Diamond Scan	528
Seiko 1430	649

#### TeleVideo

T.V. 905	\$309	T.V. 9220	\$399
T.V. 955	385	T.V. 965	417

### LEASING AVAILABLE



## Scottsdale Systems

—Since 1980—

617 N. Scottsdale Rd., Scottsdale, AZ 85257

602-941-5856 1-800-777-2369 602-941-5897

For Inquiries Toll Free — For Orders FAX

Prices listed are for cash/MasterCard and Visa add 1% surcharge on AM/EX/AZ residents add 6% 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
- Open Architecture
- 8 Slots
- Enhanced Keyboard
- 220 W Power Supply
- Security Keylock
- MS-DOS 3.2 GW-BASIC 3.2
- 1 Year Warranty

\$2760

## WYSE 286

- 6 & 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
- Model 2200
- Model 2108
- Model 2112

\$1350

1275

1695



S-800 20 MHz	\$2605
S-500 8 & 10 MHz	1085
S-300 XT 8 MHz	559

## TeleVideo TeIOAS III 386

- Socket for 16 MHz 80387 Coprocessor
- 1 MB RAM
- 1.2 MB Floppy Drive
- 12 Expansion Slots
- Room for 2 Full-Height and 2 Half-Height Drives
- Open Architecture
- 2 Serial and 1 Parallel Port
- Clock Calendar with Internal Battery
- Enhanced AT-Style Keyboard with LEDs
- Security Lock and Reset Switch
- 1 Year Warranty

\$2689

### LAPTOPS

NEC MULTISPEED E.L.	\$1379
ZENITH Super Sport 20 MB	\$2445
Super Sport 286 20 MB	3445
TOSHIBA / 1 Year Warranty	
T-5100	\$4799
T-1000	779

### STANDBY POWER SYSTEMS

CURTIS Computer & Power Acc.

### ALLOY

P.C. Slave 16N	\$ 746
NTNX	379
Retriever 40	455

### ARCNET

Cards, Cables & Hubs	CALL
Modems	CALL

### TOPS NETWORKING

DOS & Mac	CALL
-----------	------

### NOVELL

### FAX

PACKARD BELL P.B. FAX 100	\$ 960
P.B. FAX 200	1105
TOSHIBA 30100	\$1075
3300	1239
3700	1689
PANASONIC LF-500 Worm Drive	\$1982

### TAPE BACKUPS

Emerald Systems	CALL
Genoa	CALL
Priam	CALL
Irwil	CALL

### BOARDS

Genoa	CALL
Intel	CALL
Verticom All Models	CALL
BOCA	CALL
Image Manager All Models	CALL
Cobra All Models	CALL
Paradise All Models	CALL
Video 7 V Ram	\$475
Fastwrite	355
Vega Deluxe	210
VGA	249



## Software Publishers: Do It for Mom

Brian  
Camenker



**R**ecently my mother called to announce that she is selling her PC and buying a Macintosh. She wants to write a book but can't figure out how to use any of the word processing packages that I've sent her. She's giving up in disgust.

Naturally, this is a bit embarrassing for the executive director of a major PC user group. The truth is that the overwhelming majority of software for the PC is simply too difficult for normal people to use, and there's just no excuse for it. You shouldn't have to run a five-day mental steeplechase just to learn the basics of a high-end word processor. That only results in large amounts of expensive shelfware.

So what's going on here? Some major issues stand out:

**SETUP** Who knows what device drivers are? Who knows that 07 means gray on black when you're setting the colors on a screen display? Why can't anyone write a setup program that makes sense? And I don't mean a maze of menus that seem endlessly recursive. Instead, the menus should offer enough depth and hand-holding for novices but be flexible enough to let experts avoid them if they wish. The *WordStar 3.3* setup programs show the right idea (sans the DEBUG code, of course).

**MANUALS** Manuals should be clear and succinct. They should be like automobile users' guides—not like the Talmud—and read the way we think. That's not easy, I'll agree, but most of them stink. The best are the Microsoft language manuals.

**PROGRAM COMPLEXITY/SOPHISTICATION** The more sophisticated a program gets, the more difficult it is for the newcomer, so most "easy to use" products have limited functions. But it doesn't have to be that way. Anyone can sit down and fully use ABT's *Project Manager's Workbench*, the most sophisticated package in its class. Why can't more companies make products like that?

**USER INTERFACE** Pete Peterson, head of WordPerfect Corporation, recently asked me if I used *WordPerfect*. I said no, because I have a terrible memory, and I hate rooting through a template or pamphlet all the time. Why can't keys be intuitive? What ever happened to <Esc> to back out of a program, or something as obvious as <Alt>-P to print? Designing a good, clear user interface is a painstaking, time-consuming process. And it really starts with good program structure.

**GRAPHICS INTERFACE** I hope I'm never reduced to having to point to a little garbage can in order to delete a file. I think the WIMP (windows, icons, mouse, and pointer) interface is a cop-out and actually constrains the software designer.

I lay blame first on vendors and second on magazine product reviewers. The vendors find it easiest to compete by using fancy marketing and sheer numbers of features. They cram in what they can and let the user sort it all out.

Most reviewers are too busy playing journalist. They don't take the time to live with a product to see what makes it tick. They get snowed by benchmarks and numbers of features, and just plain intimidated by "name" vendors. How many times have I seen a major new release rated "highly easy to use" and later found it the exact opposite?

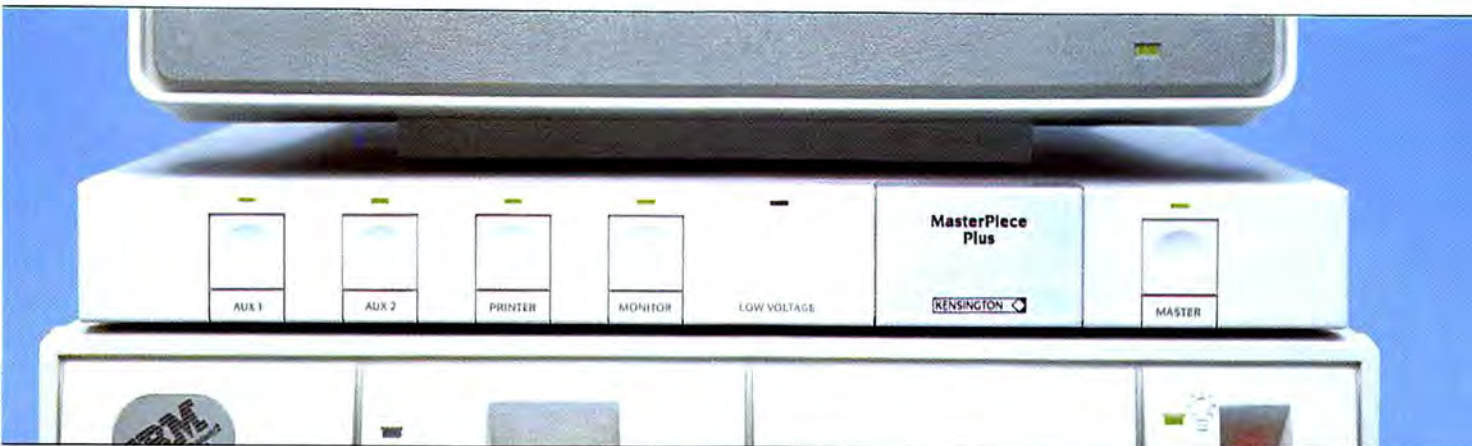
One of these days I'll build a word processor myself that's both sophisticated and easy—for you, Mom. ●

*Brian Camenker is executive director of the Boston Computer Society's IBM PC Users' Group.*

*Have a different perspective? Write Dan Lavin, User Ombudsman, PC World, 501 Second St., San Francisco, CA 94107.*



# Give us an inch...



## ...and we'll give you complete power control. MasterPiece Plus

Master Piece Plus gives you everything you need to organize and protect your personal computer system. It offers five outlets, a master switch, surge suppression, noise filtering, static protection, a low voltage indicator, modem protection, and a swivel — all in one elegant unit just an inch and a half high.

Master Piece Plus blends in perfectly with any system. Just slide it between your monitor and system unit, and plug your equipment into its five outlets for complete control. Its master switch lets you power up everything at once, and its individual switches let you control your peripherals separately. Touch the master switch to shut down and you'll never accidentally leave anything running overnight.

Master Piece Plus also offers the most complete protection available. Its heavy duty surge suppression



circuitry exceeds strict UL and IEEE specifications. Its noise filtering circuitry protects against EMI and RFI. Its two protected phone jacks defend your modem (and PC) against surges and spikes on the phone line. Its nameplate dissipates harmful static whenever you touch it. And its unique low voltage indicator alerts you when your power level drops below the safety of 104 Volts, to warn you of dangerous low power conditions.

Master Piece Plus even has a hidden swivel that lets you adjust the angle of your monitor. (Easily detachable if your monitor already has a built-in swivel.)

Master Piece Plus — the only complete power center — only \$159.95. Call 800-535-4242 or 212-475-5200 for a Kensington dealer near you. Or write to Kensington, 251 Park Avenue South, New York, NY 10010.



*Setting new standards  
of performance.*



**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.

**1-800-548-3420**

Call to find out which JT Fax is right for you.  
PS/Q and 9600 baud now available, too.



**QUADRAM**   
An Intelligent Systems Company  
One Quad Way, Norcross, GA 30093  
(404) 564-5566. Fax: (404) 564-5528  
Quadram logo and JT Fax are trademarks of Quadram

Circle 168 on reader service card