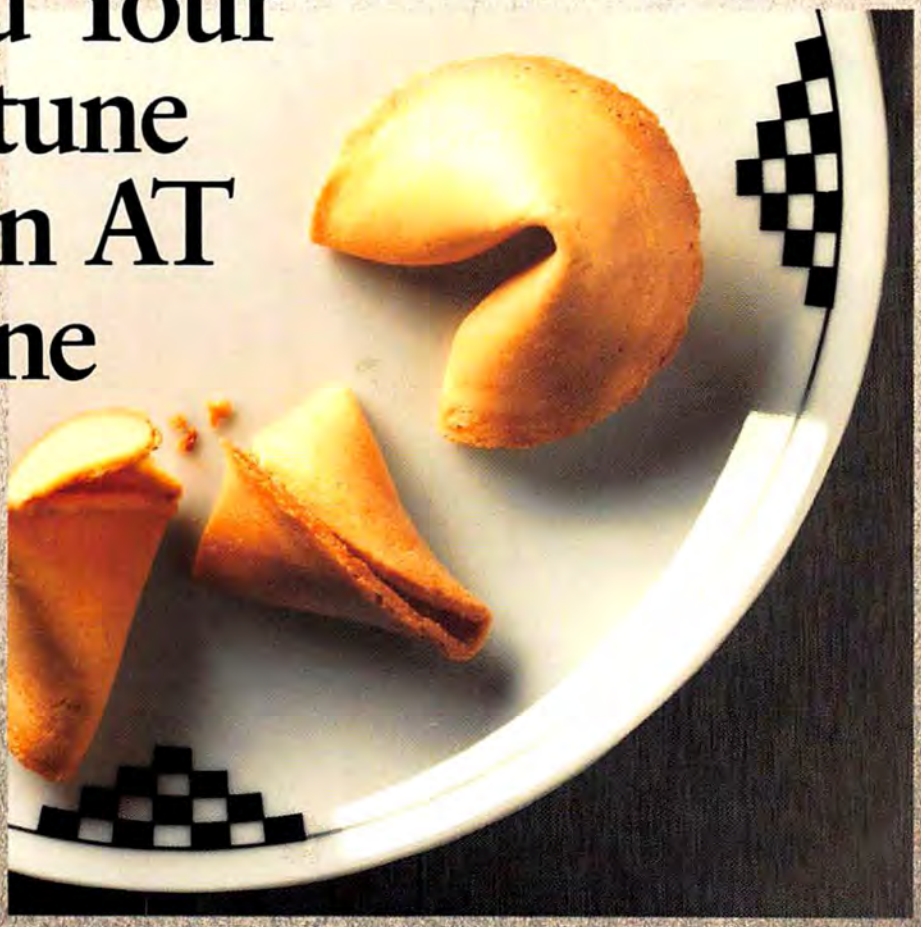
First Look–Compaq's Deskpro 386

PC WORLD

November 1986 $2.95
Canada & Foreign $3.95

The Comprehensive Guide to IBM Personal Computers and Compatibles

Find Your Fortune in an AT Clone



You will meet a mysterious stranger selling PCs. Believe him.

What's Best– A 1-2-3 Add-On That Maximizes Profits

Is Faster Better? Accelerator Boards Compared

How to Manage Files on Hard Disks

$10.00 Scratch 'n Win Rebate!

SideKick®

Instant Desktop Management!

Powerful desktop management program and the #1 best seller for the IBM® PC. SideKick includes notepad, calendar, calculator, appointment scheduler, telephone directory, autodialer, and ASCII table. It's RAM-resident—which means SideKick is always there ready to react when you need to do something, call someone, or find out something in a hurry. And it does all this *while you run* other programs. *InfoWorld* named SideKick "Product of the Year" in '85 and *PC World*'s William Urschel recently wrote that "*Borland's SideKick continues to be the most popular.*" Minimum memory: 128K. Suggested retail: copy protected, $54.95 (*only $44.95* with a $10.00 Scratch 'n Win Rebate); not copy protected, $84.95 or *only $74.95* with a Scratch 'n Win $10.00 Rebate!

SideKick for the Mac available!

Notepad and Calculator Window over Lotus 1-2-3®

Traveling SideKick!
Next year is 1987 *not* 1887!

Perfect Christmas/New Year's Gift!
$10.00 Scratch 'n Win Rebate!

aveling SideKick
ly.) Whether you use
er or have someone's
ideKick is the smart new way to take your computer with you—without taking your computer with you. Your appointments, phone list, address list, meeting schedule, travel itinerary—even your mailing list—can be kept up to the minute. If you already use SideKick, think of Traveling SideKick as SideKick's sidekick. The files in one can be instantly transferred to the other. Or you can use Traveling SideKick as a stand-alone! Minimum memory: 256K. Suggested Retail: $69.95 or *only $59.95* with a $10.00 Scratch 'n Win Rebate!

$10.00 Scratch 'n Win Rebate!

ATTENTION SIDEKICK USERS!

SuperKey®

Turns 1000 Keystrokes Into 1!

If you use SideKick, you need SuperKey. They're designed to work together—and work for you. SuperKey's an amazing keyboard enhancer for your IBM PC and compatibles. With easy-to-write macros, you and SuperKey can turn 1000 keystrokes into 1. SuperKey also includes powerful encryption technology (so powerful that the U.S. Government restricts the export of SuperKey) that can scramble your files and keep confidential files absolutely confidential. Unless you tell someone your secret password, no one else can get into your files for any good or not-so-good reason. SuperKey's macros put an end to keystroke repetition, and encryption puts an end to any security risk. Minimum memory: 128K. Suggested retail: $69.95, or *only $59.95* with a $10 Rebate from your Scratch 'n Win card!

How to use Scratch 'n Win Rebates

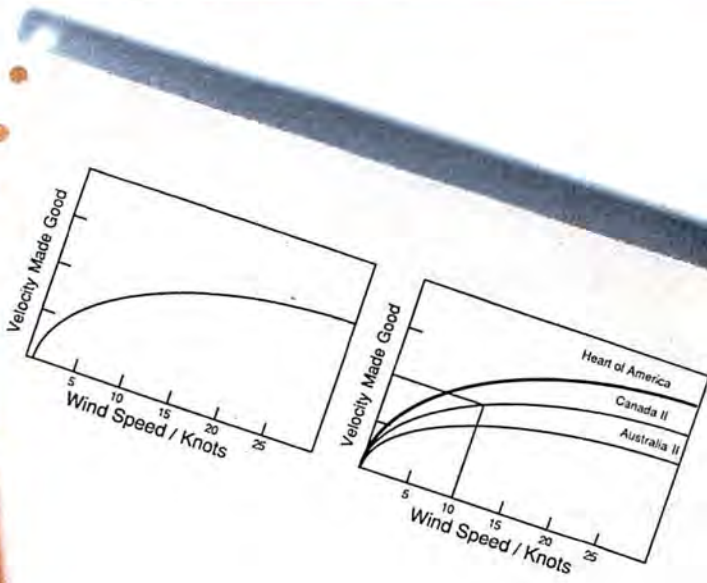
It's really simple. You purchase your product between 9/5/86 and 3/31/87, and return the license agreement along with dated proof of purchase and your rebate card. We'll mail you a check for $10.00 on single product purchases or a check for $15.00 when you buy an advertised "bundle"—which means our Turbo Pascal Jumbo Pack, or Turbo Lightning and Lightning Word Wizard, or Reflex: The Analyst and Reflex Workshop, or SideKick and Traveling SideKick. (Restrictions do apply. See Official Rules on back of Instant Winner card.)

Recognition for Borland International has come from business, trade, and media, and includes both product awards and awards for technical excellence and marketing.

America's Cup. Coming Soon!

Send a buck to the boat!

If you'd like to help America's effort to recapture the America's Cup from Australia, you can make a tax-deductible donation to "Heart of America" Challenge, 11 South LaSalle St., Suite 1670, Chicago, Illinois 60603



$10.00 Scratch 'n Win Rebate!

Turbo Lightning®

Solves All Your Spelling Problems Now!

While you use SideKick,® Reflex,® MultiMate,™ WordPerfect,® Microsoft® Word, Lotus 1-2-3®, and most popular programs, Turbo Lightning proofreads *as you write!* Lightning's a revolutionary new software program and the forerunner of a complete Electronic Reference Library. It includes the 80,000-word Random House® Concise Word List and the 50,000-word Random House Thesaurus. (If you use electronic mail services like MCI,℠ CompuServe,® BIX® or The Source,℠ Lightning will check your spelling on-line and save you from those unfortunate typos which tell a huge electronic audience that you can't spell for nutz!) The thesaurus, meanwhile, gives you instant synonyms—better ways to say it, write it, think it—so your vocabulary gets better all the time. "*Lightning's good enough to make programmers and users cheer, executives of other software companies weep,*" says Jim Seymour of *PC Week*. Minimum memory: 256K. Suggested retail: $99.95...*only $89.95* with a $10.00 Scratch 'n Win Rebate!

The Sound-Alike list of the Turbo Lightning Proofreader

$10.00 Scratch 'n Win Rebate bought separately, $15.00 Rebate when bought with Turbo Lightning!

Includes Turbo Pascal Source Code!

Lightning Word Wizard™

Technical Reference Manual For Turbo Lightning!

An important addition to Turbo Lightning, Lightning Word Wizard includes fascinating and challenging word games like "Akerue" (try reading that backwards), "That's Rite," "CodeCracker," "CrossSolver," "MixUp," and "FixUp," to name some of them. With CrossSolver, mind-benders like the New York Times crossword puzzle are demystified, solved, and your sanity saved. Lightning Word Wizard introduces you to the "nuts and bolts" of Turbo Lightning technology, and gives you more than 20 different calls to the Lightning engine. By studying the Turbo Pascal source code and the Lightning engine calls, you'll learn how to put word power into your own programs. You can use Lightning Word Wizard for the games it can play, and/or as the technical reference manual and development toolbox for Turbo Lightning. Minimum memory: 256K. Suggested retail: $69.95 or *only $59.95* with a $10.00 Scratch 'n Win Rebate! (Bundled with Turbo Lightning, $149.95 minus our $15.00 Scratch 'n Win Rebate on advertised bundles. *You pay only $134.95 for both!*)

Borland's Programming Languages and Toolboxes:

Turbo Pascal® 3.0 High-speed Pascal compiler and integrated programming environment.
Turbo Tutor® 2.0 Basic through advanced Turbo Pascal programming concepts and techniques.
Turbo Graphix Toolbox® High resolution graphics for Turbo Pascal.
Turbo Database Toolbox™ Complete library of database routines for Turbo Pascal.
Turbo Editor Toolbox™ Word processor construction set for Turbo Pascal.
Turbo GameWorks® Chess, Bridge, and Go-Moku in Turbo Pascal.

Artificial Intelligence:

Turbo Prolog™ High-speed compiler for Prolog, the 5th-generation Artificial Intelligence language.

Technical Specifications:

TURBO PASCAL 3.0 Minimum memory: 128K; includes 8087 and BCD features for 16-bit MS-DOS and CP/M-86 systems. CP/M-80 version minimum memory: 48K. 8087 and BCD features not available. ***TURBO DATABASE TOOLBOX*** Minimum memory: 128K. CP/M-80 minimum memory: 48K. Requires Turbo Pascal 2.0 or later. ***TURBO GRAPHIX TOOLBOX®*** Minimum memory: 192K. Requires PC/MS-DOS 2.0 or later, Turbo Pascal 3.0, and IBM CGA, Hercules Monochrome Card or equivalent. ***TURBO TUTOR 2.0*** Minimum memory: 192K. CP/M-80 version minimum memory 48K. Requires PC/MS-DOS 2.0 or later and Turbo Pascal 3.0. ***TURBO EDITOR TOOLBOX®*** Minimum memory: 192K. Requires PC/MS-DOS 2.0 or later and Turbo Pascal 3.0. ***TURBO GAMEWORKS®*** Minimum memory: 192K. Requires PC/MS-DOS 2.0 or later and Turbo Pascal 3.0. ***TURBO PROLOG®*** Minimum memory: 384K. ***REFLEX: THE ANALYST®*** Minimum memory: 384K. Requires IBM CGA, Hercules Monochrome Card or equivalent. Works with Intel's AboveBoard-PC and -AT, AST's RAMpage! and RAMpage! AT, Quadram's Liberty-PC and -AT, Tecmar's 640 Plus, IBM's EGA and 3270 PC, AT&T's 6300 and many others. ***REFLEX WORKSHOP®*** Minimum memory: 384K. Requires Reflex The Analyst. ***TURBO LIGHTNING®*** Minimum memory: 256K. Two disk drives required. Hard disk recommended. ***LIGHTNING WORD WIZARD®*** Minimum memory: 256K. Requires Turbo Lightning. Turbo Pascal 3.0 required to edit source code. ***SIDEKICK®*** Minimum memory: 128K. ***TRAVELING SIDEKICK®*** Minimum memory: 256K. ***SUPERKEY®*** Minimum memory: 128K. *For IBM PC, AT, XT, PCjr and true compatibles only, running PC/MS-DOS 2.0 or later.

Never "Expires!"

Switch to Borland's Forget Stone-Age Diaries!

Traveling SideKick®

It's the electronic organizer for this electronic age. Neither you nor your secretary need to face 1987 with old-fashioned 1887 diaries. Traveling SideKick has everything they have—and a lot more. (Unlike dusty old diaries, Traveling SideKick doesn't "expire" at the end of '87, because it's electronic and good for '88, '89, '90 and on and on and on.) It's a professional binder, a software program, and a report generator—a modern business tool that prints your ever-changing appointments in daily/weekly/monthly/yearly form. (If your schedule changes *hourl* handles the changes ins your own personal comp help with that, Traveling

All Borland products are registered trademarks or trademarks of Borland International, Inc. or Borland/Analytica, Inc. Turbo Lightning Library is a trademark of Borland International, Inc. dBASE is a registered trademark of Ashton-Tate. AboveBoard is a trademark of Intel Corp. AST TurboLaser, AdvantagePremium, SixPakPremium, 3G Pak, RAMpage! AT and RAMpage! are registered trademarks of AST Research Corp. Liberty is a trademark of Quadram Corp. Hercules is a trademark of Hercules Computer Tech. CP/M is a registered trademark of Digital Research, Inc. IBM, XT, AT, and PCjr are registered trademarks of International Business Machines Corp. Multimate is a trademark of MultiMate International Corp. WordPerfect is a registered trademark of Satellite Software International. Microsoft Word is a registered trademark of Microsoft Corp. BIX is a registered trademark of McGraw-Hill Inc. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. Random House is a registered trademark of Random House, Inc. CompuServe is a registered trademark of CompuServe Corp. The Source is a service trademark of Source Telecomputing Corp. MCI is a registered service mark of MCI Communication Corp. Traveling SideKick is not in any way associated with Traveling Software, Inc. of Seattle, Washington.
Copyright 1986 Borland International. BI-1076A

How Borland is helping bring the America's Cup back to America!

"In the America's Cup, they don't give Gold Medals for second place"

Buddy Melges, skipper, "Heart of America," and one of the best helmsmen in the world.

Heart of America's skipper Buddy Melges with Borland International's skipper Philippe Kahn on a testing, training and analytical run, Santa Cruz, California.

Buddy Melges knows about medals. He's won both Olympic Bronze and Gold (Soloing Class, '72) and he knows there is no medal for coming in second in the America's Cup race.

"In the race, there are two *reaching* legs where anyone who doesn't fall overboard looks good, but the real duel is in the four *upwind* legs and two *downwind* legs. That's where you have to disadvantage your opponent, outsmart them, outguess them, and outsail them, and I think the kind of analysis Reflex provides is giving us a racing edge," says Melges.

"Borland's support has been both welcome and generous, and their interest in us is a lot more than the fact that we use Reflex® (and SideKick® and Turbo Pascal®). In fact, they didn't know we were using so many Borland products until we made a Tech Support call. They were more than helpful. Then one thing led to another, and now Borland is one of our sponsors. We're flying a Borland spinnaker, and they've even given us the full-time help of one of their top technical guys who's going down to Australia with us at Borland's expense. Philippe's an avid sailor and is so competitive that he keeps challenging us to race him in his boat here in Santa Cruz for the *Borland Cup.*"

"Heart of America" sporting its new Borland spinnaker, surfing downwind, Santa Cruz, California.

"So if trim tab angle is 4 degrees, windspeed's 21 knots and heel angle is 27 degrees, what's our best possible boat speed?"

Alex Brincko, "Heart of America," 12-meter racing yacht

Instant answer needed—because this is no academic question, *this is a race!* The America's Cup race, and the stakes are high. So Reflex: The Analyst® answers that question and the next question and a thousand other questions that stream at 4800 baud from *Heart of America*, one of the American contenders in the 1987 America's Cup races in Australia.

Reflex: The Analyst has to measure, calculate, connect, interconnect and interpret at least 20 different sets of criteria instantly. Data like *trim tab angle, wind speed, heel angle, heading, load on head stay, load on standing rigging, load on back stays, rudder angle,* give me lift vs drag, where's our best pointing angle?, what's our boat speed?, tell me and tell me *now!*

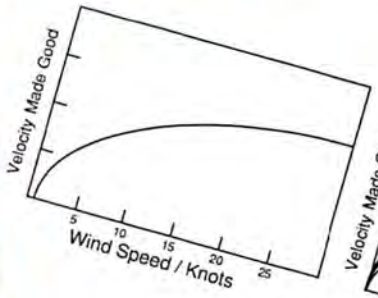
And in pure Reflex action, the graphs come up and the right answers race in.

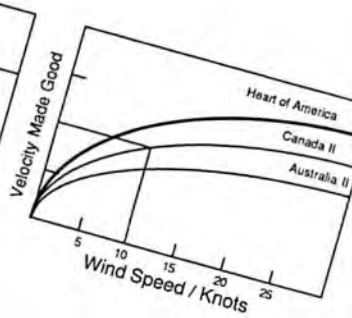
Wrong answer and you lose. Wrong move and you're history—because a wrong tack will cost you that *critical 30 seconds* that it takes a 12-meter yacht to get back up to speed.

America's Cup races are tactical, chess-game kind of races where the boats are usually equally fast, but the race pattern is *speed, speed, slowdown, speed, speed, slowdown*—and the *slowdowns* are tacks, sail changes, wrong guesses on the wind, and dumb moves on the high seas.

The *Heart of America* crew knows all that and more, and they're using Borland's Reflex: The Analyst to "Bring The Cup Up!" So here's to them all—and *Don't Leave Perth Without It!*

"There is no second prize" Omar Bradley





If You Use Lotus 1-2-3, You Need Reflex!

Reflex: The Analyst®

Unique, easy-to-use database management and analysis system. With Reflex, when you look, you see, because it shows you patterns and interrelationships that ordinary spreadsheets and database managers hide in data and numbers. It's also the greatest complement to 1-2-3.® Your What-If's?" are all answered, and you use Reflex's Form View, List View, Graph View, CrossTab View or Report View to take a revealing new look at what your numbers really mean. Adam B. Green of *InfoWorld* wrote, *"Everyone agrees that Reflex is the best-looking database they've ever seen."* Peter Norton of *PC WEEK* says, *"The next generation of software has officially arrived."* Minimum memory: 384K. Suggested Retail: $149.95 or *only $139.95* if you use a Borland Rebate coupon. (You can get both Reflex: The Analyst *and* Reflex Workshop for only $199.95, and this advertised "bundle" offers you a $15.00 Rebate, which means you pay *only $184.95* for both!)

$10.00 Scratch 'n Win Rebate!

NEW! Reflex for the Mac™ version now available!

$15.00 Scratch 'n Win Rebate on all Xmas packs!

NEW!

Reflex Workshop™

Gives you 22 different templates to help you understand and run your business. Minimum memory: 384K. Suggested Retail: $69.95 or *$59.95* with a $10 Borland Rebate from the Scratch 'n Win card!)

For Finance/Accounting:
- *Business Expense Tracking*
- *Petty Cash Tracking*
- *Line of Credit Tracking and Analysis*
- *Accounts Receivable Tracking and Aging Analysis*
- *Purchase Order Entry and Analysis*
- *Purchase Order Tracking System*
- *Leasing Inventory/Management*
- *Asset Inventory Tracking*
- *Cash Management Trial Balance*
- *Commercial Real Estate Tracking and Analysis*

For Administration:
- *Mail Lists*
- *Appointment Scheduling*
- *Applicant Tracking and Inquiry System*
- *Facilities Planning*
- *Project Scheduling*

For Sales & Marketing:
- *Sales Lead Tracking and Analysis*
- *Store Check Inventory Analysis*
- *Sales Analysis*
- *Trend Analysis*

For Production & Operations:
- *Manufacturing Quality Assurance Tracking*
- *Assembly Repair Turnaround Tracking*
- *Product Cost Analysis and Control*

YES! I want the best!

For credit card orders or the dealer nearest you

call (800) 255-8008

in CA call (800) 742-1133

Copies	Product	Price	Totals
__	*Reflex: The Analyst*	*$149.95**	$ ____
__	*Reflex Workshop*	*69.95**	$ ____
__	*Reflex, Reflex Workshop*	*199.95**	$ ____
__	*Turbo Prolog*	*99.95*	$ ____
__	*Turbo Pascal 3.0 w/8087 & BCD*	*99.95*	$ ____
__	*Turbo Pascal for CP/M-80*	*69.95*	$ ____
__	*Turbo Database Toolbox*	*69.95*	$ ____
__	*Turbo Graphix Toolbox*	*69.95*	$ ____
__	*Turbo Tutor 2.0*	*39.95*	$ ____
__	*Turbo Editor Toolbox*	*69.95*	$ ____
__	*Turbo GameWorks*	*69.95*	$ ____
__	*Turbo Lightning*	*99.95*	$ ____
__	*Lightning Word Wizard*	*69.95*	$ ____
__	*Turbo Lightning, Lightning Word Wizard*	*149.95*	$ ____
__	*SideKick*	*84.95*	$ ____
__	*Traveling SideKick*	*69.95**	$ ____
__	*SideKick, Traveling SideKick*	*125.00**	$ ____
__	*SuperKey*	*69.95*	$ ____
__	*Turbo Jumbo Pack*	*299.95*	$ ____

Outside USA add $10 per copy
CA and MA res. add sales tax $ ____
Amount enclosed $ ____
Prices include shipping to all US cities.

Carefully describe your computer system:
Mine is: __ *8-bit* __ *16-bit*
I use: __ *PC-DOS* __ *CP/M-80*
__ *MS-DOS* __ *CP/M-86*
My computer's name and model is:

The disk size I use is: ☐ 3½" ☐ 5¼" ☐ 8"
Payment: *VISA MC Money order Check*
Credit card expiration date ___/___
Card #

Name:
Shipping Address:
City:
State: *Zip:*
Telephone

CODs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by bank draft, payable in US dollars drawn on a US bank.
**Limited Time Offer*

NOT COPY PROTECTED
60-DAY MONEY-BACK GUARANTEE

If within 60 days of purchase you find that this product does not perform in accordance with our claims, call our customer service department and we will gladly arrange a refund.

All prices are suggested list prices and are subject to change without notice.

GF23

SPECIAL PRICES! AMAZING VALUES! ACT NOW!

Reflex: The Analyst *and the new* ***Reflex Workshop*** *for only $199.95! And a $15.00 Scratch 'n Win Rebate cuts that down to* ***only $184.95!***

It's the Works! Everything! The whole electronic enchilada! It's the ***Jumbo Pack . . . Turbo Pascal 3.0, Turbo Tutor 2.0, Turbo Editor, Turbo GameWorks, Turbo Graphix*** *and* ***Turbo Database.*** *All 6 Turbo Pascal programs for only $299.95—or* ***only $284.95*** *with a $15.00 Scratch 'n Win Rebate! That's about $47.00 each and that's a deal!*

Save a bundle on our bundles!

SideKick *and* ***Traveling SideKick*** *for only $125.00 but* ***only $110.00*** *after a $15.00 Scratch 'n Win Rebate!*

Turbo Lightning *and* ***Lightning Word Wizard*** *for only $149.95! and an* ***amazing $134.95*** *after a $15.00 Scratch 'n Win Rebate!*

BORLAND INTERNATIONAL

Vive la différence

4585 SCOTTS VALLEY DRIVE
SCOTTS VALLEY, CA 95066
(408) 438-8400 TELEX: 172373

Circle 481 on reader service card

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles
November 1986

208 **Better Than Big Blue?**

Before you look to the Far East for a low-cost, low-profile XT or AT compatible, look at this penetrating overview of what you should know about bargain imports.

252 **What's Best**

Trying to make the most of your inventory? Wondering how to cost-effectively staff your company? Take the guesswork out of these problems with *What's Best*, a *1-2-3* add-on that lives up to its name.

280 **Accelerate!**

Prescription for your PC's mid-life crisis: turbo boards from Orchid Technology, PC Technologies, and Classic Technology that put the processing power of the AT's 80286 into your tired system.

Getting Started

208 Better Than Big Blue?, *David Needle*

218 Oldies but Goodies, *Steve Cummings*
Buying a used PC takes some extra effort, but the money you save will be your own.

Community

226 The PC Hear and Now, *Thais Mazur and Ives Brant*
After years of suffering the "vaporware" stigma, PC-based voice recognition is finally making itself heard in the workplace.

236 Junior Partners, *Jane Mintzer*
In a successful symbiotic program, high school whiz kids helped New York businesspeople tackle common computing tasks.

240 "Software Support ... Please Hold," *Anita Amirrezvani*
Queueing up for technical support is a pervasive problem. *PC World* explores the emergence of fast, pay-as-you-go services.

Review

252 What's Best, *William Urschel*

260 Show-Stopping Slides, *Richard Jantz*
VCN Concorde combines a voluminous image library and a full range of graphing and painting features for stunning slide shows.

266 All the News That's Fit to Download, *Judy Getts*
Independent Publications' NewsNet is an on-line library that provides specialized business newsletters and major wire services.

272 Function Follows Forms, *Jonathan Marshall*
Software Solutions' *DataEase* provides a data entry screen for every occasion, from setting up menus to creating queries.

280 Accelerate!, *Robert Nusbaum*

State of the Art

296 Link Up With Light, *Judy Getts*
Local area networks are conducting their business over high-speed fiber optic cables fashioned of finely spun glass.

Hands On

306 Avert Hard Disk Disaster, *Donald B. Trivette*
Prudent habits and a few trusty utilities can keep you on good terms with your hard disk—and your data.

314 SuperKey Creates Custom Tutorials, *Rick Altman*
With *SuperKey*, a little patience, and some artful macros, you can create tailor-made training programs and demos.

324 Word's Responsive Merge, *Janet Crider*
Insert variable text in form letters? Just answer the on-screen prompts. *Microsoft Word*'s Print Merge command does the rest.

Departments

15 David Bunnell

37 Letters

69 Harry Miller

90 PC World View, *Edited by Eric Bender*
Insufficient power is the disease. The Deskpro 386 is the cure.

108 From the Software Shelf, *Edited by Robert Luhn*
Putting the *SQZ* on bloated worksheets

177 From the Hardware Shelf, *Edited by Eric Knorr*
AT&T's 6300 Plus straddles two worlds.

335 Password: Communicate, *Edited by Eric Brown*
Why the French have said *oui* to videotex

359 The Help Screen, *Karl Koessel*
Replaceable DOS parameter do-si-do

407 *.*, *Edited by Steven Cook*
Faster copying with *1-2-3*

425 Kevin Strehlo

Index

444 Advertisers

PC World Directory

445 A classified guide to products and services

Cover: photographed by Kathryn Kleinman

PC WORLD

November 1986
Volume 4, Number 11

David Bunnell
Editor-in-Chief

Jacqueline Poitier
Director/Art & Design

J. Kelley Younger
Executive Editor

Harry Miller
Editor

Skip Johnston
Art Director

Editorial
Managing Editor: Richard Landry
Associate Editors: Eric Knorr, Robert Luhn, Reed McManus
Southwest Editor: Ken Greenberg
East Coast Editor: Eric Bender
Editorial Mgr.: Cynthia Hamburger
Senior Copy Editor: Tema Goodwin
Technical Editor: Karl Koessel
Product Review Editor: Christine Whyte
Assistant Editor: Anita Amirrezvani
Copy Editors: Barbara Lewis, Peggy Nauts, Felicity O'Meara
Editorial Assistant: Wesley Nihei
Editorial Administrative Assistant: Lori Bragg
Assistant to the Executive Editor: Gina Vanlue
Contributing Editors: Burton L. Alperson, Stephen A. Blumenthal, Steven Cook, Bill Crider, Eddie Currie, Danny Goodman, Jeremy Joan Hewes, Janette Martin, Ted Nace, Art Wilcox, Andrew T. Williams

Art and Design
Designer: Monica Ames
Associate Art Director: Eleanor Leishman
Art Associate: Donna Sharee
Design Associates: Barbara Adamson, Laura Stoll
Design Consultant: Spiegelman Design Associates

Corporate Development
Manager: Karen Wickre
Special Projects: Jeffrey S. Glines

Production
Director: Herbert Linden
Senior Production Mgrs.: Frances Mann, Lee R. Trevino
Editorial Production Mgr.: Ellyn L. Hament
Production Editor: Susan M. Ford
Ad Traffic Coordinator: Jayne Boyer
Lead Typesetter: Mark L. Duran
Typesetter: Virginia Weir
Display Advertising Supervisor: MaryAnn DePietro
Advertising Billing Coordinator: Hollis Brush
Production Assistant: Rosanne Reynoso

James E. Martin
Publisher

Advertising Sales & Marketing
National Advertising Mgr.: Margaret O'Reilly (415/546-7722)
Northern California (San Francisco) & Northwest: Sharon Van Leuven (415/546-7722)
Northern California (San Jose): Michela O'Connor (415/546-7722)
Southern California (Los Angeles): Susan Curtis *(Southwestern Mgr.)* (213/201-5900)
Southwest/Texas: Joanne Gillis (213/201-5900)
New England (Boston): Bob Ostrow (617/879-0700)
Midwest (Chicago): Bob Diftler (312/827-4477)
Northeast (New York): Jeff Edman (Eastern Advertising Mgr.) (201/967-1350)
Mid-Atlantic (Philadelphia): (201/967-1350)
Southeast (Atlanta): Judy Sutter (404/394-0758)
Action Ads/Directory Sales: Carol Watson
Advertising Services Mgr.: Ray Petsche

Circulation
Associate Publisher/Director of Circulation: Penny Ertelt
Circulation Subscription Mgr.: Gail Egbert
Single Copy Sales Mgr.: George Clark
Promotion Mgr.: Carolyn Goudsmit
Fulfillment Coordinator: Doug Norde
Promotion Coordinator: Billie Brownell

Research
Director: Cheryl Woodard
Research Mgr.: Gary L. Rocchio
Research Analyst: Ralph Ames
Administrative Assistant: Steven York

Administration
Director: Janet D. McGinnis
Accounting Mgr.: Pat Murphy
Facilities Mgr.: Joseph Wollenweber
Personnel: Shelly Ginenthal
Technical Mgr.: Nancy Canning
Assistant to the President: Christina W. Spence
Assistant to the Publisher: Loretta Giglione

Corporate
PCW Communications, Inc.

David Bunnell
Chairman

Bartlett R. Rhoades
President & CEO

Herbert Linden
Vice President

James E. Martin
Vice President

Jacqueline Poitier
Vice President

Cheryl Woodard
Vice President

Andrew Fluegelman
1943-1985
Founding Editor

PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $53.90 for two years (24 issues), $74.90 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 $12 per year for Canada and Mexico; add $25 per year for surface mail or $110 per year for airmail for all other countries. For subscriber service questions call toll-free 800/525-0643 (in Colorado 303/447-9330) or write: Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders call 800/642-9606. Second-class postage paid at San Francisco. POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 55029, Boulder, CO 80323-5029. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/546-7722; CompuServe 74055,412; The Source STE908; MCI Mail PCWORLD.

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 © 1986, PCW Communications, Inc. All rights reserved. The following are trademarks of PCW Communications, Inc.: PC World View, ".", PC World.

PC World™ is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes over 50 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of the group include Argentina: *Computerworld/Argentina*; Asia: *Asian Computerworld*; Australia: *Computerworld Australia, Australian PC World, Macworld*; Brazil: *DataNews, PC Mundo*; China: *China Computerworld, China Computerworld Monthly*; Denmark: *Computerworld/Danmark, PC World, Run* (Commodore); Finland: *Mikro*; France: *Le Monde Informatique, Golden* (Apple), *OPC* (IBM), *Theoreme, Distributique*; Germany: *Computerwoche, Infowelt, PC Welt, Computer Business, Run*; Italy: *Computerworld Italia, PC Magazine*; Japan: *Computerworld Japan*; Mexico: *Computerworld/Mexico*; Netherlands: *Computerworld Netherlands, PC World*; Norway: *Computerworld Norge, PC Mikrodata*; Spain: *Computerworld/España, PC World, Commodore World*; Sweden: *ComputerSweden, MikroDatorn, Svenska PC World*; United Kingdom: *Computer News, PC Business World, Computer Business*; Venezuela: *Computerworld Venezuela*; United States: *Amiga World, Computerworld, inCider, InfoWorld, Macworld, Micro Marketworld, PC World, Run, 73 Magazine, 80 Micro, Focus Publications, On Communications.*

A PUBLICATION OF CW COMMUNICATIONS

BPA

Interoffice Memo.

A single MaynStream™ backs up *all* the PCs in your office, file by file!

Protecting Files: Top Priority.

Hard drive users learn fast how indispensable tape backup really is. But equipping each of your PCs with its own backup system is a costly way to go. That's why we developed the MaynStream, our lightning-quick, *file-by-file* tape backup. When you've backed up one PC, just detach the MaynStream's Quick-Release Cable and snap it onto any other PC equipped with a low-cost MaynStream controller. Simple menus will guide you through another backup in seconds. And restoring data is just as easy. So when your hard drive forgets to treat your files like your business depends on them, the MaynStream remembers.

Backup That Won't Back Down.

The MaynStream is small, lightweight, and big on performance features. Its rugged design and convenient carrying handle make multi-PC backup a breeze. And talk about fast! Backup takes just 3 minutes* for the average 10MB drive (that's file-by-file, and it's still faster than the now antiquated image mode technology)! The MaynStream uses handy data cassettes small enough to slip into your shirt pocket. Available in 20 and 60 MB models.

Other Powerful Systems for the PC.

MaynStream internal, available in both 20MB and 60MB models.

MaynStream 60Q internal, available in 60MB model.

MaynStream portable, available in both 20MB and 60MB models.

MaynStream 60Q portable, available in 60MB model.

Transport Plus™ portable combination 20MB hard drive and 20MB tape backup.

Transport™ 20MB portable hard drive.

All Maynard systems are backed by our 1-year warranty.

Sold at the finest computer stores. Contact your local dealer or write to us today for product information.

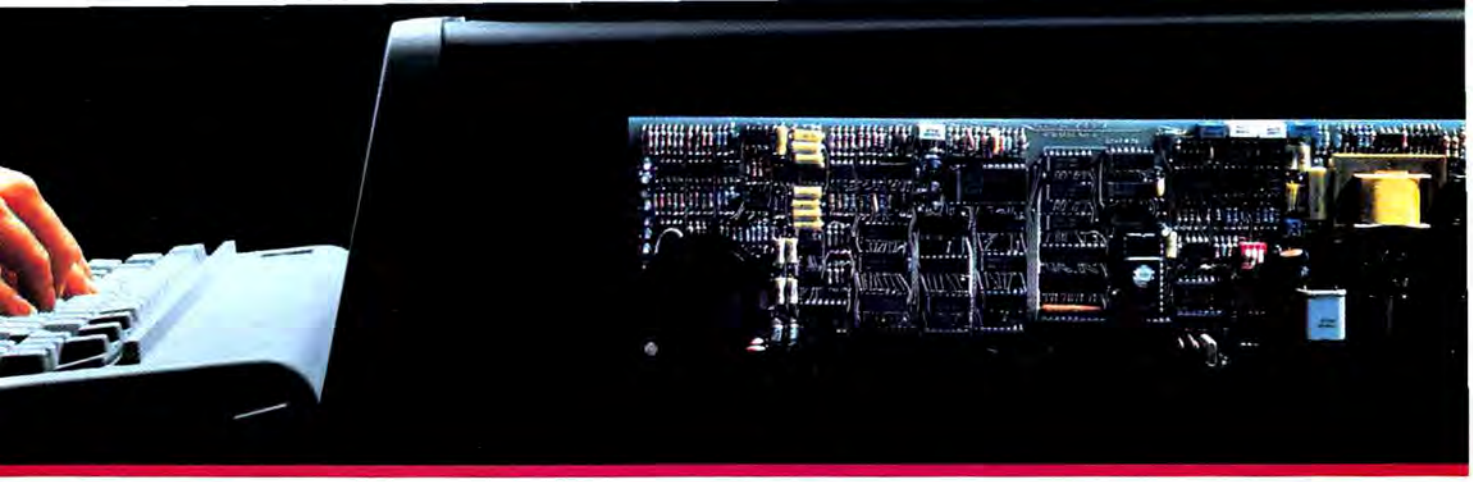
Maynard Electronics

Shaping tomorrow's technology.

460 E. Semoran Blvd., Casselberry, FL 32707 305/331-6402

*Actual time: 2min/57sec. Total files backed up: 376 consisting of 10,002,432 bytes. Computed on IBM PC with 512K memory and one 10MB hard disk drive. Your actual backup time may vary. IBM PC is a trademark of International Business Machines.

Circle 98 on reader service card



Error-Correcting 2400 bps Modems from Multi-Tech Systems:

When it has to be as good as it is fast

- Dial-up 2400 bps modems have arrived. More datacomm users are upgrading from 1200 to 2400 than ever before. But there can be a flip side to increased speed: More transmission errors.
- That's why our MultiModem224E™ offers MNP™ error correction. Available in our 2400 bps desktop, internal and rack-mounted modems, MNP gives you 100% error-free transmissions. No matter how bad the phone line. And MNP does it without the speed degradation of the less efficient, software-based protocols.
- Another important point: MNP Class 3 has emerged as an industry standard. It's now in the public domain, and has been implemented in virtually all 2400 bps modems that offer error-correction.
- So, why buy error-correcting modems from Multi-Tech? There are lots of good reasons, including:

1. Multi-Tech modems are 100% Hayes-compatible (more so than Hayes' own 2400 bps modems*). And our MultiModem224E with error-correction costs less than a Hayes Smartmodem 2400™ without error-correction.
2. Bonus features, like speed conversion. Both synch and asynch operation. And battery-backed option settings and phone number memory.
3. Versatility. The auto-dial/auto-answer MultiModem224E modems run at 2400, 1200 or 300 bps, with or without error-correction, and do so automatically.
4. A two year warranty that means something. Since Multi-Tech modems are designed and manufactured at our Minnesota headquarters (as they have been for the last sixteen years), you know we'll be here when you need us.

- Please call us toll-free, at **1-800-328-9717**, to get the rest of the reasons. And get a modem that's as good as it is fast.

**InfoWorld–8/5/85–reprints available*

Trademarks: MultiModem and the Multi-Tech Systems logo: Multi-Tech Systems Inc. • MNP: Microcom Inc. Smartmodem: Hayes Microcomputer Products, Inc.

MultiTech Systems

The right answer every time.

Circle 870 on reader service card

Multi-Tech Systems, Inc. • 82 Second Avenue S.E. • New Brighton, Minnesota 55112 U.S.A.
1-800-328-9717 • 1-612-631-3550 • TWX 910-563-3610 (Domestic) • Telex 4998372 MLTTC (International)

FACTORY DIRECT

Just in Time!

Kamerman Labs XT's

640K, 135 Watt power supply, 360 KB floppy drive, IBM*-style keyboard. Turbo 4.77-6.77 MHz–30% faster.

KL-XT **$699***

KL Turbo XT **$799***

IBM-Compatible XT&AT Hard Disks**

	XT Fixed Disks	AT Fast Access
20 MB	$299	$579
30 MB	$499	$699

60 MB Streaming Tape Backup **

Both image and file-by-file backup and restoration.

Internal or external portable units, both **$499**

Kamerman Labs TCS 7000™

Software

16 bit 80286 unit, selectable dual 6/8 MHz motherboard – 30% faster, 1.2 Mbyte floppy, 192 Watt power supply, AT style keyboard.

$1399*

Display Cards

Enhanced Graphics Adapter	$299
IBM-Compatible Color Card	99
Hercules™-Compatible Monographic Card	99
IBM-Compatible Monochrome Card	79

Modem & I/O Cards

1200 bps, Hayes™-compatible, internal modem with software. **$129**

XT Multi-function I/O	$129
AT Multi I/O	$229

Kamerman Labs Masterflight™**

High performance mass storage system with up to 60 Mbyte tape and/or 60 Mbyte disk, peripheral director, surge protector, noise filter, security lock.

From **$899**

Kamerman Labs Slot Machine™

A 21 MB complete hard disk drive on a card. Fits 1½ expansion slots in IBM PC/XT or compatibles.

$449

Kamerman Labs

TO ORDER CALL: 800-522-2237

7861 SW Cirrus Drive, Beaverton, OR 97005
Oregon and Alaska (503)626-6877 Telex 501 886

IBM PC, XT & AT are trademarks of International Business Machines. Hercules is a trademark of Hercules Computer Technology. Borland is a trademark of Borland International. Hayes is a trademark of Hayes Microcomputer Products, Inc. Kamerman Labs is a trademark of Kamerman Labs, Inc. Some quantities may be limited. We reserve the right to substitute equivalent items. All prices and specifications are subject to change without notice. Add 3% for credit card purchases. *Monitor not included. **Controller kit not included.
© 1986 Kamerman Labs, Inc.

Circle 683 on reader service card

AST Sets The Multifunction Standard.

First there was SixPakPlus®...the single most popular PC enhancement product in history. Now AST makes the best even better. SixPakPremium™ sets the new standard for multifunction PC enhancement.

Expanded Memory and More I/O. The new standard includes up to two serial ports, a parallel port, optional game port and battery-backed clock/calendar. And we've beefed up the memory, giving you up to 2 megabytes of conventional and/or enhanced expanded memory.

Intelligent Memory.™ We dubbed our enhanced expanded memory *Intelligent Memory.* Intelligent, because it combines full Lotus®/Intel®/Microsoft® EMS compatibility with new, exciting capabilities. Capabilites no ordinary EMS board can match!

Guaranteed EMS Compatible. Test our Premium Guarantee. If within ninety days of purchasing a SixPakPremium, you find an EMS software package incompatible with it, we'll either establish compatibility or buy you a comparable EMS board of your choice.*

THE AST PREMIUM GUARANTEE

More Capability Than Ordinary EMS. SixPakPremium, together with its DESQview™ software—included at no extra cost, lets you organize up to nine standard PC applications at a time in your Intelligent Memory. And DESQview is compatible with hundreds of the most popular PC applications.

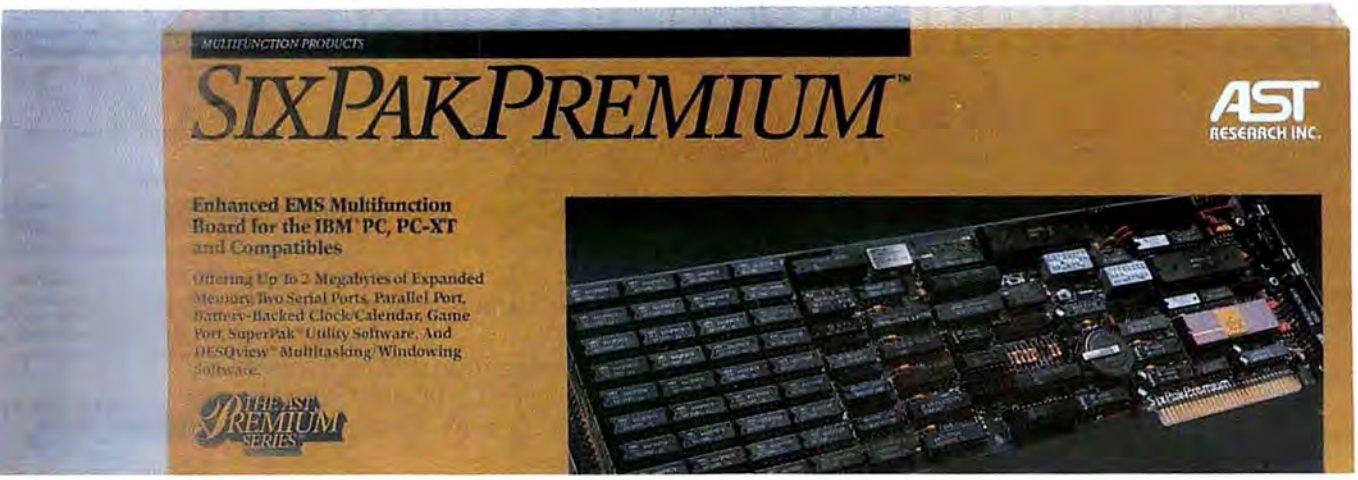
FastTask:™ The End Of Workflow Interruptions. Simply load all the applications you use during the course of the day into your Intelligent Memory once in the morning. It's that easy.

Now you're ready to FastTask. That's what we call the ability to move instantly from application to application. There's no fussing with diskettes or closing

*Applies to boards purchased after 9/1/86. Valid only in U.S.A. Some additional restrictions apply. For complete details write to AST Research, Attn. M.C.G.

SixPakPlus registered and SixPakPremium, Intelligent Memory, FastTask, Premium Guarantee and SuperPak trademarks AST Research, Inc. IBM registered trademark International Business Machines Corp. DESQview trademark Quarterdeck Office

Again.



down one application to open another.

It's easy to transfer data between applications like Lotus 1-2-3,® dBASE®II and WordStar.® And you can create windows to view applications, even run multiple programs at the same time.

SixPakPremium: The New Multifunction Standard

There's More.

We've included utilities for RAM disks and print spoolers. And our easy-to-comprehend documentation makes installing and using SixPakPremium fast and easy.

Call (714) 863-1480 For Your FREE Intelligent Memory Booklet! Or send the attached coupon to AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714-4992, Attn. M.C.

Yes, send me AST's Intelligent Memory Booklet.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone (_____) _____

Number of PCs _____

PCWRB059B2SPP
11/86

Send to: AST Research, Inc., 2121 Alton Ave.
Irvine, CA 92714-4992, Attn. M.C.

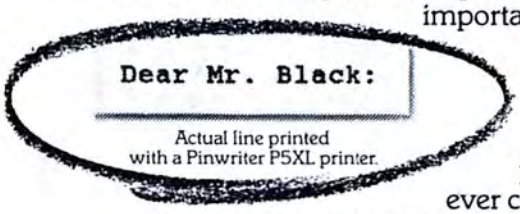
AST RESEARCH INC.

Systems, Lotus, 1-2-3 registered trademarks Lotus Development Corp. Intel registered trademark Intel Corp. Microsoft registered trademark Microsoft Corp. dBASE registered trademark Ashton-Tate. WordStar registered trademark MicroPro International Corp. Copyright© 1986, AST Research, Inc. All rights reserved.

NEC'S PINWRITER P5XL HAS MADE BLACK A PRIMARY COLOR.

Our Pinwriter® P5XL printer has changed forever the way people look at dot matrix printing.

It's the first 24-pin dot matrix printer to use a letter-quality multistrike film ribbon—the same ribbon used in typewriters and letter-quality printers, such as our Spinwriter.® So for the first time in computer history there is a printer that honestly does everything. A printer that produces important letters and documents with crisp, black, true letter-quality printing. But with all the speed and graphics capability dot matrix printers are known for.



Actual line printed with a Pinwriter P5XL printer.

Fast, black letter-quality printing will be the primary reason many people will buy a P5XL printer. But there are plenty of other good reasons. In fact, it's the most versatile printer ever created for personal computers.

It can use an optional ribbon to print seven other colors plus black. And it has the best graphics resolution of any impact printer you can buy, due in part to our advanced 24-pin printhead. Plus it can print more type faces automatically than any other dot matrix printer. And it's quiet and fast.

You can also expect a P5XL printer to turn out millions of characters before it will need service because it has the highest reliability rating in the industry. And there's a nationwide network of NEC Customer Service Centers to take care of maintenance.

Now, while the Pinwriter P5XL performs a little black magic, you won't have to go in the red to buy it.

The Pinwriter P5XL is the latest addition to the most advanced and extensive family of 24-pin printers available. See it at your dealer or for an information package that includes actual print samples, call 1-800-343-4418 (in MA 617-264-8635). Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

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

NEC

NEC Information Systems, Inc.

C&C Computers and Communications

The chevrons and serpentine designs are registered trademarks of Binney and Smith Inc., used with permission

Circle 124 on reader service card

HowardSoft gives you the upper hand on the bottom line.

HowardSoft® can help you get a firm grip on your financial matters. With the most accurate, timely, comprehensive and easy-to-use financial software on the market today:

Tax Preparer.®
Rating a perfect report card from InfoWorld, it's the #1 selling tax software in the nation. Simple. Yet incredibly powerful.

Real Estate Analyzer.®
Based on the same clear logic, and utilizing HowardSoft's time-tested tax experience, this bestselling tool provides a complete financial analysis of your real estate investment.

Tax Preparer: Partnership Edition.™
For producing partnership tax returns, with all the power, simplicity and tax expertise of Tax Preparer right at your fingertips.

HowardSoft packages are available for Apple (II series), IBM-PC or compatible. And each does the work of software costing many times its price. But the bottom line is this: The sooner you use HowardSoft, the faster you'll get a handle on your money. And that could mean you'll have a lot more money to handle.

Ask your dealer for a free demonstration.

HowardSoft.®
The software investment you can count on.

1224 Prospect Street, Suite 150
La Jolla, CA 92037
(619) 454-0121

IBM is a trademark of International Business Machines Corporation. Apple is a trademark of Apple Computer Inc. HowardSoft, Tax Preparer, Real Estate Analyzer and Tax Preparer: Partnership Edition are trademarks of Howard Software Services.

Everyone who travels

Presenting the IBM PC Convertible.

Now there's a personal computer you can use when you're in the office. And when you're not.

The IBM PC Convertible can change from desktop computer to portable at the drop of a hat. Because it works with both a detachable flip-up screen and an optional monitor.

Little Tramp character licensed by Bubbles, Inc., S.A.
© Copyright IBM Corporation 1986

should have a convertible.

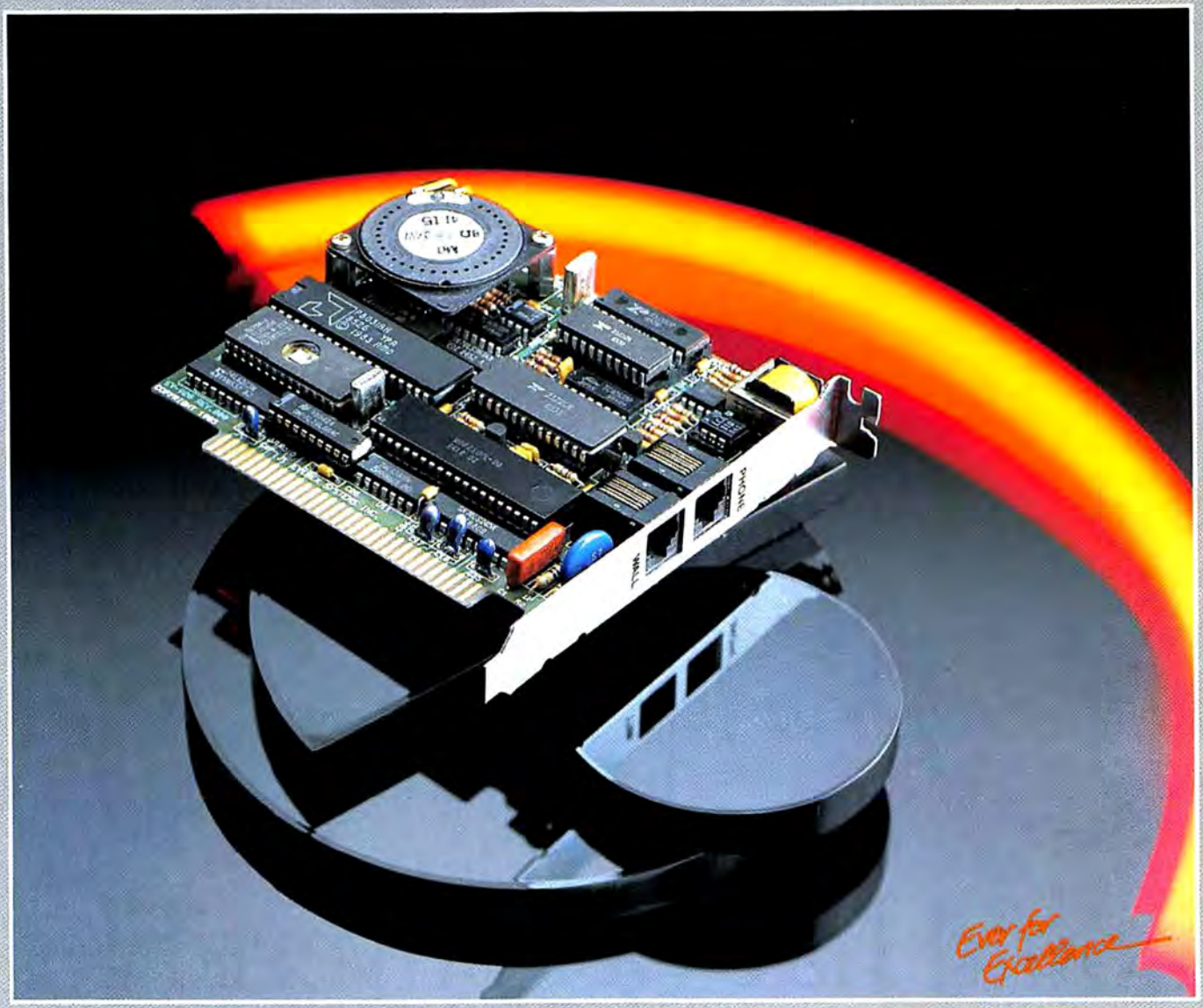
It weighs in at just over twelve pounds. But still has all the power you'd expect from an IBM PC. With two diskette drives and up to 512KB of memory, the PC Convertible can run many of the most popular business programs.

It works like other IBM PCs, too. Right down to the full-size keyboard and the 80-column, 25-line display.

And even when you add options, the PC Convertible is easy to carry. There's a printer, for example, that snaps on the back. And a modem that fits neatly inside.

So pick one up. Just visit an Authorized IBM PC Dealer, or call your IBM marketing representative. And be sure to ask about the IBM Credit Card and Commercial Lease plans. For the name of a store near you, call 1-800-447-4700. In Alaska, call 1-800-447-0890.

IBM®



Evercom™ 1200B for Every PC!

Innovative engineering and state-of-the-art technology has produced a winner from Everex! Evercom is now a household item with thousands of satisfied customers enjoying its benefits.

Features Plus

It connects to both the phone line and the phone itself. It is fully Hayes compatible and and can be set to COM1-COM4 ports. Various User conveniences include auto-matic receiver "off-hook" detect, call progress monitoring and auto data-to-voice switching.

The Software Partner

Bitcom ™, a powerful menu-driven communications program remembers up to 32,000 phone numbers. Call us today for the name of your local Everex dealer.

Before you buy a modem, check these features:

	EVEREX EVERCOM	LEADING EDGE MODEL "L"
• Hayes AT compatible	YES	YES
• 300/1200 baud	YES	YES
• Software Volume control	YES	NO
• Simplex communication for noisy lines	YES	NO
• Automatic data-to-voice switching	YES	NO
• Telset off-hook detect	YES	NO
• ROM test on command	YES	NO
• Speed mismatch message	YES	NO
• DTMF timing control	YES	NO
• Works in slot 8 of XT	YES	NO
• Runs with all versions of Smartcom II	YES	NO

1-800-821-0806
in California
1-800-821-0807

EVEREX
EVER for EXcellence

48431 Milmont Dr. Fremont CA 94538
(415) 498-1111

Evercom is a trademark of Everex Systems, Inc., IBM XT is a registered trademark of International Business Machines Corp., Model "L" is a trademark of Leading Edge Hardware Products, Inc.

Circle 699 on reader service card

David Bunnell

Coming Out of the PC Closet

A call to action! The great state of Georgia wants to develop its high-tech industry. But it is also the home of an oppressive law that threatens the spirit of the PC community. What can we do about it?

Usually in this column I focus on issues largely relevant only to the personal computer community. Now, in a departure from my regular subject matter, I'd like to address an issue with much broader social significance. It's one, I believe, that's important enough to merit your attention and your involvement.

Recently, I received a letter from Governor Joe Frank Harris of Georgia inviting me to take part in a technology tour of the Atlanta area. He's looking for good press about that region's great technological opportunities. Of course, Georgia has some wonderful success stories. After all, it's the home of some major personal computer companies and industry leaders.

Unfortunately, Georgia, like a handful of other states, happens to be the home of an oppressive law whose spirit stifles the very progressiveness Governor Harris hopes to promote in his quest for high-tech immigrants to his state.

I'm referring to the Georgia state law, recently upheld by the U.S. Supreme Court, that outlaws sodomy (defined as oral and/or anal sex)—even when practiced by consenting adults in the privacy of their own homes.

This statute threatens the personal sexual freedom of everyone—heterosexuals and gays alike.

By threatening to imprison or punish offenders, this archaic law may violate constitutional rights, including the Eighth Amendment's ban against "cruel and unusual punishment" and the Fourth Amendment's guarantee of "the right of the people to be secure in their persons [and] houses."

You may well ask, what does a law against sodomy have to do with personal computers and high technology? The answer is that the law conflicts with the very vision that compelled the growth of personal computers.

(continues)

A modern tool for time.

Introducing the KRONOS® TIMEKEEPER CENTRAL SYSTEM.

Now you can record, total, and report employee hours *automatically* using your PC. And communicate that information 300 feet or 3000 miles to your central payroll computer.

Timekeeper Central eliminates costly manual handling. Cuts errors to zero. Helps you control labor costs. Provides fast, accurate management reports. Assures employees that payroll policies will be enforced fairly, consistently.

And, the system is easy to install. We've done most of the work for you. Developed the right software, the right Timekeeper® terminals (badge or card), the right data communications. Just plug them in.

You pay for our ready-to-use software *once.* Then hook as many low-cost data collection terminals, on-site and remote, as you need to your central PC.

This is the computerized time accounting system you've been waiting for. Simple. Flexible. Cost-effective. With reliable National Sales and Service support.

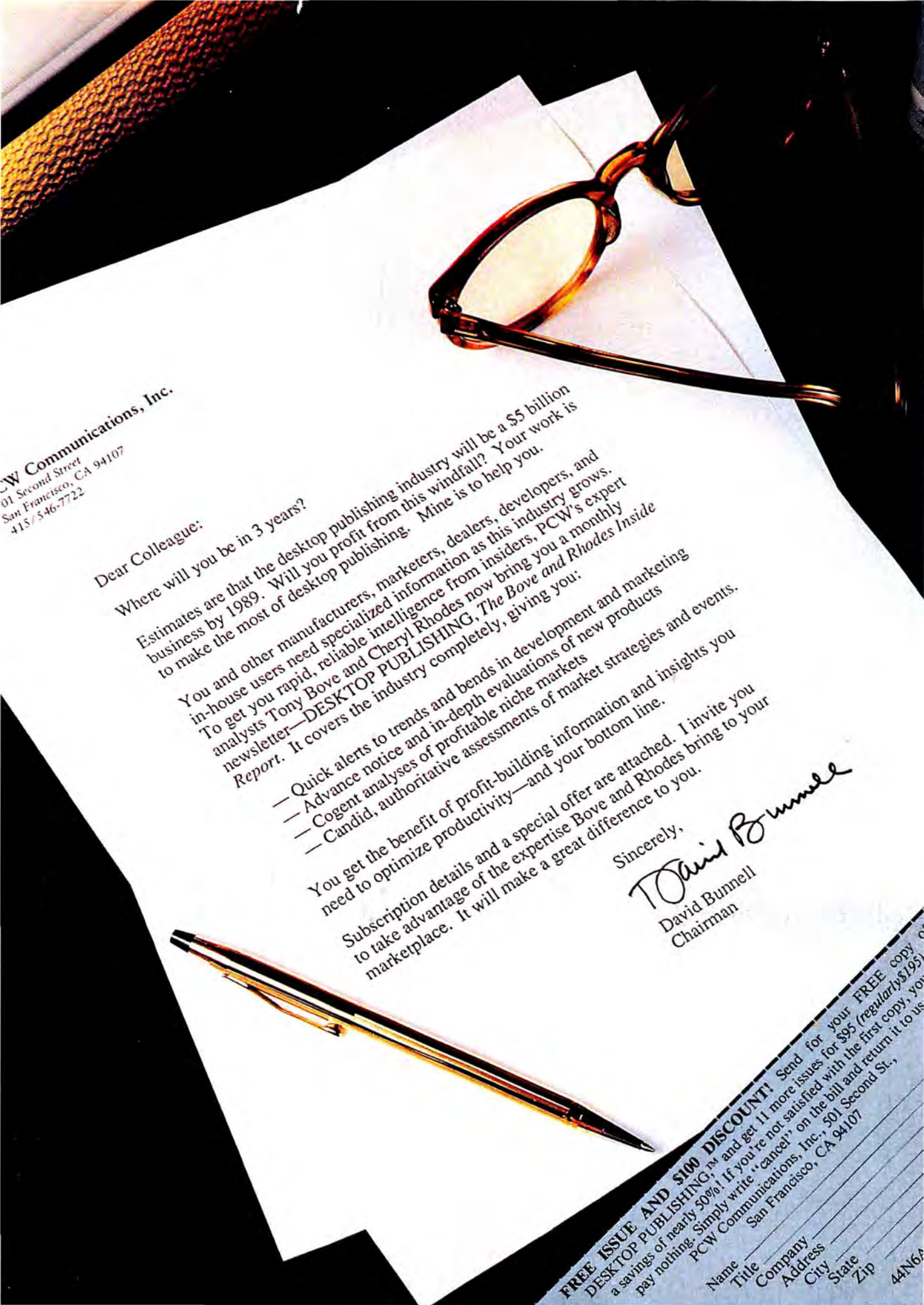
Call us today. Ask for our brochure, "Now You Can Centralize Time and Attendance Information, Right From The Start."

Call us
TOLL-FREE
1-800-225-1561.

Timekeeper Central features parameter driven software. Tailored on-site to fit your company's payroll policies. Easy to update.

Time Accounting Systems by KRONOS
Because every minute counts.

© 1986. KRONOS Incorporated
62 Fourth Avenue, Waltham, MA 02154
Circle 828 on reader service card



CW Communications, Inc.
501 Second Street
San Francisco, CA 94107
415/546-7722

Dear Colleague:

Where will you be in 3 years?

Estimates are that the desktop publishing industry will be a $5 billion business by 1989. Will you profit from this windfall? Your work is to make the most of desktop publishing. Mine is to help you.

You and other manufacturers, marketers, dealers, developers, and in-house users need specialized information as this industry grows. To get you rapid, reliable intelligence from insiders, PCW's expert analysts Tony Bove and Cheryl Rhodes now bring you a monthly newsletter—DESKTOP PUBLISHING, *The Bove and Rhodes Inside Report*. It covers the industry completely, giving you:

— Quick alerts to trends and bends in development and marketing
— Advance notice and in-depth evaluations of new products
— Cogent analyses of profitable niche markets
— Candid, authoritative assessments of market strategies and events.

You get the benefit of profit-building information and insights you need to optimize productivity—and your bottom line.

Subscription details and a special offer are attached. I invite you to take advantage of the expertise Bove and Rhodes bring to your marketplace. It will make a great difference to you.

Sincerely,

David Bunnell

David Bunnell
Chairman

FREE ISSUE AND $100 DISCOUNT! Send for your FREE copy of DESKTOP PUBLISHING,™ and get 11 more issues for $95 *(regularly $195)*, a savings of nearly 50%! If you're not satisfied with the first copy, you pay nothing. Simply write "cancel" on the bill and return it to us. PCW Communications, Inc., 501 Second St., San Francisco, CA 94107

Name _____
Title _____
Company _____
Address _____
City _____
State _____
Zip _____

44N6A

ANTHROCART.™

MOBILE...

A key reason why people like the AnthroCart. Share your hardware. Move it around. Take it room to room or floor to floor.

AnthroCart. High-tech furniture for high-tech equipment. Space saver. Compact. Rugged.

The AnthroCart is designed to move. Designed so your workspace is as slick as your hardware.

Call us: ***800-325-3841***

Supports up to 150 lbs.
All steel frame construction
5½ square foot footprint

ANTHRO

Anthro Corporation
Technology Furniture
3221 NW Yeon St.
Portland, OR 97210

Anthro Corporation is a wholly owned subsidiary of Tektronix, Inc. Anthro is a registered trademark of Anthro Corporation.

Circle 953 on reader service card

David Bunnell

The original vision of the personal computer world was based on the principle of a progressive, laissez-faire capitalist society. One that allowed for more personal expression and gave people greater decision-making power. A society where people were judged by their contributions and not their lifestyles.

Therefore, I feel that the personal computer world should think twice about supporting high-tech development in states that lack a decent social climate for high-tech to operate in.

In fact, it would behoove the state of Georgia and other states with similar laws to consider the sensibilities of those very individuals they are seeking to attract to their high-tech corridors.

The personal computer was created by renegade hobbyists who were committed to individualism. The PC promise—which thrives and is upheld by many of this industry's founders—is to preserve and enhance the power of the individual.

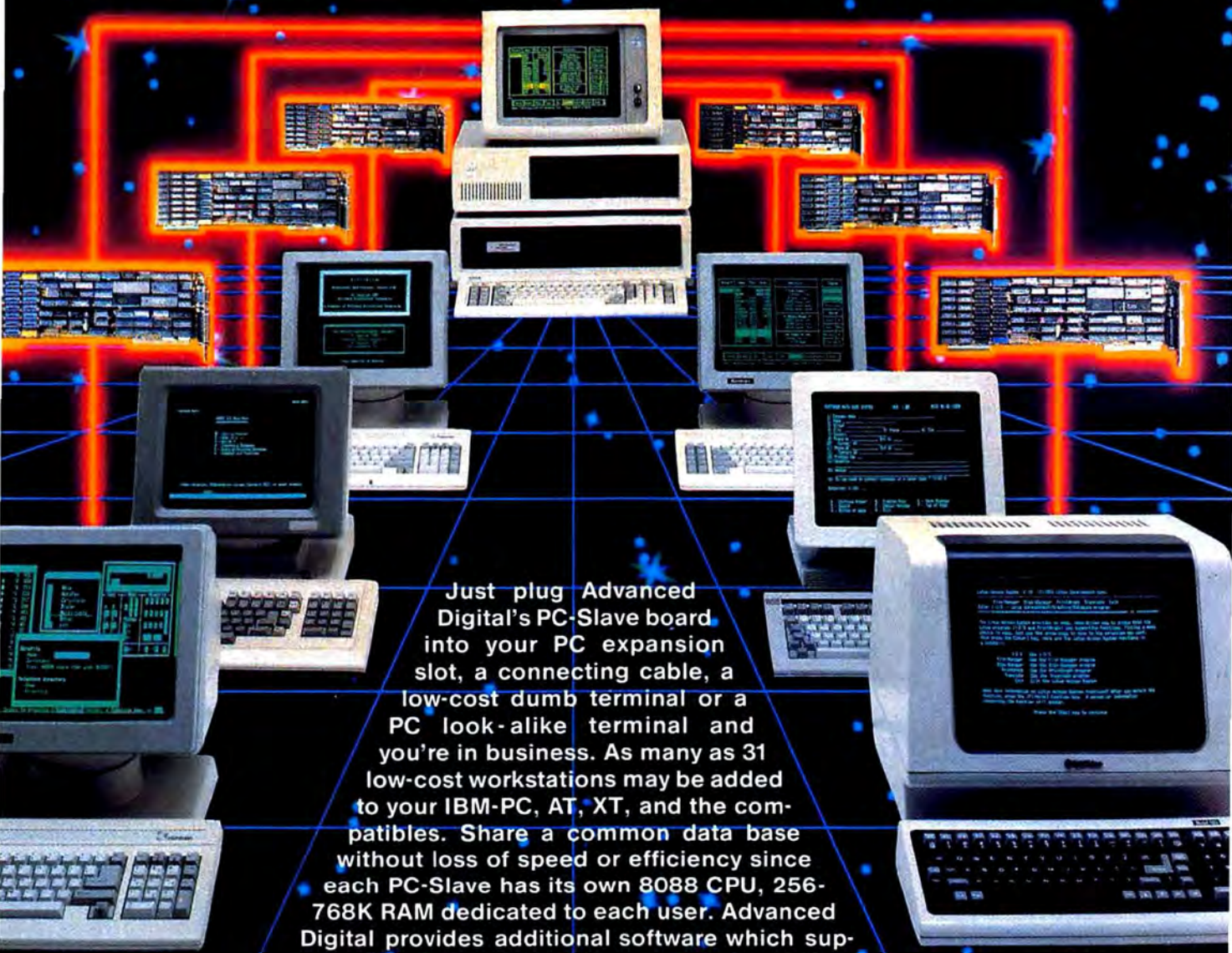
What that means is more freedom. Not less freedom.

Today, that same open spirit prevails in many personal computer companies where employees wear blue jeans and T-shirts to work. Where they have the freedom to come and go as they like, as long as they're really good at what they do. Their value as employees directly relates to the value of their work.

(continues)

MORE USERS FOR YOUR PC

Advanced Digital's PC-Slave is the solution to your multi-user or local area network problems.



Just plug Advanced Digital's PC-Slave board into your PC expansion slot, a connecting cable, a low-cost dumb terminal or a PC look-alike terminal and you're in business. As many as 31 low-cost workstations may be added to your IBM-PC, AT, XT, and the compatibles. Share a common data base without loss of speed or efficiency since each PC-Slave has its own 8088 CPU, 256-768K RAM dedicated to each user. Advanced Digital provides additional software which supports File & Record locking and print spooling. Advanced Digital's slave concept provides the best multi-user PC system available today! For the location of the dealer nearest you contact:

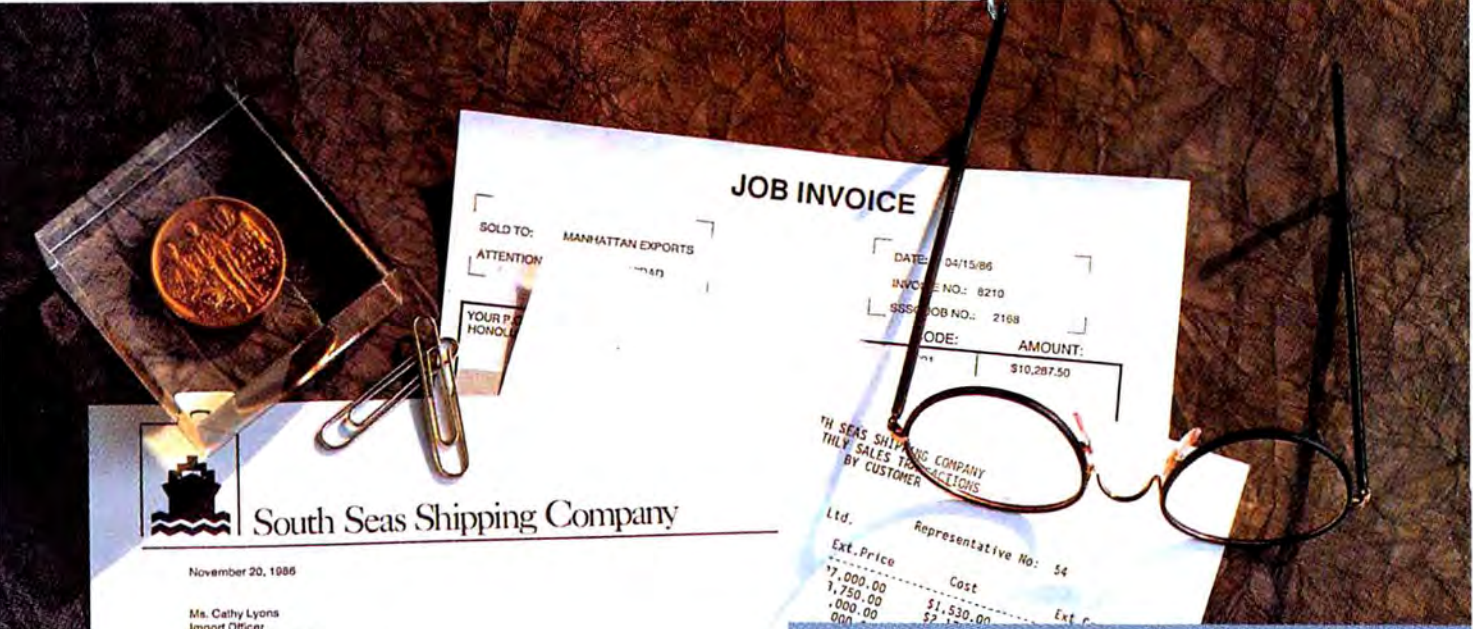
Advanced Digital Corporation
5432 Production Drive
Huntington Beach, CA 92649
(714) 891-4004 (800) 251-1801
Telex 183210 ADVANCED HTBH

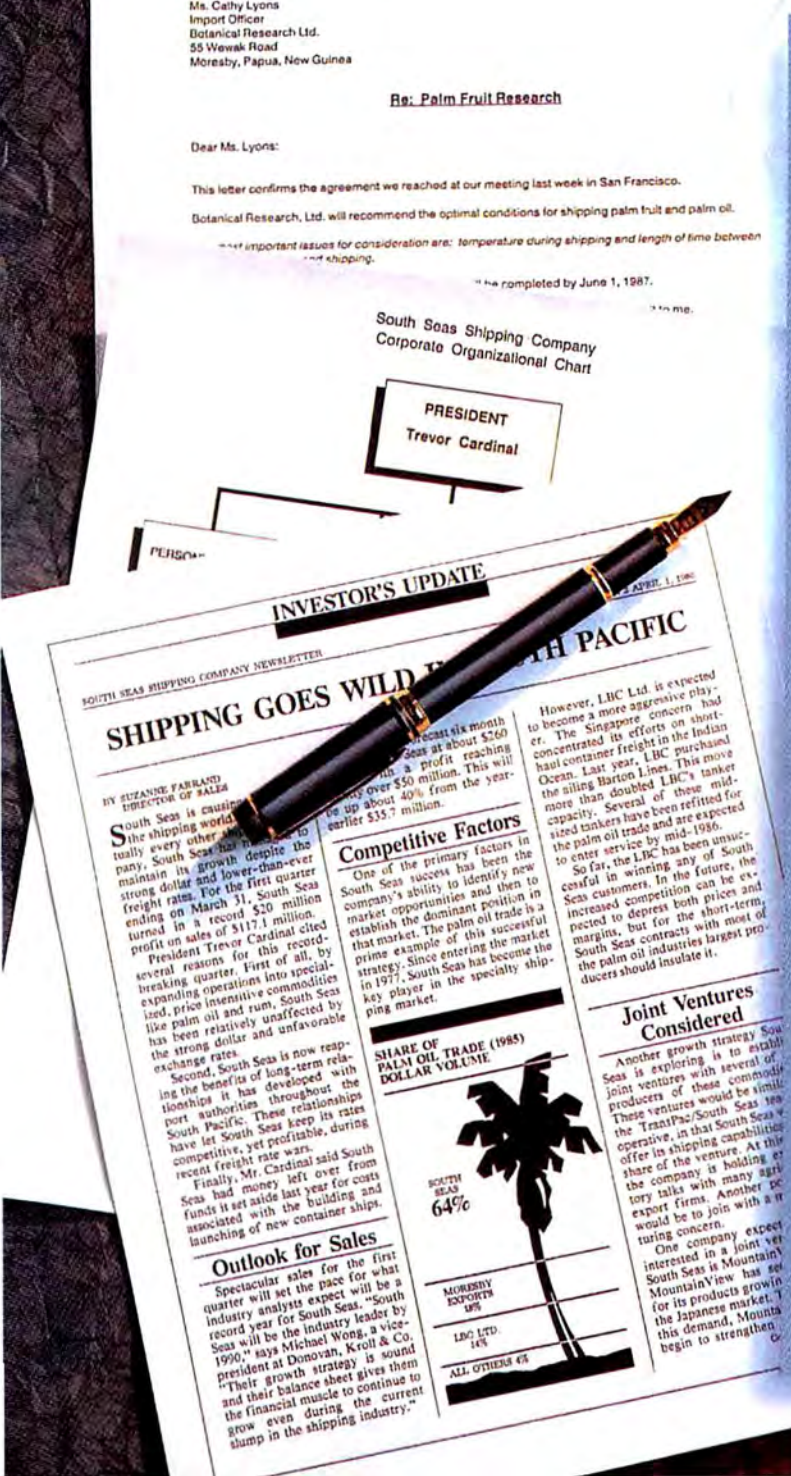
ADVANCED DIGITAL CORPORATION

Advanced Digital U.K. Ltd.
27 Princes Street, Hanover Square
London W1R8NQ-United Kingdom
(01) 409-0077 (01) 409-3351
TLX 265840 FINEST

Regional Distributors: in California, /Thomas Data Systems, Inc. (213) 214-4661; M P Systems (714) 770-6411; in Texas, M P Systems (214) 385-8885; in Ontario, Canada, B&L (416) 299-7660; in Australia, Archives Computers (03) 699-8377; Florida, IMS (305) 665-1515

Circle 944 on reader service card





What if...

YOU COULD PRINT EVERYTHING ON THIS DESK FROM A BUSINESS PC?

The world's best-selling desktop laser printer has something in store for just about every business that's ever dealt with the printed word.

Because the Hewlett-Packard LaserJet Printer is the only printer of its kind specifically designed to work with over 300 software programs. And since it hooks up to almost any business PC, it's right for all kinds of users—not just the art department. So you can print everything on this desk—from simple memos to your life's memoirs. And get high-quality, professional-looking output.

Combined with our very fast, very versatile HP Vectra PC (it's IBM PC/AT compatible) and the software of your choice, the HP LaserJet is the cornerstone for a complete desktop publishing solution. One your whole company can easily use.

Of course, the HP LaserJet also works with IBM PC's and compatibles. As well as software like Lotus 1-2-3, WordStar and d:BASE II. And, for around $3,000, it's *the* laser printer you can afford.

HP Vectra PC

We can't print all the reasons our HP LaserJet is the printer of choice. But if you stop by an authorized HP dealer or call us at **1 800 367-4772**, Dept. 710J for the one nearest you, we'll show you why HP quality printing makes very good business sense indeed.

Print samples produced on a LaserJet Plus with the following software packages: Studio Software Spellbinder® Desktop Publisher, MicroPro WordStar 2000® Lotus 1-2-3® and FormMaker II™ HP Vectra PC is a trademark of Hewlett-Packard. IBM PC is a registered trademark of International Business Machines Corp. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. WordStar is a registered trademark of MicroPro International. d:BASE II is a registered trademark of Ashton-Tate. © 1986 Hewlett-Packard Co.

HP LaserJet

HEWLETT PACKARD
Business Computing Systems
PG601PWX

Circle 242 on reader service card

Perfect Balance

Now the scales are in your favor. Dac-Easy Accounting gives you the best price plus tremendous performance. That means value, and the experts agree. Dac-Easy Accounting was recognized by *InfoWorld* as 1985's overall "BEST SOFTWARE VALUE."

No other accounting package can match the explosive user base or the unanimous acclaim from industry experts. Dac is the perfect choice for your first accounting system or for upgrading from a single module system. Either way compare, and you will join over 150,000 people who have computerized with Dac-Easy.

PERFORMANCE

Accurate information when you need it is what performance is all about. Fast, flexible reports give you what you need to know to manage cash-flow, turn inventory and increase profits . . . Listen to the skeptics-turned-believers.

"Dac-Easy Accounting is so inexpensive . . . we were skeptical . . . We expected to find a program that couldn't compete on a feature-by-feature basis . . . We were wrong."
InfoWorld, 1985

EXPANDABILITY

You never have to worry about outgrowing the Dac-Easy Series, which offers seven software products, support, and ten different business forms. All of our products are top performers offered at amazing prices.

Dac-Easy Payroll is the best full featured payroll system on the market.

Dac-Easy Tutors are disk-based tutorials available for Accounting and Payroll.

Dac-Easy Port sends accounting and payroll files to your favorite spreadsheet.

Dac-Easy Mate is the perfect companion to Accounting and Payroll offering file look-up, macros, calculator, color, and much more.

Dac-Easy Word is our easy to use word processor that is packed with powerful features.

Dac-Easy Forms and Fast Forms offer the best in continuous, multi-part forms, and checks.

INTEGRATION

Dac-Easy's seven modules work together perfectly. Enter data once and it's posted to the other modules automatically. Also, most modules can be used stand-alone.

SUPPORT

Subscribe to our toll free support agreement and join the best support program in the industry. Our friendly 12 person support staff are trained to answer your accounting and technical questions. No excuses, and no delays.

Find out for yourself why Dac-Easy is the fastest selling accounting package in history. Call us today!

FEATURES

General Ledger
- Unlimited multi-level accounts with screen inquiry for three years
- Pencil and pen correction option
- Automatic budgeting by department
- Unlimited journals and departments
- Excellent audit trail and flexible financial statements

Accounts Receivable
- Open invoice or balance forward per customer for unlimited number of customers
- Multi-sorted mailing labels
- Statements and invoices support automatic finance charges and special comments
- Detailed history for three years for number of invoices, sales, cost, and profits
- Customized aging report
- Automatic sales forecasting

Accounts Payable
- Checks handle multiple invoices, unlimited allocations and cash available protection
- Multi-sorted vendor labels and directories
- Customized aging report
- Automatic forecasting of purchases

Inventory
- Average, last purchase, and standard costing
- Physical inventory with perpetual comparisons
- Accepts fractional measure such as dozens
- Automatic forecasting of product needs
- Automatic forecast of product sales
- Detailed three-year history for every product
- Automatic pricing, alert and activity reports
- Screen inquiry for on-hand/on-order/sales/cost/profit/turns/GROI/etc.

Purchase Order
- Inventory and non-inventory items
- Allows up to 99 lines
- Per line discount in %
- Accepts generic deductions
- Accepts back orders and returns
- Purchase journal

Billing
- Service or Inventory invoicing on plain or pre-printed forms with remarks
- Prints sales journal
- Allows return credit memo

Forecasting

Unique program that automatically forecasts using your three-year history:
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost and profit
- Inventory item usage
- Four different forecasting methods

OVER 80 ROUTINES AND 300 REPORTS

FLEXIBILITY

Dac offers the rare ability to handle either service or product-oriented companies without sacrificing features.

"Dac-Easy Accounting is everything its designers say it is . . . It is also flexible enough to fulfill the accounting needs of almost any type of business."
Journal of Financial Computing, 1985

NOW FOR ATARI & APPLE

Dac-Easy Accounting and Payroll are now available for the Atari 520 & 1040 ST.

Dac-Easy Accounting is also available for the Apple II+, IIe & IIc.

Minimum hardware requirements
All Dac-Easy products run on IBM or other compatibles. 256K memory, two disk drives, MS-DOS, PC-DOS 2.0 or later, 132 column printer in compressed mode, color or monochrome monitor. Selected products available on the Atari ST and Apple II series.

Dac Easy Accounting

1986 PC WORLD World Class Winner

TO ORDER CALL TOLL FREE
1-800-992-7779
Ask for Operator #210
IN TEXAS CALL
1-214-458-0038
or mail the order form below.

Mail to:
dac software, inc.
4801 Spring Valley Rd
Bldg. 110-B
Dallas, TX 75244

Yes, please rush me the following Dac products:

Product	Qty.	Price	Total
Dac-Easy Accounting	___	69.95	___
Dac-Easy Payroll	___	49.95	___
Dac-Easy Word	___	49.95	___
Dac-Easy Mate	___	39.95	___
Dac-Easy Port	___	29.95	___
Dac Accounting Tutor	___	19.95	___
Dac Payroll Tutor	___	19.95	___
Add Shipping Charge			7.50
Texas Residents Add Sales Tax (6½%)			___
		TOTAL	___

☐ Check ☐ Money Order
☐ AMEX ☐ VISA ☐ MASTERCARD
Account # _____
Expires _____
Signature _____
Name _____
Company _____
Address _____
City _____
St. _____ Zip _____
Phone _____
Computer Brand _____
Type of Business _____
No. of Employees _____

30 Day Money-Back Guarantee
Dac Software offers an unconditional guarantee on all Dac-Easy products (less shipping charges). There is a $10 restocking fee if the disk seal is broken. This guarantee is available on all products bought directly from Dac Software.

MS-DOS is a trademark of MicroSoft Corp. IBM and PC-DOS 2.0 are registered trademarks of International Business Machines Corp.
#210

Circle 33 on reader service card

At last! - Fast, On-screen

FLOWCHARTS

Finally! An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work.

Interactive EasyFlow is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With this program you can quickly compose charts on the screen. More important, you can easily modify charts so they are always up to date.

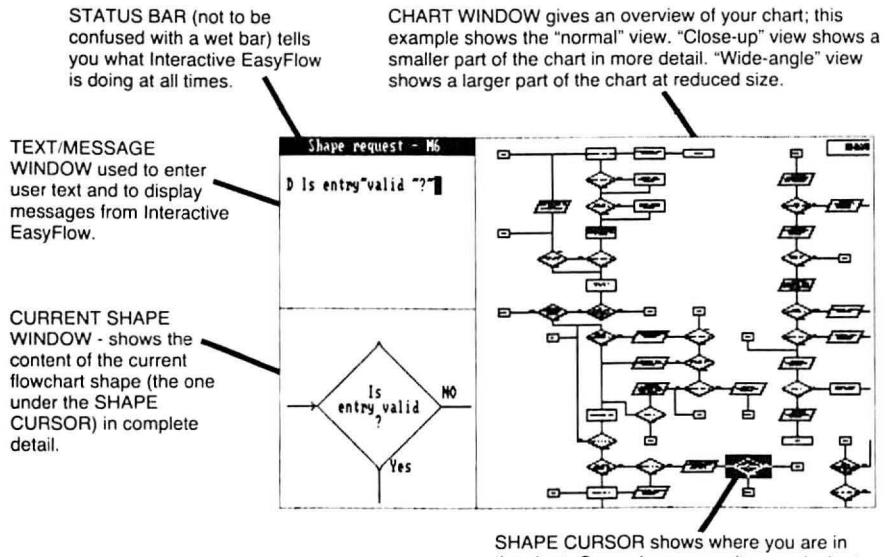
Features: • Text is automatically centered, character by character, within shapes as you type it • Text formatting controls allow you to over-ride the automatic formating where desired • Lines are created by specifying the starting and ending points - the program automatically generates the route • Cut and paste facility allows arbitrary chart fragments to be moved, copied rotated, reflected or sent to/from disk • Shape insert-delete and row/column insert-delete • Charts can be up to 417 characters wide by 225 lines high. Charts too wide for the printer are automatically printed in strips. • Charts can be larger than the screen - the window into the chart scrolls both horizontally and vertically as necessary • Works with many popular matrix printers including Epson, IBM graphics printer and compatibles. Full support for HP LaserJet and LaserJet Plus. Works with HP 7475A (& compatible) plotters. Can be used with ANY printer when non-graphic (character) output is acceptable • All standard flowcharting shapes included • Most shapes supplied in large, medium and small sizes • Extensive manual (100+ pages) includes many examples • Context sensitive "help" facility provides immediate assistance at any time • Any number of titles can be placed on a chart • Commentary text blocks can be placed anywhere in the chart • Fast: written in assembly language • Plus many more features than we can mention here

Requires at least 320K memory, DOS-2 or higher and an IBM or Hercules compatible graphics card. On EGA, full 640x350 resolution is used.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by MO, check, VISA, MasterCard, COD or Company PO. Rush orders accepted ($15.00 S&H; USA/Canada only). Rush orders received by noon will be delivered the next business day (to most locations).

Order Desk: 1-800-267-0668

The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting "help" and so on.



HavenTree Software Limited
P.O. Box 1093-M
Thousand Island Park, NY 13692
Information: (613)544-6035 ext 47

Circle 489 on reader service card

The industry guardians of the original PC vision are careful to foster this creativity. In doing so, they allow for a more richly diverse world and society. In fact, personal computer technology is moving away from what had been predominantly white, upper-middle-class management, to the great benefit of our society as well as other societies around the world. This broad-mindedness is helping to create new jobs, new opportunities, and new markets every day.

Now, it's extremely important to recognize that gay people are among the foremost contributors to the creation, success, and fulfillment of the personal computer vision.

Many programmers, designers, and engineers who happen to be gay have been the brains behind some of the most significant products that helped revolutionize our information-driven society.

How can people who are gay feel secure living in Georgia when an inhumane law hangs over their heads like the sword of Damocles?

In the meantime, I think we can take certain decisive steps to combat sexual apartheid in Georgia. Changing the law there would make it easier to reverse similar laws in other states.

PC users who are concerned about Georgia's sodomy law should use their PCs to create and

(continues)

How I work three times faster without raising a sweat.

I always considered myself a 'power' PC user. But waiting for the system to load and recalculate spreadsheets, post accounts, and sort databases, was holding me back.

Then I installed Orchid's TinyTurbo 286 high-performance accelerator. It's tiny in size: just a half slot card. And tiny in price. But there's nothing tiny about the performance: now my programs run three to four times faster than before. So I get AT performance without the AT price. And without the downtime of transferring my files to a new system.

I count on my PC every day. So I was glad to learn that TinyTurbo 286 is made by Orchid—the leading manufacturer of turbo products for accounting, finance, and other business professionals. And the only company offering a full line of turbos. They've even got a super high-performance PCturbo 286e with *five* times the speed of the PC. Nice to know, in case the work really piles up.

ORDER YOUR TINYTURBO TODAY.
IT WILL PAY
FOR ITSELF IN FOUR WEEKS.

	IBM XT	WITH TINYTURBO
Post 700 accounts	12 sec/acct (2.3 hours)	3.5 sec/acct (0.7 hours)
Sort 10,000 records	25.4 minutes	14.9 minutes
Spreadsheet recalc.	44 seconds	14 seconds
Integer calculation	10 minutes	3 minutes

I used to panic when my boss asked me to work up some additional reports an hour before a big meeting. Now I just smile and say, "no sweat."

TinyTurbo 286™

TinyTurbo 286 and PCturbo 286e are trademarks of Orchid Technology
IBM is a registered trademark of International Business Machines Corp.

ORCHID

WHEN YOU SAY TURBO,
YOU MEAN ORCHID.

47790 Westinghouse Drive, Fremont, CA 94536
(415) 490-8586 TELEX 709289

Circle 133 on reader service card

"If you can

EVEREX Streaming Tape Family

If you can find a company with better tape achievements, buy from them:

- Over 30,000 streaming tape sub-systems, ½ height, 5¼" form factor industry standard QIC 24 recording format, QIC-36 hardware interface and largest installed customer base worldwide.
- Over 100,000 industry standard streaming tape controllers in the field.
- The first company to release QIC-02 IBM-compatible software drivers to the OEM community.
- The first company to release an internal 5¼"half-height IBM compatible tape subsystem.
- The first company to release file-by-file retrieval from a mirror-image backup.

If you can find better streaming tape software, buy it:

User Interface

- Menu driven.
- Multiple windows (nestable and movable).
- Context sensitive on-line help.
- File selection from directory listing or command line.
- Constant tape status display.
- Menu driven hardware configuration guide.

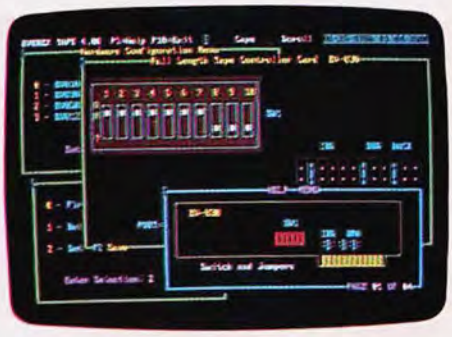
Tape Functions

- Multiple tapes allowing unlimited backup capacity.
- Multiple datasets for multiple backups on the same tape.
- Tape sequence management recorded on the tape.
- Programmable messages.
- File-by-file and image backup on the same tape.
- Installation program.

Functionality

- Physical image backup/restore of local disks.
- Logical image backup/restore of local or remote disks.
- File backup from any local or remote disk of any file size.
- File restore from image backup or file backup.
- Allows wildcards for selection of files.
- Automatic scheduler for unattended backups.
- Backup across networks (using logical image or file-by-file).
- Real time clock display.
- Backup any disk whether formatted for DOS or not
- Escape to DOS while in backup/restore operation.

Automatic Scheduler



Nestable, Movable Windows

find...

Backup with Multiple Datasets

Multiple Tape Restores

If you can find a streaming tape with better performance and system characteristics, buy it:

Performance

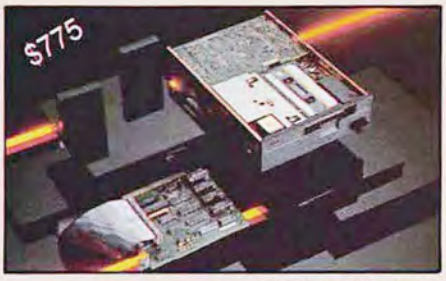
- File-by-file operations near streaming speed.
- Dynamic adjustment to disk and system speeds.

System Characteristics

- Hardware identification provides software integrity.
- External systems can be shared with many users.
- Same software for all types of tape drive, controller, and computer system configurations
- External systems uses a shielded round cable with a D-connector for tangle-free, easy connect and disconnect.
- Hardware read-after-write data verification.
- Track 0 seek to insure tape interchangeability.
- Original controller manufacturer.
- Industry standard QIC-24 tape format.
- Industry standard QIC-36 interface.
- Industry standard QIC-02 commands.
- Tape does not require pre-formatting.
- Available in 20MB, 60MB, and 100MB drive capacities.

...buy it!"

EVEREX Excel Streaming Tape.
For the name of your nearest EVEREX dealer or more information, call us.
Remember... We are
EVER for EXcellence.



Excel Stream 20 Internal

Excel Stream 60 Internal

Excel Stream 60 External ½ Height

Excel Stream 20 External

Excel Stream 60 External

Excel Stream 60-8 External

EVEREX
EVER for EXcellence ™

1-800-821-0806 1-800-821-0807 (in CA)

48431 Milmont Dr., Fremont, CA 94538

Circle 699 on reader service card

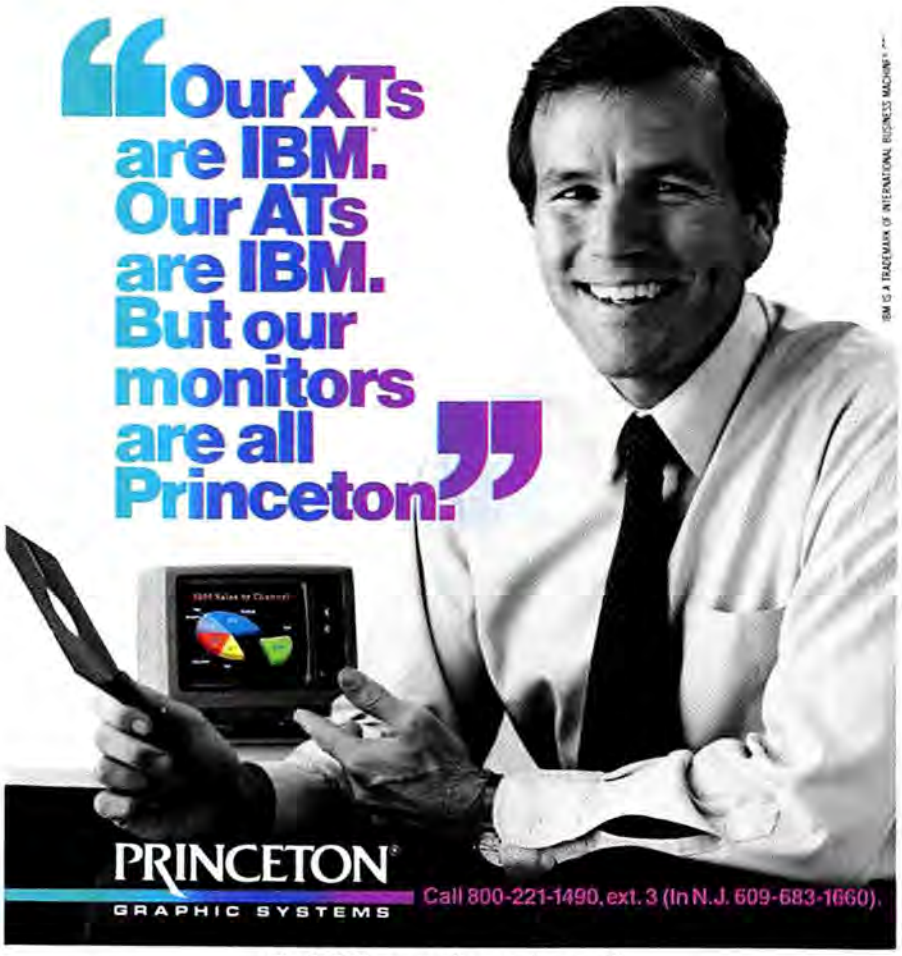
distribute mailing lists of Georgians who are influential in the state legislature and the civil rights movement.

Perhaps a massive letter-writing campaign would unleash the power of the PC to foster an environment in Georgia that we can all support and enjoy. Atlanta is a wonderful place, after all. It's one of the most elegant and charming cities in the world.

Above all, as concerned citizens—not only of the personal computer community but of the world beyond the keyboard—we should come out of our closets and rally to the cause of justice and freedom by exorcising this distinctly user-unfriendly law.

I encourage concerned readers to begin the campaign by writing to

The Hon. Governor
Joe Frank Harris
State of Georgia
Office of the Governor
Atlanta, GA 30334



Circle 931 on reader service card

Innovative Barcode Data Collection Systems

IBM PC/AT/XT keyboard reader Model BM-BAR

- Autodiscriminates all popular symbologies.
- With high clearance (up to 2mm) scanner.
- Install inline with keyboard and main unit without affecting keyboard operation.

THERMAL BARCODE PRINTER Model BW-110T or BARCODE PRINTER with reader Model BW-200T

- High density printing.
- Quiet operation.
- RS-232C and Centronics type interfaces to host computer.
- Internal reader permits barcode duplication without computer connection.

TOUCH SCANNER Model BD-500

- No manual scanning.
- Compact & light weight CCD scanner.
- Accurately reads symbologies on curved or bumpy surfaces.
- Autodiscriminates all popular symbologies.
- Clearance, up to 6m/m.
- Many functions programmable through RS-232C interface.

IBM-PC/XT/AT internally mounted barcode reader Model BMBD-51

- Autodiscriminates all popular symbologies.
- Decoded output to host is 8 bit ASCII

DISPLAY WAND Model PBD-10

- Data input/output terminal (RS232).
- Extended operation (up to 5 hours) on NiCd Battery.
- Applications programs easily developed using IBM's Basic interpreter.
- Light weight — 2.2 oz/90 g.
- Compact — Less than 7.5 in./186 mm. "Pocket" size.
- 40KB internal RAM for date, time and applications.
- 16 character LCD display for date, time, data and operator prompts.

Other products:

Pen Type Scanners
BS-Series
BL-Series
Fixed Scanners
BX-Series
Barcode Writers

BarComp Inc. 18226 W. McDurmott St., Suite D, Irvine, CA 92714
Phone: (714) 863-0901 FAX: (714) 545-8542

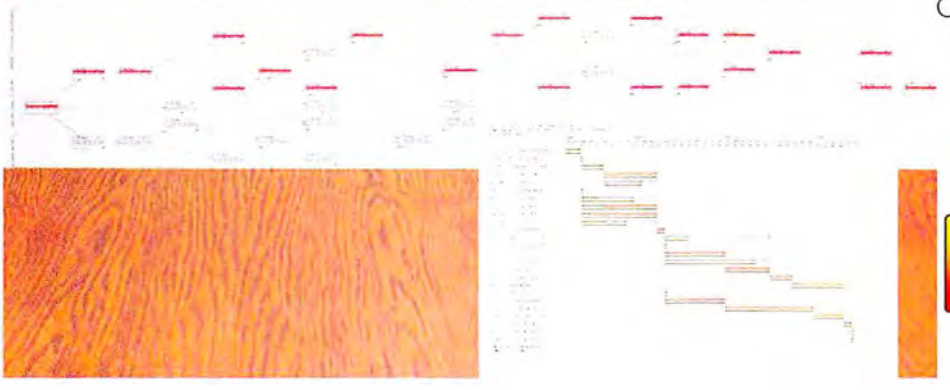
U.S. Exclusive Distributor of Mekano Systems, Tokyo, Japan

IBM PC/XT/AT are registered trademarks of IBM Corporation. Centronics is a registered trademark of Centronics Corporation

Circle 372 on reader service card

"Thirty minutes 'til the meeting and we've got changes?"

"Absolutely no problem . . ."



". . . when you use Scitor Project Management Software."

At Scitor we recognize that there is no one solution to project management dilemmas. Each manager is different and every project is unique.

That's why we've taken the time to fully develop two prime solutions:

Project Scheduler 5000, V.3

Project Scheduler Network, V.2.

The main difference between these products is one of user interface and emphasis on Gantt Charts and Network Diagrams respectively.

You choose the one that feels most comfortable to use.

With either one, you get a comprehensive product to help you anticipate change, make difficult decisions on schedule and cost, and respond quickly.

Call us for a detailed brochure. Or if you've already made your decision, call in an order.

415/570-7700

SCITOR
250 Lincoln Centre Drive
Foster City, CA 94404

Tallgrass wants to put a bug in your system.

Introducing Grasshopper.® Fast

20 or 40 Megabyte. Tape backup comes in a lot of packages nowadays, with a lot of promises. But to give you up to 40 Megabytes of convenient backup at an affordable price, many manufacturers have had to compromise. Those compromises create the kind of bugs you can't afford.

The Grasshopper is the bug you need. It is not a compromise. It is simply superior technology. That superiority gives you up to 40 Megabyte capacity with more capability, more absolute dependability than you will find elsewhere in the under $1000 price range. Or any price range.

Automatic. It's not just the machine that's dependable. You can depend on people using it, too. The Grasshopper is alone in offering completely automatic, internal backup. Every few minutes, at the times the operator is away from the keyboard, Tallgrass BackTrack® software will check your disk for changed files and automatically insert the changes on your backup tape.

That's just one of a half-dozen convenient, menu-driven backup options, but it's one that no competitor can offer.

Internal. It all comes in a very convenient package. The Grasshopper fits in a half-height floppy bay, and uses a data cartridge that fits comfortably in your shirt pocket.

Whether you need 20 or 40 Megabyte capacity, you get it with zero footprint. You can specify either capacity Grasshopper with a companion hard disk, and the Tallgrass controller for both disk and tape plugs into a single slot.

The entire Grasshopper family is

internal tape backup for $895.

available in compact external packages as well. And every system is covered by a one-year limited warranty.

Fast. The Grasshopper flies through backup functions with a 750 Kb/s data transfer rate, 50% faster than other budget alternatives.

Both the new 40 Megabyte storage system and the original 20 Megabyte Grasshopper offer logic circuitry and software unique to Tallgrass.

So both also permit selective record updates on the backup tape, reducing time requirements to an absolute minimum. We even provide XTREE™ directory and file management software for both disk and tape, to help organize and find your data.

Totally reliable. Tape error detection and correction are unparalleled. In fact the probability of error is so small as to be statistically insignificant. Our unique Data Reconstruction Code™ means you know your backup will be there to back you up. Every bit of it.

Only Tallgrass can put this tape backup reliability into your PC. Because Tallgrass incorporates a dedicated tape controller that maximizes the capabilities of the tape storage medium. Others treat tape like a floppy disk. That shortcut is just too dangerous.

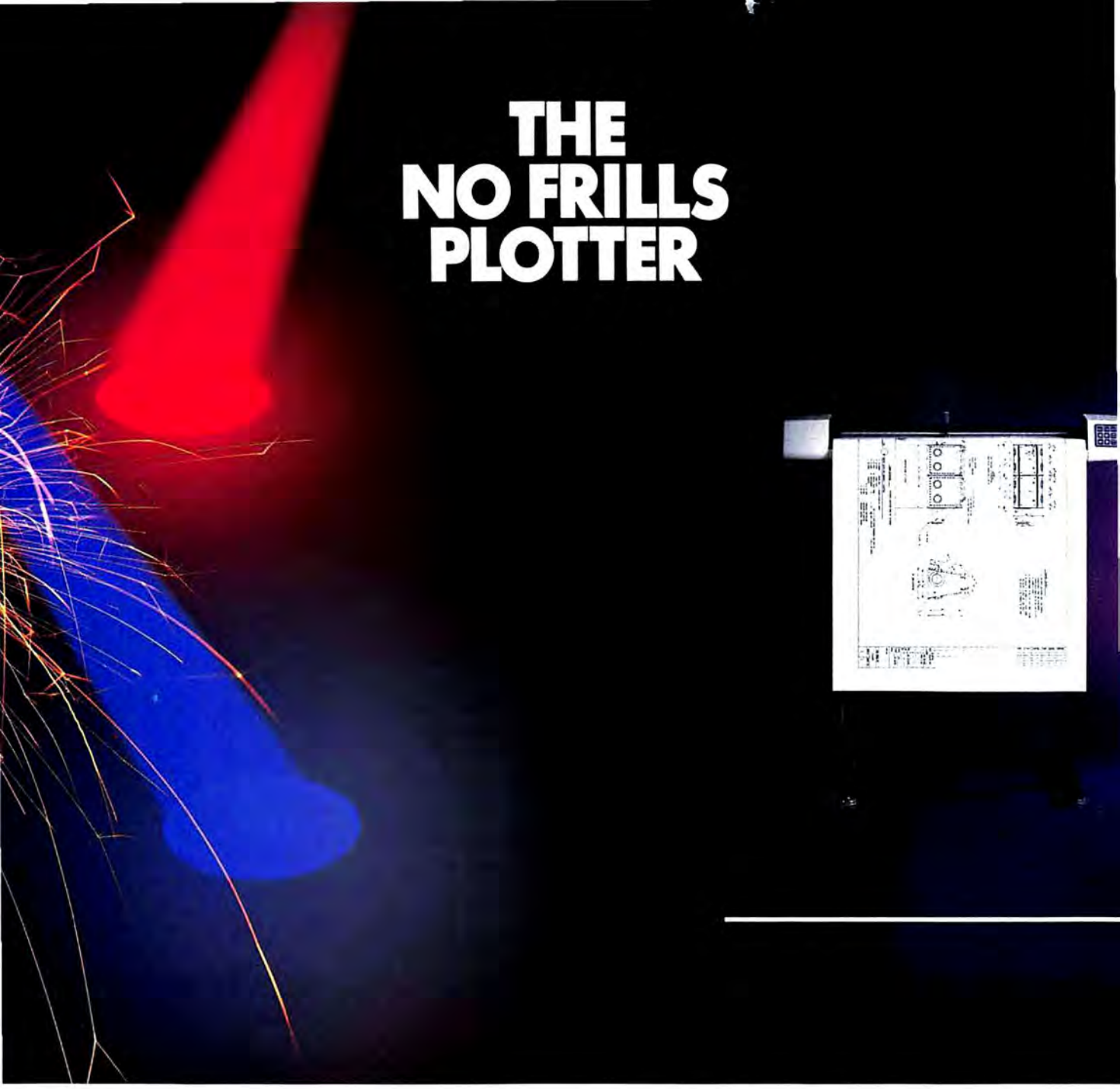
Tallgrass. There are a good many capabilities in the Grasshopper that no competitor can offer.

That's because Tallgrass Technologies developed QIC-100, the tape backup technology which has become an industry standard. And then kept right on expanding the lead.

The first time you call on tape backup you'll know how important absolute dependability is. We just want you to know how affordable the Grasshopper has made it. Call (800) 228-DISK for complete information, and the name of the Tallgrass dealer nearest you.

TALLGRASS TECHNOLOGIES
11100 W. 82nd Street
Overland Park, KS 66214

Circle 188 on reader service card



Enter the world of professional CAD applications with Houston Instrument's low cost DMP-41/42 series plotters. These single-pen plotters give you the features you need—C and D size plots, extensive software compatibility, and proven reliability—for a very affordable no frills price of $3295.*

The DMP-41/42 series' large C and D size formats are ideal for a wide range of CAD applications, from architectural elevations to assembly drawings. And a .005 inch resolution ensures crisp drawings on a variety of media—paper, matte film, or vellum.

With the DMP-41/42 series, you can choose from an impressive selection of off-the-shelf graphics software packages such as VersaCAD, AutoCAD, and CADKEY. Or, by using Houston Instrument's popular DM/PL™ language, you can create your own custom software and be assured of upward compatibility with Houston Instrument's entire line of plotters.

The DMP-41/42 series. The plotters that offer superb reliability, comprehensive graphics capabilities, and a no frills price. The proven performers for low-cost CAD.

For more information, call 1-800-531-5205 (512-835-0900 if in Texas), or write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. In Europe, contact Houston Instrument, Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel.: 32-(0)59-277445. Tlx.: 846-81399.

*U.S. suggested retail price. Pricing subject to change.
DM/PL is a trademark of Houston Instrument.

houston instrument

A Division of AMETEK

Circle 394 on reader service card

The Most Powerful Business Software Ever Has Just Become Even More Powerful!

FOR YOUR IBM PC, XT, AT, TANDY, COMPAQ, AT&T OR OTHER IBM COMPATIBLE COMPUTER

OVER 100,000 SOLD

The VERSABUSINESS™ Series

Each VersaBusiness module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSALEDGER-II™ $149.95
is a complete accounting system that grows as your business grows. VERSALEDGER-II can be used as a simple, personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software.

VERSARECEIVABLES™ $99.95
is a complete menu-driven accounts receivables, invoicing and monthly statement generating system that keeps track of all information related to who owes you or your company money.

VERSAPAYABLES™ $99.95
is designed to keep track of all current and aged payables, keeping you in touch with all information related to how much money your company owes and helping to manage your cash flow.

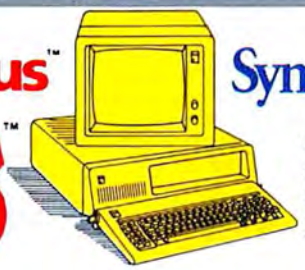
VERSAPAYROLL™ $99.95
is the most powerful fully automated payroll system available, yet easy to use. Keeps track of all government-required payroll information, instantly calculates payroll deductions (in every state) and prints checks and related forms.

VERSAINVENTORY™ $99.95
is an instant access inventory program that gives you virtually unlimited storage capacity and the comprehensive statistics required to make all of your vital inventory decisions.

REVIEWS
Distribution of the VersaSeries has now exceeded 100,000 making the VersaSeries the largest mass distributed accounting software package in the world. Among recent reviews, the VersaSeries received an excellent rating in the new Addison-Wesley rating encyclopedia. The VersaSeries actually outperformed competitive packages selling at three to five times the price.

COMPUTRONICS
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977
TOLL FREE ORDER LINE (800) 431-2818 — 24 HOUR ORDER LINE (914) 425-1535
30-DAY MONEY BACK GUARANTEE

Lotus™ 1-2-3™ Symphony™



READY-TO-RUN APPLICATIONS PACKAGES FOR LOTUS® 1-2-3™ AND SYMPHONY™

THE COMPLETE BUSINESS PAC

The five essential modules for all small businesses.

- GENERAL LEDGER
- PAYROLL
- ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE
- INVENTORY CONTROL

The Complete Business Pac $99.95

PERSONAL/BUSINESS PAC

Contains all the essentials for business, home or personal use.

- CHECK REGISTER CONTROL
- TELEPHONE DIRECTORY
- MAILING LIST MANAGER
- THE BUSINESS/HOME ACCOUNTANT
- CREDIT CARD MANAGER
- BANK ACCOUNT MANAGER

Personal/Business Pac $99.95

STOCK PAC

All the major functions for evaluation, selection and management of your investment portfolio.

- PORTFOLIO VALUATION
- BOND CALCULATIONS
- FUTURE PRICE PROJECTIONS
- FINANCIAL RATIOS
- STOCK MARKET ANALYSIS
- CASH MARKET FORECASTING

Stock Pac $99.95

LOAN APPLICATION PAC

Calculates and prints all interest, mortgage and savings calculations.

- LOAN AMORTIZATION SCHEDULE
- MORTGAGE/REAL ESTATE CALCULATION
- CASH FLOW ANALYSIS
- PRESENT/FUTURE PAYMENT
- INVESTMENT ANALYSIS
- LEASING

Loan Application Pac $99.95

BUDGET ANALYSIS PAC

For accountants, investors and small businesses that want to present professional statements to their clients.

- BALANCE SHEET PREPARATION
- COMPARATIVE INCOME STATEMENTS
- FINANCIAL RATIOS
- CASH FLOW ANALYSIS

Budget Analysis Pac $99.95

DEPRECIATION PAC

Performs all standard IRS-accepted depreciation calculations and prints professional reports.

- DEPRECIATION/ACCELERATED COST RECOVERY SYSTEM
- STRAIGHT LINE DEPRECIATION
- SUM OF THE YEAR'S DIGITS
- DOUBLE DECLINING BALANCE

Depreciation Pac $99.95

Each of these Lotus 1-2-3/Symphony add-on packages comes on an unprotected diskette. The user may modify any add-on package for his own needs. Each package can be used with or without a printer. When used with a printer, the user is provided with professional looking printouts which can be customized to meet the needs of the user. A manual accompanies each package. 1-2-3 and Symphony are trademarks of Lotus Development Corp. Lotus® is a registered trademark of Lotus Development Corp.

COMPUTRONICS
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977
TOLL FREE ORDER LINE (800) 431-2818 — 24 HOUR ORDER LINE (914) 425-1535
30-DAY MONEY BACK GUARANTEE

Professional Time and Billing System

INSTANT BUSINESS™

For ATTORNEYS, ACCOUNTANTS, ARCHITECTS, CONSULTANTS, DOCTORS and Anyone Who Bills for Time or Service

Dramatic Breakthrough for Any Professional Who Bills for Time or Service. This New User-Friendly Package Will Outperform Your Present Time and Billing System.

Save Time and Money. Your INSTANT BUSINESS Professional Time and Billing System takes over your routine Billing and Management Chores.

- Automates your billing.
- Bills by time and/or service.
- Keeps track of both billable and non-billable time.
- May be used by an individual or by a multi-employee professional practice.
- Keeps a computerized customer file with both historical and current billing information.
- Use the built in Accounts Receivable module to keep track of all money due.
- The employee file contains basic information pertaining to each of your employees.
- A payment file contains a complete record of all payments and adjustments.
- Includes flexible invoices, statements and reports.
- Supports up to 999 service codes.
- You may bill your clients either by the hour or by the service rendered making the system an excellent package for any professional who must bill for time or specific services.
- Requires 2 floppy disk drives or a hard disk drive system. Capacity is only limited by disk drive size.

$295.
FOR YOUR IBM PC/XT/AT, TANDY, COMPAQ, AT&T, or other IBM Compatible Computer

COMPUTRONICS
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977
TOLL FREE ORDER LINE (800) 431-2818 — 24 HOUR ORDER LINE (914) 425-1535
30-DAY MONEY BACK GUARANTEE

INSTANT BUSINESS™

PROPERTY MANAGEMENT SYSTEM

THIS EASY TO USE PROPERTY MANAGEMENT AND ACCOUNTING SYSTEM is ideal for anyone who needs to keep track of rental income and expenses.

This system performs all bookkeeping activities associated with owning small or large apartment buildings, commercial office buildings, warehouses, retail stores, single-family homes, co-ops or condominiums, recreational vehicles, personal property storage facilities or any other similar rental properties.

EASY TO UNDERSTAND

The INSTANT BUSINESS PROPERTY MANAGEMENT SYSTEM is designed to save time and money. The comprehensive user's manual gives step-by-step instructions with detailed reproductions of screen displays and sample reports. The on-line help instructions and easy to follow menus will quickly eliminate the need to refer to the manual.

CHECK REGISTER ACCOUNTING SYSTEM

Print checks and keep detailed information related to any checks that must be written. Flexible accounts allow for customization of your system. The CHECK REGISTER ACCOUNTING SYSTEM also keeps track of all cash disbursements.

SAVE TIME AND MONEY

This system is designed to save time and money. The goal of INSTANT PROPERTY MANAGEMENT is to automate your accounting and management of properties in a fast and economical way. The system is flexible so that you can pick and choose only those options that apply to your needs.

Save time and money by issuing COMPUTERIZED STATEMENTS and COLLECTION NOTICES. Your timely, accurate and professional statements and collection notices will speed up collections and spot potential losses early enough to take corrective action.

INSTANT STATUS QUERIES

At the touch of a button, see the current status of any property, rental unit or tenant. A memo file allows the recording of notes such as damages, noise complaints, etc.

COMPLETE TRANSACTION BOOKKEEPING

Record complete transaction history for all residential and/or commercial property-related charges, deposits, payments, refunds, write-offs, etc. Automatically posts standard monthly rents for easy entry and computes common area assessments and percentage leases.

INSTANT PROPERTY MANAGEMENT SYSTEM REPORTS

- PROPERTY REPORTS
- RENTAL UNIT REPORTS
- TENANT INFORMATION
- LEASE REPORTS
- VACANCY LISTS
- ACTION DATE REPORTS
- LATE RENT REPORTS
- INCOME AND EXPENSE REPORTS
- TRANSACTION REPORTS
- TENANT ACTIVITY REPORTS
- ACCOUNTS RECEIVABLE AGING REPORTS
- STATEMENT GENERATION
- MAILING LABELS

PROPERTY MANAGEMENT FEATURES

- PROPERTY FILE MAINTENANCE
- RENTAL UNIT FILE MAINTENANCE
- TENANT FILE MAINTENANCE
- LEASE FILE MAINTENANCE
- AUTOMATIC BILLING FOR FIXED RENTS
- TRANSACTIONS PROCESSING
- QUERY TENANT ACTIVITY
- REPORT GENERATION
- END OF PERIOD PROCESSING

$495. FOR YOUR IBM PC/XT/AT, TANDY, COMPAQ, AT&T, or other IBM Compatible Computer

COMPUTRONICS
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977
TOLL FREE ORDER LINE (800) 431-2818 — 24 HOUR ORDER LINE (914) 425-1535
30-DAY MONEY BACK GUARANTEE

Circle 891 on reader service card

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles

Give PC WORLD for the Holidays!

You can give a gift this holiday season that's not only thoughtful but thought provoking.

PC World is the ideal gift for family, friends, and associates who enjoy the exciting world of personal computing.

A world of savings at holiday time
Your first one-year gift: only $17.97

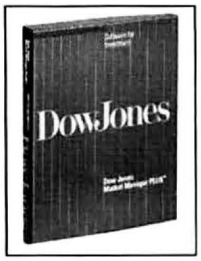
Each additional gift . . . just $14.97
(Less than $1.25 per issue!)

You can take advantage of these exceptional gift rates from now until January 31, but we urge you to act quickly so we can announce your gift with our special card . . . in time for the holiday season.

Announcing Version 2.0!

Market Manager PLUS.™

The investment software that helps you stay ahead of the odds.



In today's dynamic market, staying ahead of the odds means staying on top of your investments—making sure you have the right information at the right time to manage your portfolio effectively.

Market Manager PLUS offers portfolio management for the active investor. By linking you with Dow Jones News/Retrieval®, it provides comprehensive automatic updating and reports.

Here's what's new in Version 2.0:

- IBM DOS support
- Hypothetical portfolios to test investment options
- A calendar that notes interest and dividends due, bonds maturing and options expiring
- Updating of selected portfolios
- Capability to store 256 portfolios with up to 1500 transactions (3800 on fixed disk)
- Security data saved in a DIF® format
- 2400 baud access
- Schedule D tax report
- Portfolio Master report listing pertinent client information
- Plus much more

Market Manager PLUS gives you easy access to the portfolio information you need to make informed investment decisions.

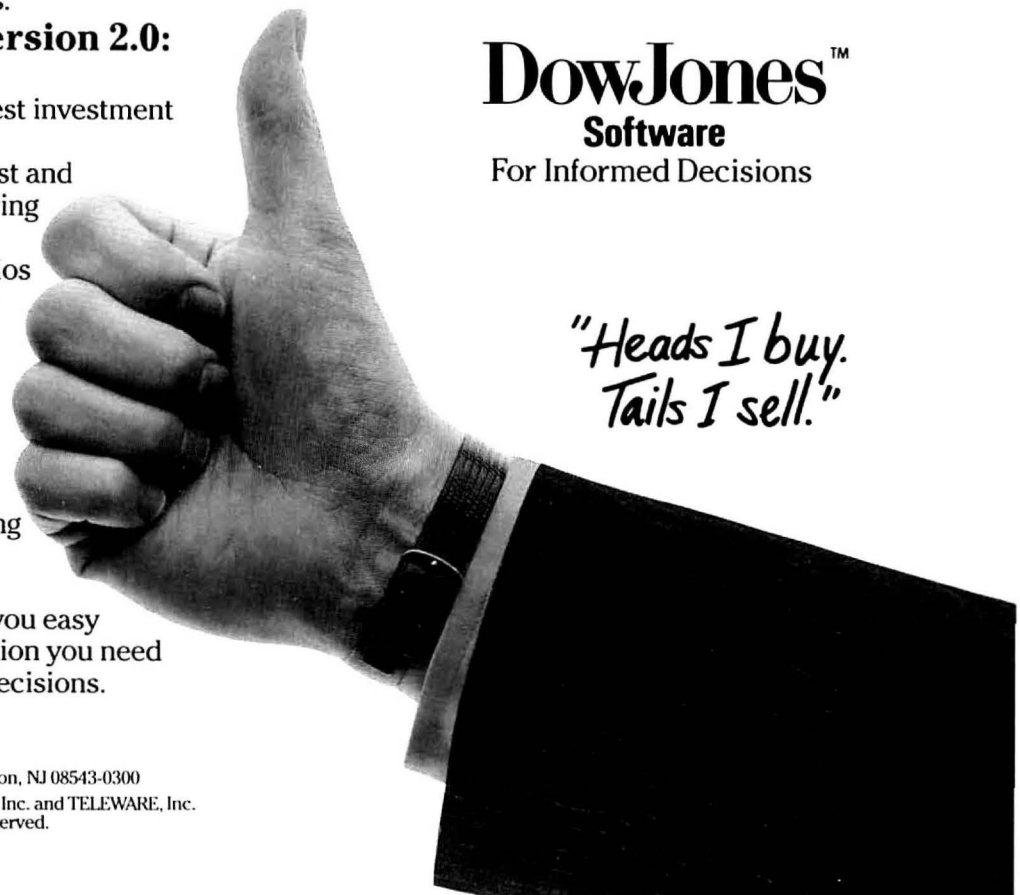
Demonstration disk. Just $5.*

We've prepared a demo disk to show you how easy it is to manage investment portfolios. Learn how you can stay ahead of the odds. For the demo disk or literature, call:

1-800-345-8500, extension 202.
(Alaska and foreign call 1-215-789-7008 ext. 202.)

To order, call **1-800-257-5114.**
(NJ, AK and Canada, call 1-609-452-1511.)
VISA, MasterCard, and American Express accepted.
*Please add $2.50 for shipping and handling.
Market Manager PLUS Version 2.0 works with IBM® PC, PC/XT™ and AT.™

DowJones™
Software
For Informed Decisions



Dow Jones & Company, Inc., P.O. Box 300, Princeton, NJ 08543-0300

Market Manager PLUS by Dow Jones & Company, Inc. and TELEWARE, Inc.
© 1986 Dow Jones & Company, Inc. All Rights Reserved.

Circle 3 on reader service card

INTRODUCING SAMNA

BEAUTY WI

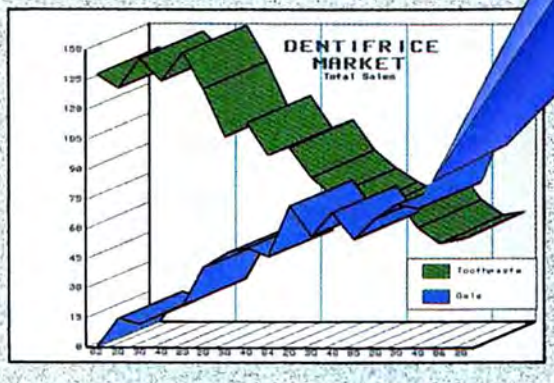
A fast, one-of-a-kind software package that presents vividly. Calculates beautifully. And makes your business decisions look better than ever.

Until now, there were sacrifices. Compromises. Oh, there were beautiful graphics packages . . . but they didn't do much more than paint a pretty picture. They had no guts. No brawn. No brains.

But now, Samna introduces a true classic.

Samna Decision Graphics has it all. It's the only software that delivers both beauty and brains. Crisp, colorful graphics come with the power to calculate. Manipulate. Analyze data and put it to work. And it does it all, faster than any other graphics package. Without ever leaving the program. Or your train of thought.

Graphs that make your numbers come alive.



MORE THAN 375 GRAPH POSSIBILITIES. AND FAST.

Decision Graphics gives you more versatility than any other package. You can choose a graph faster. Draw a graph faster. Even enter data faster. Compatible with Lotus 1-2-3, Samna+, dbase III, Symphony, Multiplan, Supercalc or Framework . . . using input formats ASCII, DIF, WKS, WK1, WRK, WR1, DBF or SYLK, you can make your hardware and your presentations work like never before.

You can add the power of 3-D. Vary your numbers with 11 totally different graph types. Use bars. Explode pies. Give lines and pyramids a whole new dimension. Special icons tailor your presentation. Or you can display points to make your point.

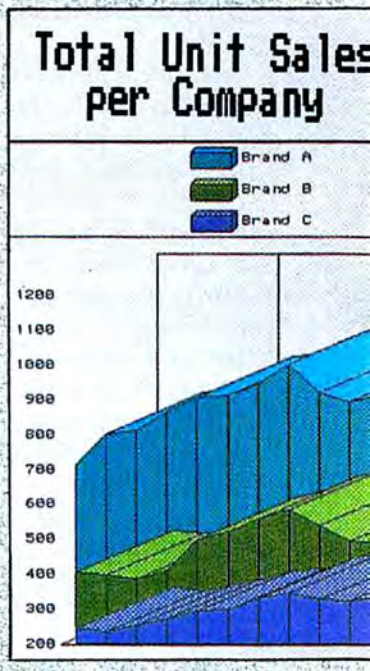
Decision Graphics offers more font options. More text enhancements. You can change every character size, color and position. Samna's package is so advanced, so professional, your inexpensive presentation looks like a million dollars. And so do you.

THE ONLY PACKAGE THAT'S A LOOKER AND A THINKER.

No other graphics software gives you over 30 built-in calculations, plus the power to add more of your own. Decision Graphics is ultra smart. Ultra simple. Ultra fast. A few easy keystrokes and suddenly boring numbers make beautiful sense. You get more out of your data. Your audience gets more out of your presentation.

And without leaving the program, you can project trends. Calculate averages. Compare growth rates. Right on the spot.

Quick, complete analysis.



Lotus 1-2-3 and Symphony are trademarks of Lotus Development Corporation. dBase III and Framework of Ashton-Tate Incorporated. Supercalc of Computer Associates. Multiplan of Microsoft Corporation. Samna+ of Samna Corporation.

DECISION GRAPHICS.™

TH BRAINS

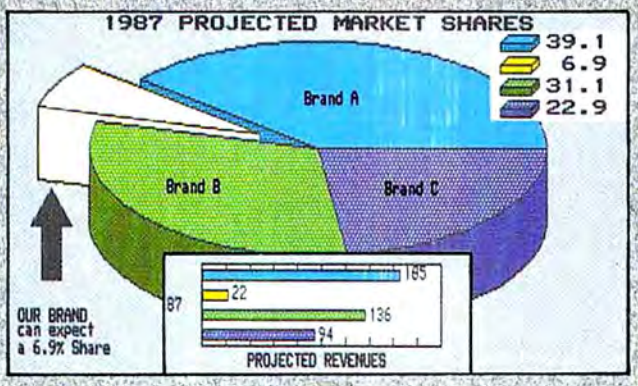
By ADDE. Sarl.

▲ NO OTHER PACKAGE GIVES YOU MACROS THAT ARE THIS EASY. THIS COMPLETE.

Decision Graphics is the only stand-alone graphics package that remembers how you built your graphs. AUTOMATICALLY. There's no planning. No hassle. The next time you need that graph, it's yours. In seconds.

Decision Graphics' macros give you more options. In less time. All in one easy-to-use package. You can have your hardware working for you—even when you're not there working. And by chaining macros together, you can automate an entire presentation. The whole thing runs more smoothly. So do your nerves.

And while Decision Graphics' exclusive macros are fast and advanced, they're also outstandingly simple. You don't need a programmer's degree to make them or your presentation work . . . beautifully.



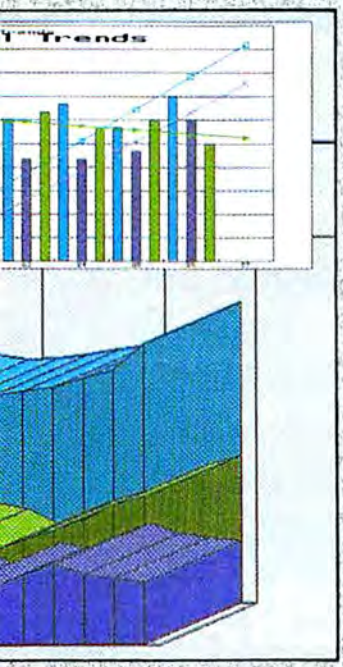
Boardroom quality. Twenty-nine seconds.

PRESENTATIONS LOOK BOARDROOM PROFESSIONAL. AND SO DO YOU.

Samna's graphics speak more vividly. More powerfully. Taking full advantage of your high-resolution hardware. Graphs build quickly. Calculations perform in a flash.

You can display 30 quality graphs on one screen. Even more if you choose. And you can put them anywhere. In any size. Plus, you can add special interest with special effects such as "zooming." Presentations look high-quality. High-tech. Even if you're not a technician. And of course, smart Decision Graphics' visuals can go directly into overheads, slides and prints.

Five keystrokes.



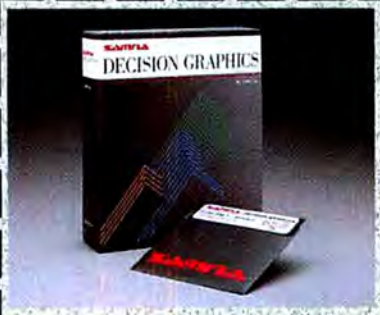
A POWERFUL BEAUTY THAT'S FAST AND SIMPLE.

Sheer genius works without effort. With record-shattering speed. And everything about this revolutionary new package is fast. Sleek. Logical. Friendly. Only a few keystrokes and you perform even the most complicated calculations. Create the most outstanding graphs. So rather than spending time working on your computer, your computer can be working for you.

▲ SAMNA: MASTERS OF SOFTWARE.

And it all comes to you backed by an outstanding reputation. Samna Corporation has become famous for break-through business software that's as advanced as it is simple. They are the industry's office automation specialists, offering experience. Proven knowledge. Quick support. More than just business software, Samna delivers business solutions.

So invest in a classic. Put Samna Decision Graphics to work for you. Call 1-800-831-9679 or send in the coupon below for a free booklet that vividly illustrates the power of beauty with brains.



I want beauty with brains. Please send my booklet to:

Name_____

Company_____

Title_____

Telephone_____

Address_____

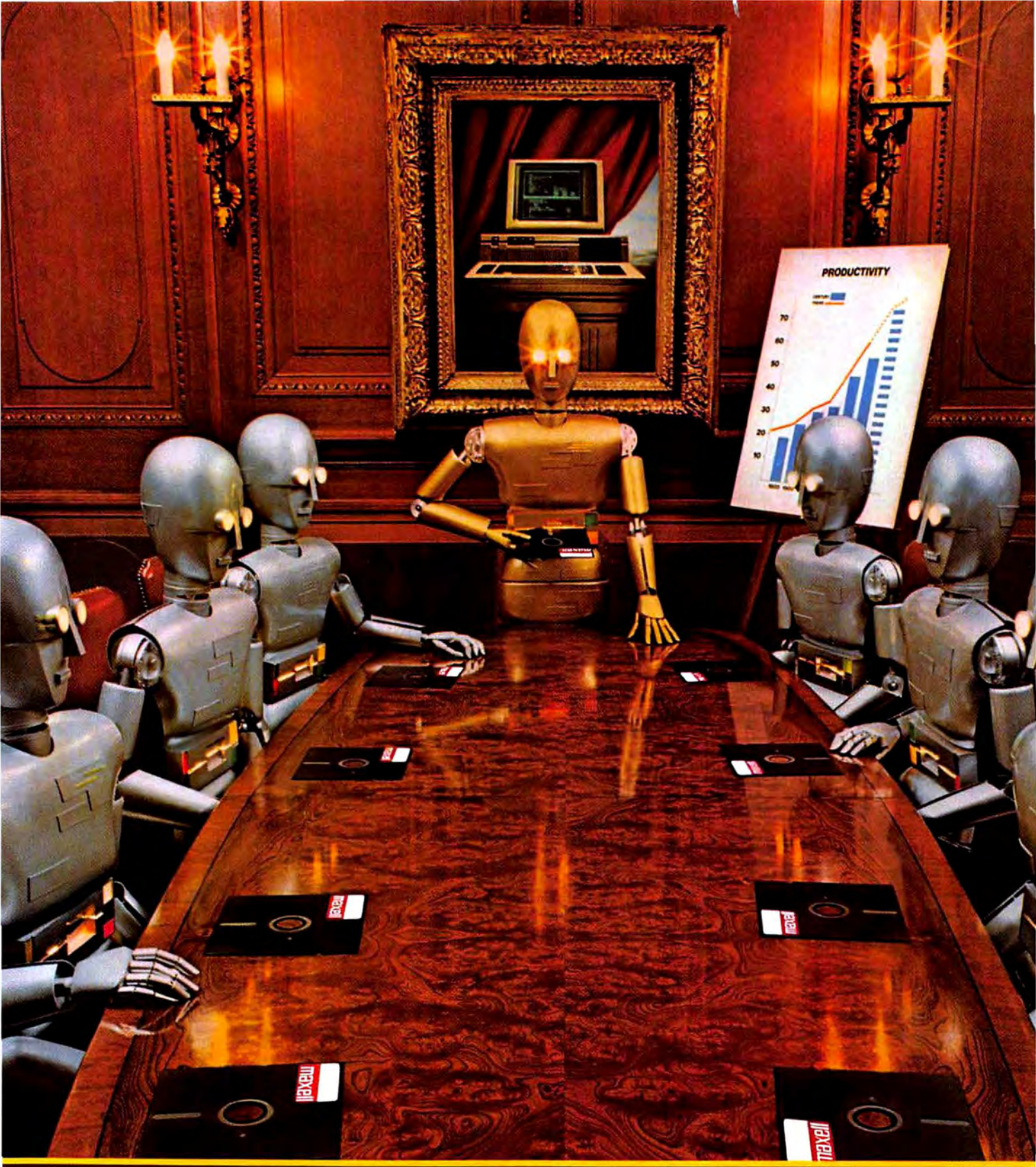
City_____ State____ Zip____

Send to: Samna Decision Graphics—
Samna Corporation, Dept. 001
2700 N.E. Expressway
Atlanta, Ga. 30345, (404) 321-5006
1-800-831-9679

SAMNA
DECISION GRAPHICS

Circle 281 on reader service card

©1986, Samna Corporation



When computers get down to business, they move up to Maxell.

Maxell was first to provide you with a 5¼" high density floppy disk. Just another example of how we keep you a step ahead.

maxell®
THE GOLD STANDARD

Maxell Corporation of America, 60 Oxford Drive, Moonachie, NJ 07074

Letters

Reactions and responses from the PC World community

Write Is Right

Something had to be wrong. At a recent educational computing conference in San Diego, California, a man wearing a "Not Copy Protected" button was giving away copies of a full-function word processor with a 300-page hardbound manual. He represented neither Microsoft nor WordPerfect Corporation, but Quicksoft, which was promoting the 13th version of *PC-Write*.

I think the personal computer industry needs more of this kind of competition. *PC-Write* sells for $75. That price includes free updates and unlimited phone and written support. If your printer doesn't support *PC-Write*, Quicksoft will write a driver for you—no charge. They even allow duplication of one copy within a corporation or school.

I find both *Microsoft Word 2.0* and *WordPerfect 4.1* slow, rigid, and clumsy, yet they command high prices. There are many ways to market a good program, and I prefer Quicksoft's.

John Cameron
Ganges, British Columbia
Canada

I Love My Fontasy

Jason Durbin's review of *Fontasy* [*From the Software Shelf, PCW*, July 1986] borders on slander. I'm neither a newspaper editor nor a designer, but after using *Fontasy* for two weeks I was able to do all the things that Mr. Durbin found so impossible.

He considers the numerous ways to select a single font redundant, but the variety of commands makes sense. If you know exactly what font you want, you use the .BF commands. If you don't know, you can display a list of available fonts. It's simple.

Fontasy's graphics and print quality far surpass programs like *Newsroom*. The command structure is no worse than *WordStar*'s. You can view an entire page before you print, and not many other publishing or paint programs allow you to do that. *Fontasy* isn't perfect, but who hasn't used a program and wished it could do more? It's a lot easier to use and much less expensive than similar programs on the market. Maybe Mr. Durbin would like to hire an experienced user.

R. A. Higgins
Clinton, Tennessee

The first automobile I ever owned was an English sports car. I grew to love that car and forgave it all its faults. I even became proficient at leaping out of it when the engine died and, without missing a step, pushing it into the nearest parking place. Fontasy *reminds me of that car and the many English kludges I have owned since. If I could love them in spite of their eccentricities, then surely Mr. Higgins has every right to love* Fontasy *in spite of all its quirks.*

I had no ax to grind with Prosoft prior to using Fontasy, *so intimation of slander borders on the absurd. I found that the interface was unnecessarily cumbersome, that functions didn't always work as advertised, and that* Fontasy *didn't offer as many features as other programs on the market.*

I've gotten too old and had too much trouble with my cars to ever

(continues)

Fast Delivery

Fast because one of our 14 fully-stocked branches is *near* you! Call before 3:30 p.m. for same-day shipment. Save on freight – we're local!

Free Help

Not sure which products you need to do the job? Our customer service staff will tell you. *Free* hotline support for Data Communication customers too!

Exclusive Products

Hundreds of problem-solving products you won't find anywhere else. Designed and manufactured exclusively by Inmac for all types and brands of computers.

Guaranteed Satisfaction

45-day free trials. *Minimum* 1-year guarantee on everything we sell. No-questions-asked on returns or exchanges. Order with complete confidence!

Great Ideas Pop Up Every Month in the Inmac Catalog.

Computer Supplies Plus More than You Realize!

When the Inmac catalog reaches your in-basket, take time to do some *serious* reading for pleasure. You'll find our catalog is both a resource book and an idea-generator. Especially when you're looking for solutions to computer efficiency problems!

Just open our cover, and you'll discover a gigantic supermarket of state-of-the-art computer supplies, accessories, furniture, cables, and data communications equipment. Plus Helpful Hints, Hot New Products, Special Savings and *Free* High-Tech Support. Ideas that give *you* ways how to solve your computer problems, save money, and make your computing life easier!

And Inmac's got great ideas about reliability and service too! With over 10 years of solid experience behind us, we wrote the book on top-of-the-line computer support products, customer service, and technical support. We manufacture many of our own products in our own plants. And put every product in our catalog

New Products

Our "New Products" section features great ideas every month. Discover innovative ways to make your job easier.

User-Friendly

Text loaded with details, information, even a touch of humor. Easy to understand. Informative and interesting!

Huge Selection

Everything you need. If it exists, we've got it. Widest selection in the industry. Over 2400 computer supply products, in-stock. One-stop desktop shopping!

Helpful Hints

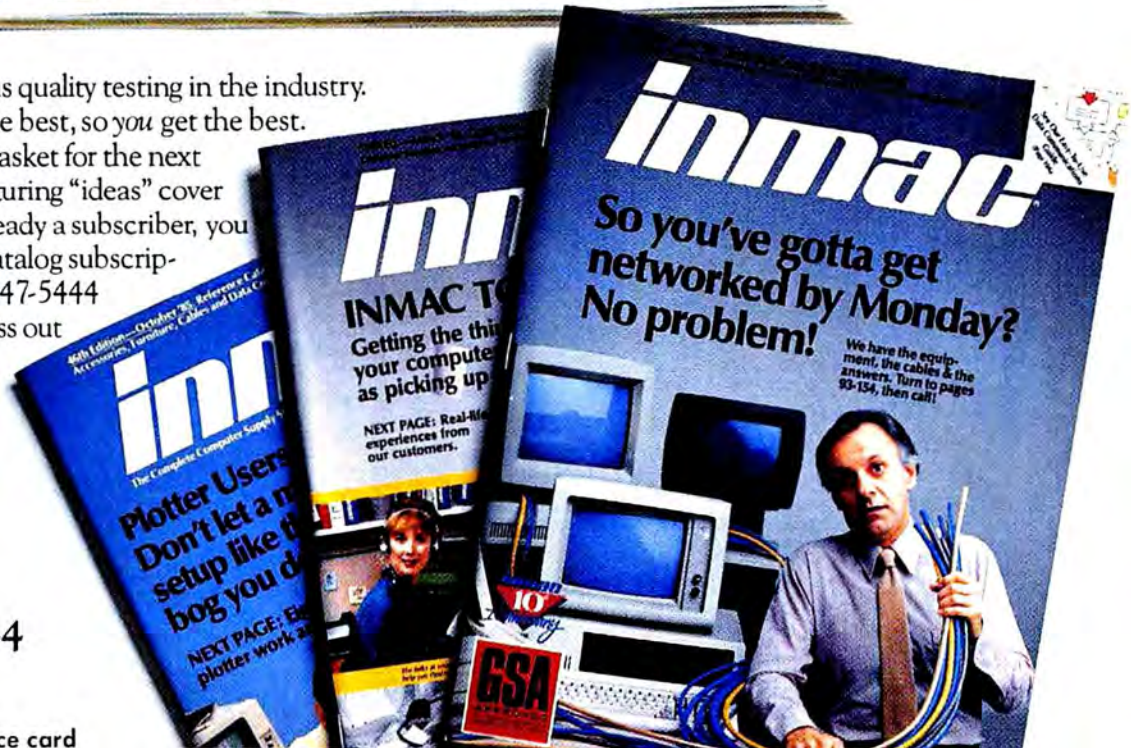
Every issue loaded with tips. Everything from cost-saving data transmission advice to how to avoid common cable installation pitfalls.

Money Savings

Low everyday prices! Special offers in every issue. Save more when you order more... Call us for moneysaving volume bids!

through the most rigorous quality testing in the industry. Our idea is to demand the best, so *you* get the best.

So watch your in-basket for the next issue of Inmac. We're featuring "ideas" cover to cover! If you're not already a subscriber, you can get a *FREE* Inmac catalog subscription just by calling 800-547-5444 toll-free today. Don't miss out on the best source for computer "ideas": The Inmac Catalog!



Free Inmac Subscription! Call 800-547-5444 toll-free today.

Circle 512 on reader service card

Get AutoBack™ for $49.95 and never lose data again! ...or keep your $49.95 and Lose your data!...

It has happened before and it will surely happen again!

After spending many hours keying in data or creating code, you hit the wrong key and exit without saving...or there's a glitch or power failure...or you run into a software bug...or your disk is full and you don't have another formatted one around.

WHATEVER THE REASON...
YOU JUST FOUND DISASTER!

Now there's AUTOBACK™

AUTOBACK™ is a data recovery system that protects your work-in-progress from accidental loss. Should any of the above disasters strike, you simply call up AUTOBACK™. Instantly you get a "video replay" in your choice of three speeds. You can even "freeze" the action and make a correction or two.

And AUTOBACK™ will work with virtually every known software package, popular or unpopular, on your IBM PC/AT PC/XT or compatible.

Built-in Security —
A "Blank Screen" command lets you leave your PC on but deactivates the keyboard and blanks out the screen for privacy and prevention of burn-in. It even gives you password protection.

For All IBM PC/AT/XT or compatibles w/64K and MS DOS 2.0 or later.

ORDER TOLL FREE: (800) 523-8354
(408) 988-7510

OR WRITE:
AMERICAN MITAC CORP. • 3385 VISO CT. • SANTA CLARA, CA • 95054

Please send me _____ copies of AUTOBACK™ at $49.95 ea.
Enclose $3.00 postage and handling. Ca. residents add $3.50 tax ea.

☐ VISA ☐ M/C ☐ CHECK

CARD # _____ EXP. DATE _____
NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

Outside USA: Add $10.00 and make check payable by bank draft, payable in U.S. Dollars, drawn by a U.S. Bank.

AUTOBACK™... Formerly called PLAYBACK
(AUTOBACK™ may not recover data from a crashed disk.)

IBM PC/XT/AT are registered trademarks of International Business Machines Inc.
MS-DOS is a trademark of Microsoft Corp.
AUTOBACK is a trademark of American Mitac Corp.

Circle 717 on reader service card

want another English sports car. I guess I've come to feel the same way about computer programs.
–Jason Durbin

The Smart Way to Upgrade

In addition to W. E. Peterson's advice that users "wait a few weeks after a release before buying the newest version on the block" ["The Thrill of Upgrades, the Dread of Obsolescence," *PC World View*, *PCW*, August 1986], they should also be aware of other considerations.

Many distribution warehouses that serve retail computer dealers stock old versions of software. Even waiting a few weeks may not guarantee that you receive the latest release. Historically, software upgrades are slow to circulate through retail distribution channels. Check that release number in the store!

Also, users must be squeaky wheels when it comes to upgrades. Often a software publisher will provide free upgrades, even beyond the warranty period, to customers who make requests. Be diligent in your feedback to the publishers. Let them know that you're real people with real problems and needs.

Robert Laird
Houston, Texas

There Are Spies Everywhere

Industrial espionage exists–even, unfortunately, in the PC software business.

(continues)

INTRODUCING THE A★STAR II™

We're having a party! It's a going away party. And, it's for IBM. But, shhhhh! Don't tell them. We want it to be a surprise!

Why a party? Well, it's because we've been told that more than a few of IBM's customers have been "going away" ever since we introduced our A★Star™ PC/AT compatible microcomputer. Now that we've announced our new A★Star II, we figure a lot *more* of their customers will be going away. That's because the A★Star II is the *only* "network ready" PC/AT compatible that can operate at 6, 8, 10 *and* 12 MHz. And because it's available in a super selection of models starting at only $995!

The A★Star II is not just another clone, it's better...*much* better! Not only is it faster and more powerful than IBM's model, it's also incredibly less expensive. Better yet, the A★Star II is built and backed by Wells American - a company that's been making microcomputers *longer* than IBM. (We bet that surprises even you!) Plus, the A★Star II is serviced nationwide by RCA Corporation - one of the world's largest and most respected consumer electronics firms. And if that's not enough, every unit includes free schematics and a money back guarantee!

If you'd like to be a part of our IBM going away party, clip and return the coupon or call us at the number below. But don't tell IBM! If they find out how many of their customers are going away, they might just go away themselves! Of course, that would be okay with us. We never *really* invited them anyway!

A PC/AT FOR ONLY $995?
WHAT A REASON TO CELEBRATE!

Special Introductory Offer: Order now and receive a $395 option - absolutely FREE! Limit one per customer. Hurry! This offer and quantities *are* limited.

Name: _____

Company: _____

Phone: _____

Address: _____

_____

City: _____

State: _____ Zip: _____

Wells American

803/796-7800•TWX 510-601-2645
Sunset Boulevard • West Columbia, SC 29169

Corporate Headquarters: 3243 Sunset Boulevard • West Columbia, South Carolina 29169•803/796-7800•TWX 510-601-2645

IBM, Personal Computer AT and AT are trademarks of International Business Machines

Circle 486 on reader service card

LANGUAGES THAT ARE CAUSING THE BIGGEST PROGRAMMING BACKLOG IN HISTORY ARE ALSO EATING NICE BIG HOLES IN OUR POCKETS.

Whether it's BASIC, COBOL, Pascal, "C", or a data base manager, you're being held back.

Held back because the language has frustrating limitations, and the programming environment isn't intuitive enough to keep track of what you're working on.

In the real world, there's pressure to do more impressive work, in less time, and for more clients.

We've been given some incredibly powerful hardware in recent times, but the languages aren't a whole lot better than they were 20 years ago.

So, whatever language you have chosen, by now you feel it's out to get you — because it is.

Sure, no language is perfect, but you have to wonder, "Am I getting all I deserve?"

And, like money, you'll never have enough.

Pretty dismal, huh?

We thought so, too.

So we did something about it.

We call it CLARION.™

You'll call it *"incredible."*

Distributed on 7 diskettes, CLARION consists of over 200,000 lines of code, taking 3+ years to hone to "world-class" performance.

With CLARION you can write, compile, run and debug complex applications in a New York afternoon.

Even if you're in Savannah.

It gives you the power and speed to create screens, windows and reports of such richness and clarity you would never attempt them with any other language.

Because *you* would have to write the code.

With CLARION you simply design the screens using our SCREENER utility and then CLARION writes the source code AND compiles it for you in seconds.

Likewise, you can use REPORTER to create reports.

Remember, only CLARION can recompile and display a screen or report layout for modification.

And with no time wasted.

All the power and facilities you need to write great programs, faster than you ever dreamed of.

Programs that are easy to use.

Programs that are a pleasure to write.

And to you that means true satisfaction.

You've coveted those nifty pop-up help windows some major applications feature. But you can't afford the time and energy it takes to write them into your programs.

That's the way it used to be.

So we fixed that, too.

CLARION's HELPER is an interactive utility that let's you design the most effective pop-up help screens that you can imagine. And they're "context sensitive," meaning you can have help for every field in your application.

Unlike the other micro languages, CLARION provides declarations, procedures, and functions to process dates, strings, screens, reports, indexed files, DOS files and memory tables.

Imagine making source program changes with the CLARION EDITOR. A single keystroke terminates the EDITOR, loads the COMPILER, compiles the program, loads the PROCESSOR and executes the program. It's that easy!

Our data management capabilities are phenomenal. CLARION files permit any number of composite keys which are updated dynamically.

A file may have as many keys as it needs. Each key may be composed of any fields in any order. And key files are updated whenever the value of the key changes.

Like SCREENER and REPORTER, CLARION's FILER utility also has a piece of the CLARION COMPILER. To create a new file, you name the Source Module. Then you name the Statement Label of a file structure within it.

FILER will also automatically rebuild existing files to match a changed file structure. It creates a new record for every existing record, copying the existing fields and initializing new ones.

Sounds pretty complicated, huh?

Not with CLARION's documentation and on-line help screens. If you are currently competent in BASIC, Pascal or "C" you can be writing CLARION applications in a day. In two days you won't believe the eloquence of your CLARION programs.

Okay, now for the best part of all. You can say it in CLARION for $295.00—plus shipping and handling. All you need is an IBM® PC, XT, AT or true compatible, with 320 KB of memory, a hard disk drive, and a parallel port. And we'll allow a full 30 day evaluation period. If you're not satisfied with CLARION, simply return it in its original condition for a full refund.

If you're not quite ready to take advantage of this no-risk opportunity, ask for our detailed 16 page color brochure. It vividly illustrates the elegance of CLARION. Consider it a preview of programming in the fast lane.

Either way, the 800 call's a freebie.

SAY IT IN

CLARION™

DEPT. A3WD/6

1-800-354-5444

VISA

MasterCard

BARRINGTON SYSTEMS, INC. 150 EAST SAMPLE ROAD POMPANO BEACH, FLORIDA 33064 305/785-4555

IBM is a registered trademark of International Business Machines Corporation. CLARION™ is a trademark of Barrington Systems, Inc. ©1986 Barrington Systems

Circle 504 on reader service card

Finally, a Multi-User Solution Easy as

Without a multi-user system, your method of sharing information is outdated and expensive.

It's a fact.

Because a **true** multi-user system lets you share data, hard disks, printers, and even programs among a multitude of users.

Which saves you a lot of money.

With MultiLink® Systems, you'll also save time.

A COMPLETE System You Can Install in 30 Minutes. Forget about the headaches of choosing the proper pieces of your system...our experts already did it for you. Then they put it together. That saves you even more time.

Think of it! No boards to install and no lengthy hardware documentation to decipher. In fact, you can even select the software you want, and we'll install it right on your system's hard disk.

Our basic three-user system, for example, comes complete with a Sperry PC/IT, a 44 Megabyte hard disk with DOS and MultiLink® Advanced already installed, two Wyse 60 terminals, and two Megabytes of memory. Literally everything you need to start your own multi-user system is included.

The Power of a $5,000 Computer for Only $795. Once you've purchased the basic MultiLink® System, additional workstations are only $795, each. But, instead of getting a cheap PC-clone, you get a top-quality workstation that's able to tap the power of the Sperry PC/IT, MultiLink® Systems' host computer.

The PC/IT was recently quoted by InfoWorld as being "53% faster, offering greater mass storage (44 Megabyte hard disk), and accommodating more users than the IBM PC AT."

A PC-DOS Compatible System Designed by the Experts. In 1983, we were the first company to make PC-DOS multi-user. To date, no one else has met the challenge.

Lotus, dBASE III, WordStar, & WordPerfect are just a few of over 3,000 programs available today for multiple users in a MultiLink® Advanced environment.

The Easiest Part About a MultiLink® System Is Picking Up the Phone. Call The Software Link TODAY for complete information and the authorized dealer nearest you. Our basic three-user system is only $8,595, and comes with a money-back guarantee. Additional workstations are $795, each.

MultiLink® Systems™

From the Developers of MultiLink® Advanced & LANLink™

THE SOFTWARE LINK, INC.

8601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK

THE SOFTWARE LINK, INC./CANADA
250 Cochrane Drive, Suite 12 Markham, Ont. L3R 6B7
CALL: 416/477-5480

Dealer Inquiries Invited

See us at **Booth #W230** CALL: 404/998-0700
COMDEX/Fall '86
Las Vegas Convention Center
West Hall

ltiLink® is a registered trademark
The Software Link, Inc. MultiLink®
vanced, LANLink™ & MultiLink®
stems are trademarks of The
ftware Link, Inc
ces & Technical Specifications
bject to change

IBM, PC, AT, & PC-DOS are trademarks of IBM Corp. Sperry, Wyse, Lotus, dBASE, WordPerfect & WordStar are trademarks of Sperry Corp., Wyse Technology, Lotus Development Corp., Ashton-Tate, WordPerfect Corp., & MicroPro, respectively.

Circle 821 on reader service card

Buy an FT-156 light pen and PXL-350 Hi Res Light Pen Board from FTG and get Microsoft's Windows™ - **free!**

It's a tidy $99 savings, plus you get the tools you need to take advantage of power Windows. Gathering your software together under a consistent, graphical interface is wha: Windows does best. Manipulating graphical software is what our light pen and board do best. Windows gives you a whole set of desktop management applications. The FT-156 and PXL-350 let you use them easily, quickly, and efficiently. And our product delivers single-pixel resolution for your graphics.

SPECIAL PACKAGE PRICE*

FT-156/PXL-350 standard configuration board/Windows
(IBM PCs, PC-XT, PC-AT and most compatibles).....$349

FT-156/PXL-350 expanded configuration board/Windows
(AT&T 6300 and COMPAQ computers).....$379

Use our toll-free numbers to order or get more information about FTG's products.

FTG DATA SYSTEMS
(714) 995-3900
(800) 962-3900
(800) 972-3900 (Calif.)

CIRCLE 250 ON READER SERVICE CARD

10801 Dale St., Suite M-2 P.O. Box 615, Stanton, CA 90680 Telex: 887840

*Offer expires October 31, 1986 and is void where prohibited, taxed, or restricted by law. Offer redeemable only through FTG Data Systems.

Circle 610 on reader service card

PC World Creates a Long Buy-Line for You

Queue up! *PC World* readers mean big business–for you. Call your Account Manager to reserve your advertising space today–please see page 4 for phone numbers.

Recently my company was contacted by a person who claimed to be a well-known writer from a major computer industry publication. The caller's stated purpose was to interview us for an article explaining how one of our products, *FormTool*, fits into the desktop publishing market.

This individual described the upcoming issue, even explaining the layout. He acknowledged our press releases, talked intelligently about sophisticated aspects of desktop publishing, and indicated where he needed additional information. After taking our usual precautions, we responded openly and honestly with detailed answers.

The next day we learned that we had been "had." The call was a fake. While we regret the loss of hard-earned proprietary information, we're more dismayed that such an underhanded tactic was used by someone in the software business.

The PC software industry has shown time and again that a bottomless pool of profitable ideas awaits anyone willing to focus the power of technology on human problems. Obviously, not everyone believes this fact. As a result, we learned a painful lesson. To others we can only say, be careful out there.

Frank Millman
President
Bloc Development Corporation
Miami Beach, Florida

(continues)

"Dear Jim, For once I'm fast, not furious."

This is the first day I can remember getting even a memo produced without a problem. It's also my first day using this new PFS:Professional Write program. That's no coincidence. For once my documents looked really professional, and they took less time and hassle. This program has everything, even mail merge pulling in data from our company files, and a built-in address book to keep track of people like you. I know we've had our furious moments getting documents out on time, Jim. That's why I thought you should know about Professional Write.

PFS:® Professional Write

Word Processing Software

Power. *77,000 word spelling checker. Personal dictionary. 180,000 synonym thesaurus. Integrated address book and full mail merge with ASCII and Professional File data. Line drawing. Underline, boldface, italic and other enhancements. Right justification. Single/double line spacing. Indented text and advanced block operations.*

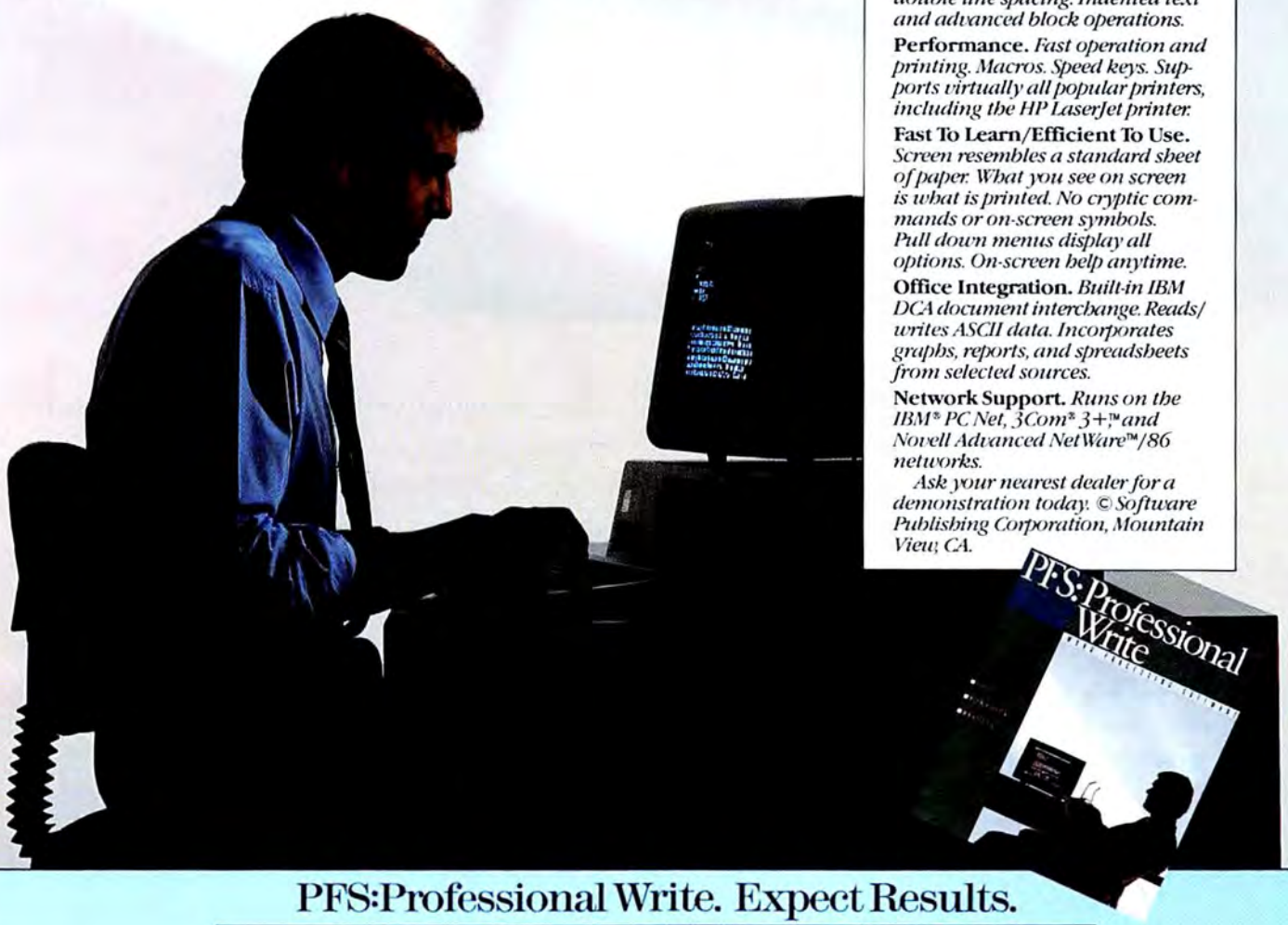
Performance. *Fast operation and printing. Macros. Speed keys. Supports virtually all popular printers, including the HP LaserJet printer.*

Fast To Learn/Efficient To Use. *Screen resembles a standard sheet of paper. What you see on screen is what is printed. No cryptic commands or on-screen symbols. Pull down menus display all options. On-screen help anytime.*

Office Integration. *Built-in IBM DCA document interchange. Reads/writes ASCII data. Incorporates graphs, reports, and spreadsheets from selected sources.*

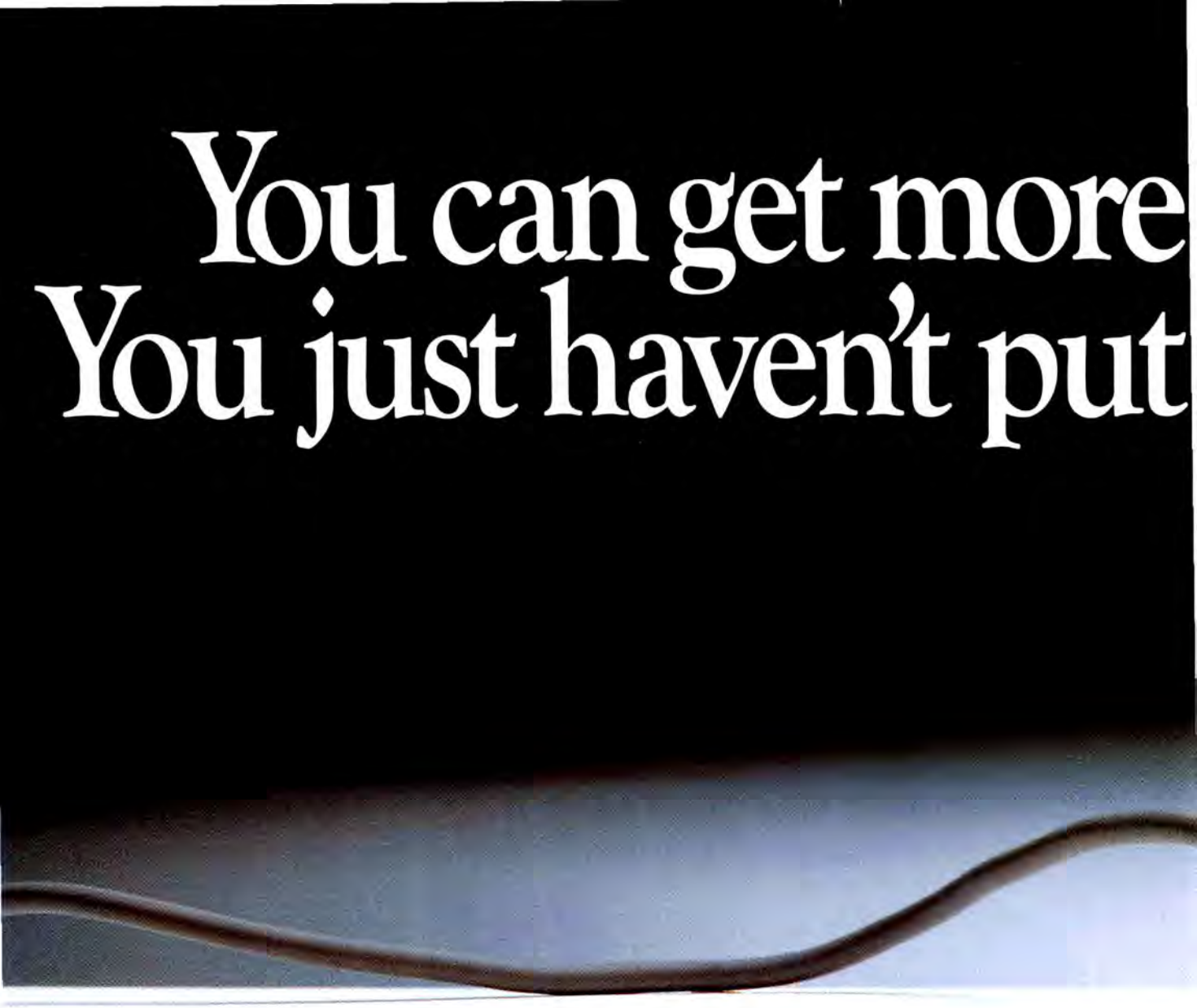
Network Support. *Runs on the IBM® PC Net, 3Com® 3+,™ and Novell Advanced NetWare™/86 networks.*

Ask your nearest dealer for a demonstration today. © Software Publishing Corporation, Mountain View, CA.



PFS:Professional Write. Expect Results.

PFS: WRITE owners call 1-800-255-5550 for upgrade information.
(IBM and compatible PC owners only: Alaska and Canada call 1-303-799-4900).



You can get more You just haven't put

Just put your finger on a Microsoft® Mouse and you'll be getting more done in no time.

Because the Microsoft Mouse comes with a fistful of software including presentation graphics programs like Show Partner™ and Microsoft Paintbrush® and Expert Mouse Menus for your favorite business programs.

To enter a command with a Microsoft Mouse, just find it on the on-screen menu and click. Not having to enter a handful of keystrokes means you can work much faster.

Easier word processing from load to print.

With the Microsoft Mouse, you can give your cursor keys a rest. Editing is now a breeze because it's easy to highlight and change or replace text.

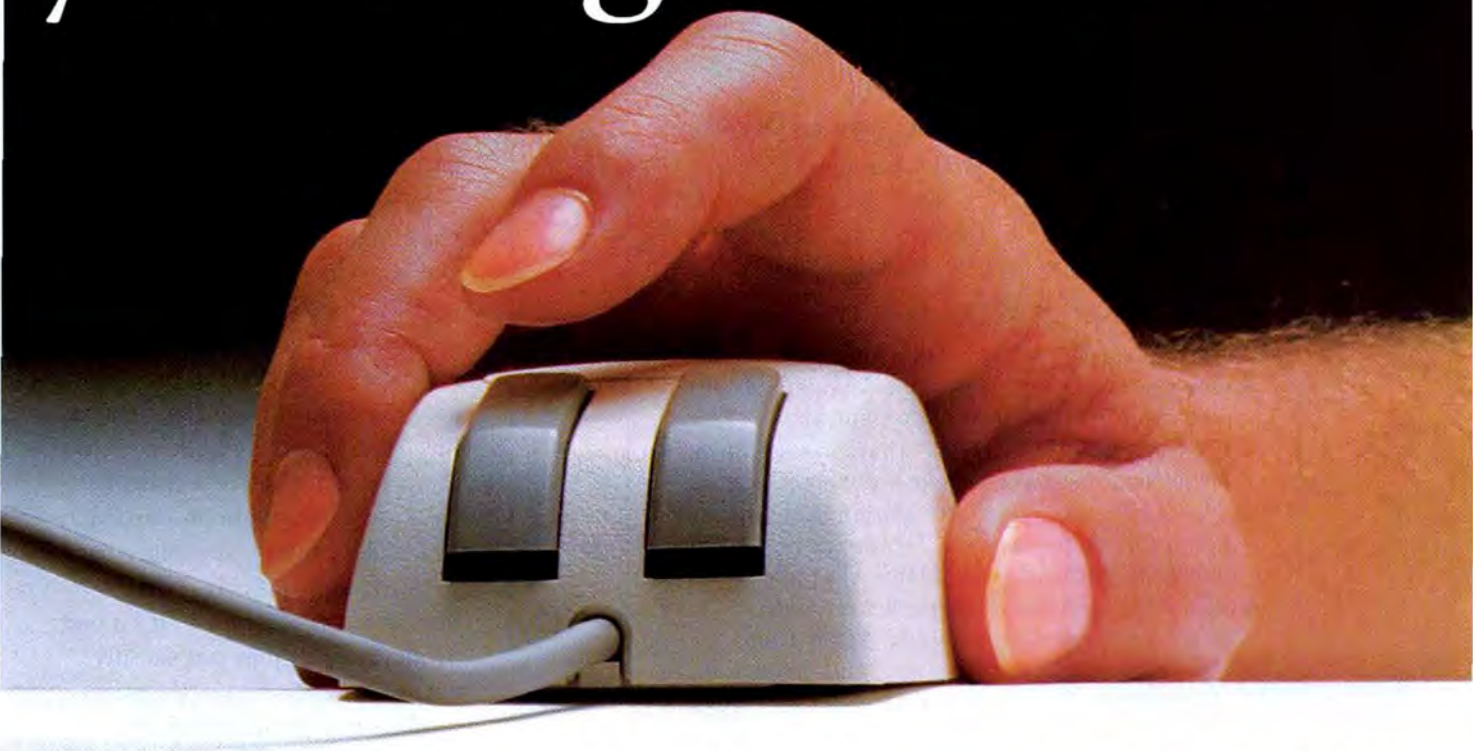
And when you're finished, you can use an Expert Mouse Menu to back up a DisplayWrite™ 3 document with just two clicks. Or use our mouse to load MultiMate® documents without ever having to type out a file name again.

This mouse knows its 1-2-3's.

The 1-2-3® Expert Mouse Menu gives you faster access to functions you use all the time like displaying graphs, setting titles and opening windows. Then print out your worksheet with one click of our mouse rather than seven keystrokes.

Microsoft is a registered trademark of Microsoft Corporation. DisplayWrite is a trademark of International Business Machines Corporation. 1-2-3 is a registered trademark of Lotus Development Corporation.

out of your PC. your finger on it.



And now you can use the numeric keypad on your PC because, with our Expert Menu, you'll never suffer from not being able to use num-lock again.

Draw attention to your presentation.

Show Partner and Microsoft Paintbrush help you and your Microsoft Mouse create presentation graphics that will help keep your audience focused on the point you're trying to make.

Show Partner lets you bring your presentations to life: like building a graph piece by piece as you're presenting your case point by point. Show Partner can also create other special effects. And it lets you pull graphic images from other programs like Paintbrush or 1-2-3.

You'll never be alone with a Microsoft Mouse.

With an impressive array of software, support by over 200 applications, continued updates from Microsoft, and the Microsoft heritage of quality, it's no wonder the Microsoft Mouse is the best-selling mouse on the market.

Buy the Microsoft Mouse and get a ton more done by just lifting a finger.

Microsoft® Mouse

For a list of mouse-compatible software or the location of your nearest dealer call (800) 426-9400.

MultiMate is a registered trademark of Ashton-Tate. Show Partner is a trademark of Brightbill-Roberts & Co. Ltd. Paintbrush is a registered trademark of ZSoft Corporation.

AT LAST: Professional Typesetting Capability For PC Users

With **PCTEX**™ — the best-selling full implementation of Professor Don Knuth's revolutionary typesetting program TEX.

FINEST Typeset Quality Printing From:
dot matrix laser phototypesetter

$$\sum_{i=1}^{\infty} \frac{1}{i} \qquad \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ a_{21} & \cdots & a_{2n} \\ \vdots & \ddots & \vdots \\ a_{m1} & \cdots & a_{mn} \end{pmatrix} \qquad \int_{-\infty}^{\infty} e^{-x^2}\,dx$$

WIDEST Range Of Output Device Drivers:

- Epson FX, LQ
- Toshiba
- Corona LP-300*
- HP LaserJet*
- Apple LaserWriter
- APS-5 phototypesetter
- Screen preview, with EGA or Hercules card

MOST COMPLETE Product Offering:

PC TEX (not copy protected) includes the following:

- Our specially written *PC TEX Manual*, which enables you to start using TEX right away.
- Custom "macro packages" that provide formats for letters, manuals, technical documents, etc.
- The LATEX document preparation system, a full-featured macro package for preparing articles, books, reports, etc., and LATEX User's Manual.
- AMS-TEX, developed by the *Amer. Math. Society* for professional mathematical typesetting.

Site licenses, volume discounts, and interfaces to PC Paintbrush, PC Palette, FancyFont and Fontrix are also available.

PRICED FROM ONLY $249.00!

(Printer drivers and interfaces additional.)

Laser printer, fonts & software from $2995.00

For IBM PC/XT, AT or compatible, DOS 2.0 or higher, and 512K RAM. Hard disk required for printer drivers and fonts. *HP LaserJet and Corona require additional interface boards.

For more information call or write:

Personal TEX, Inc.

20 Sunnyside, Suite H, Mill Valley, CA 94941 (415) 388-8853

This ad, with space for the photograph, produced by PC TEX. Typeset on the Epson FX80, the Corona LP-300 laser printer, and the Autologic APS-5 phototypesetter.

TEX is a trademark of the American Mathematical Society. Manufacturers' product names are trademarks of individual manufacturers.

Circle 615 on reader service card

Just a Review

I've read Camilo Wilson's letter "Volkswriter 3" [*Letters, PCW*, July 1986] as well as David Bunnell's column "The Battered PC User" [*PCW*, April 1986]. While I understand Mr. Wilson's efforts to correct what he perceives to be an unfavorable editorial about *Volkswriter 3*, I completely agree with the responses from Mr. Bunnell and the reviewer, Janet Crider.

In my opinion, *PC World* provides the most unbiased reviews of any magazine, but that doesn't mean I throw common sense out the window every time I read an issue. Before I decide to purchase a program, I read magazine articles, but I also listen to people who use the program. If several of them have a complaint about a product, I carefully examine its ability to perform appropriately. This doesn't necessarily mean it's a bad product; it just may not suit my needs.

Magazine product reviews should be read with an open mind. They're just one factor to consider before making an investment.

John Ridgely
Rockville, Maryland

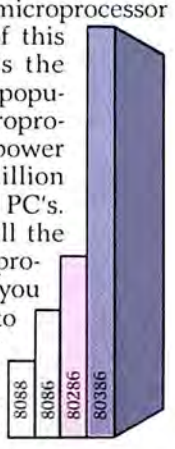
E-Mail Reshuffled

G. Berton Latamore's "The E-Mail Shuffle" [*PCW*, June 1986] was interesting and informative, especially its decription of the complexities of packet switching. However, I'd like to clarify a couple of points about Western Union's EasyLink service.

(continues)

advanced-technology computers

The new high-speed, 32-bit, 16-MHz Intel® 80386 microprocessor forms the heart of this breakthrough. It's the latest from Intel's popular family of microprocessors that now power well over nine million industry-standard PC's. As such, it runs all the popular personal productivity software you already own two to three times faster than ever *and* now lets you do things never before possible on personal computers. But the chip is only the beginning of this story.



The Intel 80386 microprocessor is faster and much more powerful than any of its predecessors.

Each component the very best

Performance enhancements go far beyond the microprocessor, however. Every component has been optimized to take advantage of the increased speed and power of the 80386.

We offer, for instance, far greater memory than other advanced-technology personal computers. Plus more storage with faster access. Enhanced color graphics. A built-in interface for your lightpen. And even a built-in expanded memory manager that breaks the "640K barrier" of current operating systems.

We made improvements to the keyboard and the internal fixed disk drive backup, and added a host of other features, which taken together, make this the most advanced personal computer available, and the very first to offer a true minicomputer level of performance in an industry-standard desktop computer.

The COMPAQ Color Monitor works with software designed for a wide variety of display standards: EGA, CGA and monochrome.

The winning numbers

The new COMPAQ DESKPRO 386 features advanced 32-bit architecture that processes twice as much information as 16-bit computers in the same amount of time. Coupled with a much faster 16-MHz processing speed, it radically improves the responsiveness of spreadsheets, databases, and networks; the ease of multi-tasking; and the power of engineering software. Because the 80386 is compatible with today's software, it is setting a clear direction for the future. It preserves your investment in software and training while allowing the development of powerful business programs, far more advanced engineering software and artificial intelligence applications.

No compromises

From the integrity of its components, to its unquestionable compatibility and connectability, to its numerous enhancements, the COMPAQ DESKPRO 386 pushes all of the limits of advanced technology—with no compromises. It's clearly the computer of choice for today's *and* tomorrow's most demanding users. From the company that has the highest user satisfaction ratings in the industry.

Run industry-standard software 2-3 times faster than ever.

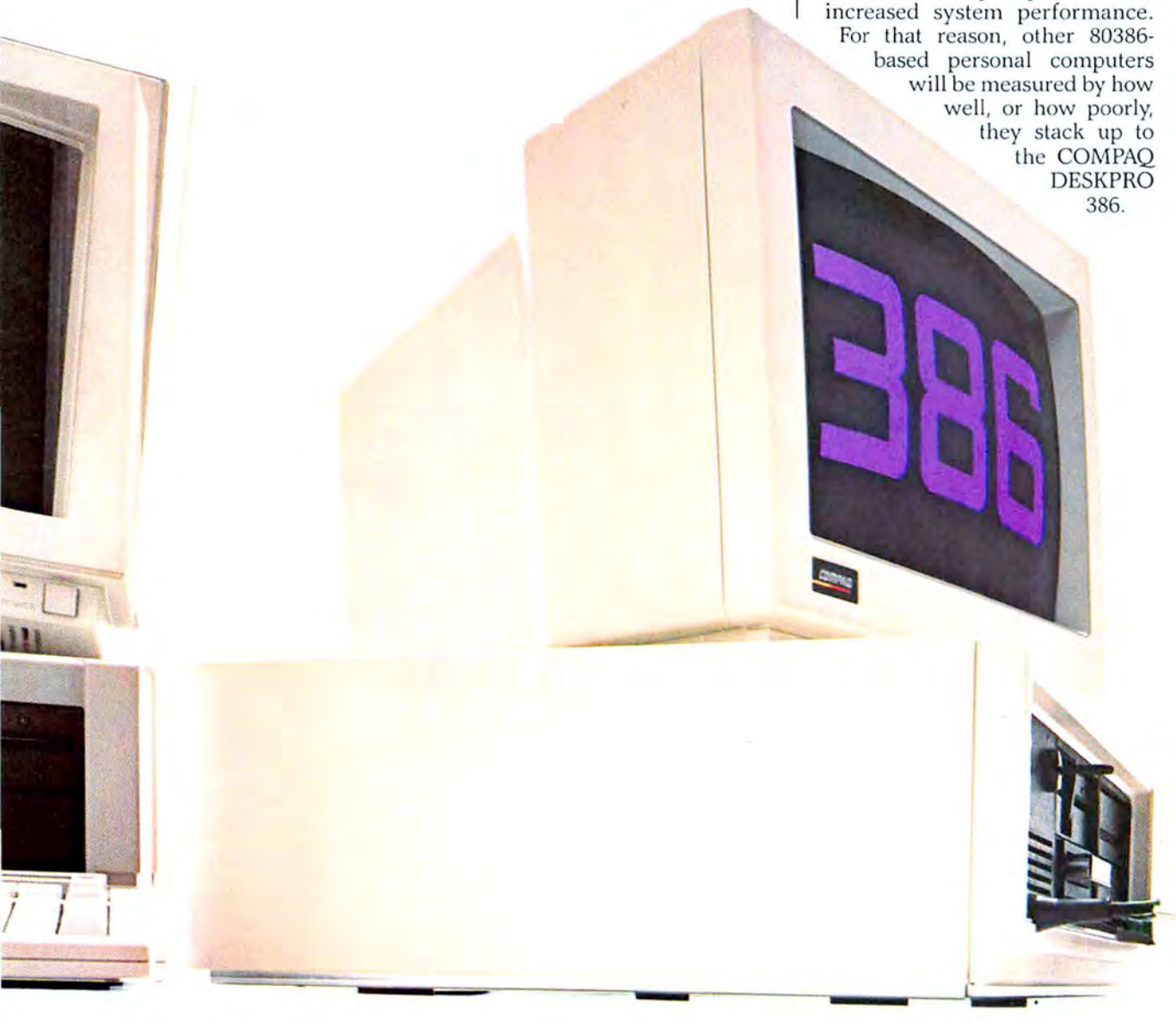
It simply works better.

computer in the world

COMPAQ DESKPRO 386

Why the COMPAQ continue to be the world's most long after others

The 80386 microprocessor is just one of the many ways COMPAQ increased system performance. For that reason, other 80386-based personal computers will be measured by how well, or how poorly, they stack up to the COMPAQ DESKPRO 386.



The most advanced personal

IBM® and IBM Personal Computer-AT® are registered trademarks of International Business Machines Corporation. Lotus® is a registered trademark of Lotus Corporation.

DESKPRO 386 will advanced personal computer copy its engine

Greater stores of knowledge

The COMPAQ DESKPRO 386 provides the most storage capacity and performance available in any personal computer. High-performance 40- and 130-Megabyte fixed disk drives are 50 to 150 percent faster than those used in other PC's. And they store a total of 5,000 to 50,000 more pages of data.

We also developed a fast, economical way to protect all that data. You can back up and verify 40 Megabytes of data on a single formatted cartridge at the timesaving rate of one Megabyte per minute.

Storage drives access data faster, enhancing performance.

The most memorable personal computer

Break the 640-Kbyte memory barrier and use up to 8 Megabytes of high-speed 32-bit RAM with the COMPAQ Expanded Memory Manager. This software comes standard and works with programs that follow the Lotus®/Intel®/Microsoft® (LIM) Expanded Memory Specification, allowing you to build bigger spreadsheets, sort larger databases and run more programs. And unlike other personal computers, this feature requires no additional software, and the high-speed RAM uses no expansion slots, leaving more for you.

Lead a much more colorful life

When combined with the COMPAQ Enhanced Color Graphics Board, the new COMPAQ Color Monitor can display 16 colors at once from a 64-color palette. And this same board provides the high-resolution graphics—640 × 350—that many users require.

Expanding horizons

Exceptional expandability lets you add as many as four internal storage devices. You can add more RAM, too. Up to 10 Megabytes of RAM can be placed on the system board without using an expansion slot; 14 Megabytes using only two. You can also add our Enhanced Color Graphics Board that has a lightpen interface built in. This leaves four expansion slots compatible with industry-standard expansion boards. So you can communicate with mainframes, in a network, or in a multi-user environment.

Built to higher standards, with "more" standards

We build more into the COMPAQ DESKPRO 386, with more care. We have included interfaces for printers and modems. We protected storage devices with shock isolation systems. We improved the keyboard to help touch typists avoid mistakes and simplify common chores. And we offer a full one-year warranty.

Some companies may copy one or two features of our latest computer. But it will be years before they copy them all. That's just one more reason why COMPAQ Computers are recognized as best in their classes by industry experts and users alike.

Use a mouse with an expansion board. Or a lightpen with a built-in interface on the COMPAQ Enhanced Color Graphics Board.

The most advanced personal computer because it incorporates the most advances.

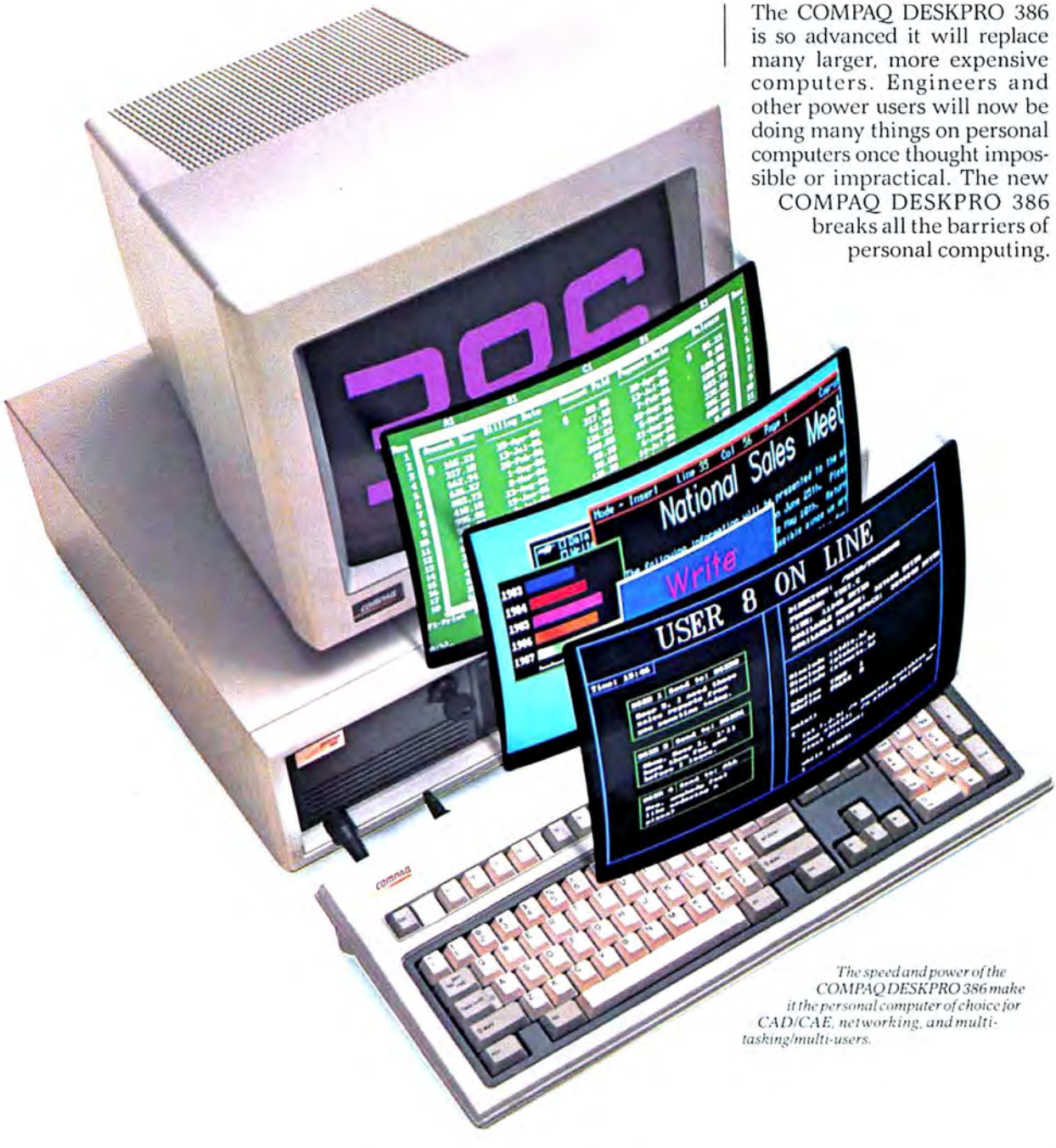
It simply works better.

computer in the world

COMPAQ DESKPRO 386

COMPAQ creates computer that

The COMPAQ DESKPRO 386 is so advanced it will replace many larger, more expensive computers. Engineers and other power users will now be doing many things on personal computers once thought impossible or impractical. The new COMPAQ DESKPRO 386 breaks all the barriers of personal computing.



The speed and power of the COMPAQ DESKPRO 386 make it the personal computer of choice for CAD/CAE, networking, and multi-tasking/multi-users.

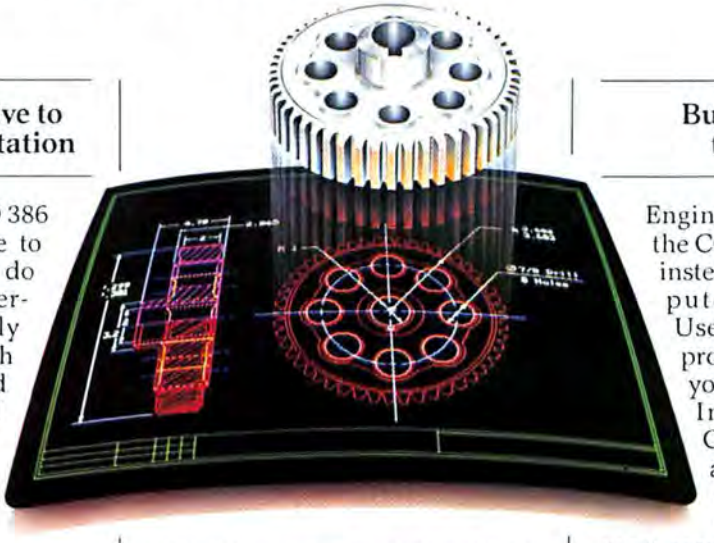
The most advanced personal

Intel® is a registered trademark of Intel Corporation. Microsoft® and XENIX® are registered trademarks of Microsoft Corporation. AutoCAD™ is a trademark of AUTODESK, Inc.

the first personal thinks it isn't

The better alternative to the dedicated workstation

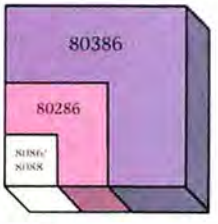
The COMPAQ DESKPRO 386 is a powerful alternative to dedicated systems that do one thing, like computer-aided design, extremely well. Now, you can match their performance, and still run hundreds of industry-standard programs as well, with a system costing thousands of dollars less.



CAD/CAE programs like AutoCAD™ enable you to do detailed electronic modeling, and the speed of the 80287 coprocessor provides real-time response.

A desktop minicomputer?

Faster disk drives, 32-bit architecture and a large linear address space allow software developers to easily modify minicomputer programs for use on the COMPAQ DESKPRO 386. Plus, you get minicomputer-level performance with your current personal productivity software.



The 80386 runs software written for earlier chips and adds more power.

Net gain

With the COMPAQ DESKPRO 386 as your network file server or multi-user host computer comes greater productivity. Your system will run faster than ever. And you can handle additional users with no loss of performance.

Multi-task master

Running several programs simultaneously, and switching between them, has never been better. Its speed and vast memory capacity make the COMPAQ DESKPRO 386 ideal, especially when running software under XENIX, System V/286 by COMPAQ.

Exceptional speed and memory make the COMPAQ DESKPRO 386 ideal for multi-tasking. You can run several programs at the same time and switch between them.

Building bridges to engineers

Engineers can now turn to the COMPAQ DESKPRO 386 instead of costly minicomputers or mainframes. Used with the 80287 coprocessor option, it gives you the speed you need. In addition, the new COMPAQ Color Monitor and Enhanced Color Graphics Board offer resolution required for most graphics applications with a built-in interface for those who use a lightpen.

Artificial intelligence

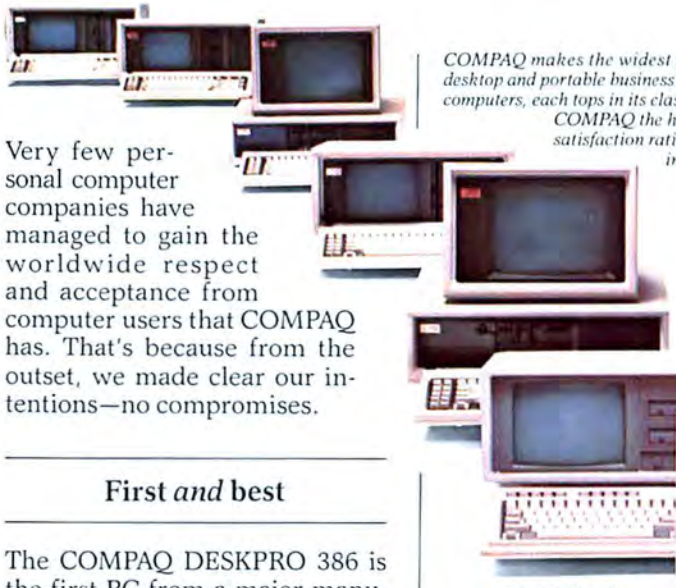
The speed, memory and storage of the COMPAQ DESKPRO 386 now make artificial intelligence in personal computers a real possibility. Soon available, these new AI programs promise to make personal computing even easier than it is now. The COMPAQ DESKPRO 386 is an investment in the future that pays handsome dividends today.

It simply works better.

computer in the world

COMPAQ
DESKPRO 386

History in the making from a company that knows how



COMPAQ makes the widest line of desktop and portable business personal computers, each tops in its class, giving COMPAQ the highest user satisfaction ratings in the industry.

Very few personal computer companies have managed to gain the worldwide respect and acceptance from computer users that COMPAQ has. That's because from the outset, we made clear our intentions—no compromises.

First *and* best

The COMPAQ DESKPRO 386 is the first PC from a major manufacturer based on the new 80386 microprocessor. Its power, speed, performance, and built-in features exceed every other personal computer you can buy. Not surprising from a company with a history of being first with the best.

A long line of firsts

COMPAQ was the first to introduce a full-function portable computer that could do more than most desktops.

We were the first to offer desktops that were faster and more expandable than the IBM®-PC.

The first to offer an internal fixed disk drive backup system.

The first to introduce a desktop more powerful than the IBM PC-AT®. And the first to offer an equally powerful, yet *portable* 80286-based personal computer.

One good thing leads to another

The COMPAQ Portable led the company to the most successful first year in American business history. Each successive product led COMPAQ to the Fortune 500 faster than any other company in history. By refusing to compromise, we'll keep making history.

Available only at Authorized COMPAQ Computer Dealers. Over 3000 worldwide offer outstanding service and support.

For the Authorized Dealer nearest you, call 1-800-231-0900 and ask for Operator 23. In Canada, call 416-449-8741, Operator 23.

COMPAQ®

It simply works better.

©1986 COMPAQ Computer Corporation, all rights reserved. Printed in the U.S.A.

COMPAQ, the company that first improved the personal computer standard, does it again...

COMPAQ advances personal

COMPAQ announces a major improvement to the industry standard, one that carries you far beyond the limits of today's "advanced technology" personal computers. It's the new COMPAQ DESKPRO 386,™ and it reaches far higher levels of speed, compatibility, performance, and expandability than have ever been attainable in personal computers. Dozens of separate

Introducing the new COMPAQ DESKPRO 386™

enhancements have been combined in one desktop computer to make the COMPAQ DESKPRO 386 the most advanced personal computer in the world. There's no personal computer more ideal for power users, networking, and connecting to a mainframe.

The most advanced personal

COMPAQ® is a registered trademark; and COMPAQ DESKPRO 386™ is a trademark of COMPAQ Computer Corporation.

The addition of FYI News and InfoMaster to our electronic messaging services represents an important step in the planned growth of these services and not, as the article suggests, minor add-ons to offset operating deficits. In fact, InfoMaster has been so well received in the business community that we now offer it as a stand-alone information retrieval service to a number of major corporations.

EasyLink is Western Union's leading-edge business network communications service, but the company is not "betting its future" on EasyLink, nor is Western Union "putting all its resources" into EasyLink. Development of our packet switching network to provide the vehicle for this and other Western Union services has been and remains an investment in their future growth.

Warren Bechtel
Assistant Vice President
Western Union
Upper Saddle River, New Jersey

Software Imitates Life

Thanks for telling your readers about the Libyan scenario for *F-15 Strike Eagle* ["Life Imitates Software," *PC World View*, *PCW*, August 1986]. There are, regrettably, some errors in the story.

F-15 Strike Eagle is not a "*Jet* clone," as described in the story. Rather, *F-15* for the PC was released in March 1985, while Sub-Logic released *Jet* in the summer.

The name of the company founder and president is Bill Stealey, not "Stears." However, his

(continues)

Sudden AT™ Death. What Would You Do?

You turn on your AT™ computer and suddenly it starts to happen. Your computer starts gasping for information because your AT battery is dying. The simplest data, like the time and date, becomes a struggle. All vital signs start fading from the screen. Without action, the victim will soon lapse into unconsciousness.

What would you do?

Until recently you would have been powerless to save your AT computer.
Replacement batteries were not readily available. All you could do was stand by helplessly as your computer's life source drained away.
But now, with the help of IBC, you can resurrect your AT, by using IBC's simple method of CPR– Computer Resuscitation. Just plug in one of IBC's new Tadiran high-energy lithium batteries, and your AT will have a new lease on life.

The Tadiran Replacement Battery from IBC saves you from an inevitable crisis. Every one of the million ATs, compatibles and clones in use today will face this emergency in the coming months. It could happen a few weeks from now, or maybe in a year. The lifespan of currently installed batteries varies from one month to 3 years.

Don't let time run out on your computer. Protect against down time!

Buy an IBC battery now, so you always have a back-up.

IBC Battery Features:
- Meets or exceeds all manufacturer's specifications
- Warranted for in-use life of 3 years
- 10-year shelf-life
- For IBM/AT, Compaq 286 series, and all other AT compatibles and clones
- Easy to install

If your computer should exhibit the following warning signs, you must take action immediately!

IBM/AT is a registered trademark of International Business Machines.
Compaq 286 is a registered trademark of Compaq Corporation.

WARNING SIGNS

- Clock calendar function fades and disappears
- Configuration files vanish

Steps to Take In Case of Sudden AT Death
- Do not panic
- Do not move injured computer
- No need to call repairman
- No need to call manufacturer

Just call IBC, and you will get immediate shipment of your new Tadiran AT replacement battery. The life you save will be your computer's.

Corporate quantity discount available.

INSURANCE AGAINST AT COMPUTER FAILURE.

Don't delay. Order today.

Shipping $3.00 per battery.

Please send me an IBC AT Battery for $27.50 (CA residents add 6.5% for sales tax)

Name _____ Title _____

Company Name _____

Address _____

_____

Make of computer _____

☐ Check enclosed* Make money order or check payable to International Battery Corporation.

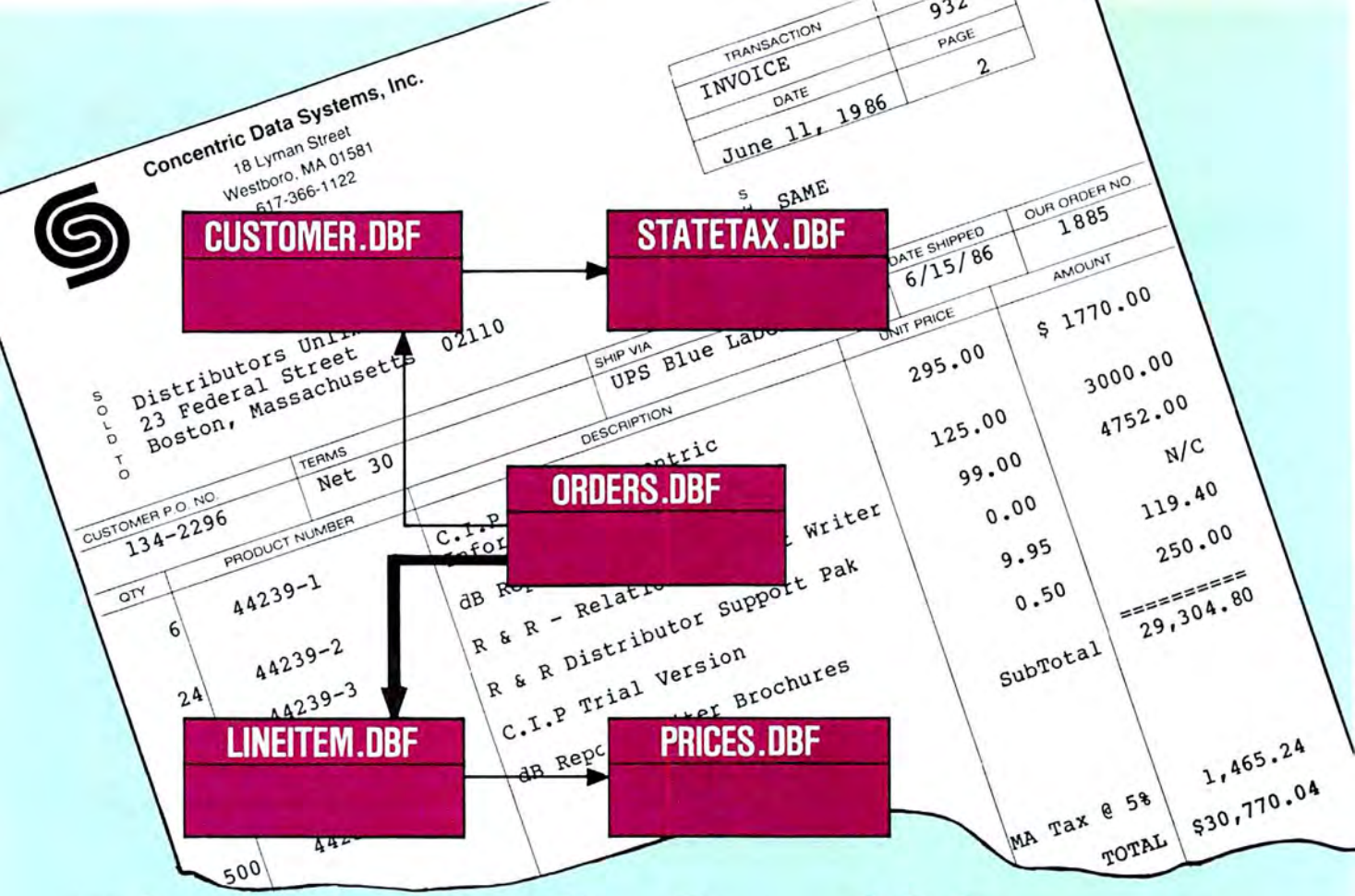
☐ Mastercard or Visa # _____

Card expiration _____

*We need 7 working days for check to clear.

International Battery Corporation
6860 Canby Ave. #113, Reseda, CA 91335 (TLX 6975427+)
To order call: **(800) 225-9359 CA**
(800) 654-3790 US
Other inquiries call:
(818) 609-0516

Circle 756 on reader service card



Relate and Report. Then Rest and Relax. With R&R, the Relational Report Writer™ for dBASE.®

The report writer dBASE is missing.

R&R helps prepare reports faster, easier, without programming — and without dBASE. Or print reports from your own dBASE programs with the R&R Runtime, *included with an unlimited-use license.*

More flexibility than you'll ever need.

Relate and report from up to 10 files at once, using one-to-one relations and one-to-many scans through dBASE indexes.

Free-form layout of text and fields anywhere on the report.

Calculate new fields with more than 60 predefined functions, including IF/THEN logic.

Eight sort levels. Eight independent record grouping levels. Compute running totals, or subtotals by group or by page.

Plain-English query, even allows date "wildcards".

The ease of use that saves you time.

1-2-3®-like commands. Move fields and text freely around on the screen. Timesavers like automatic trim and alignment.

Predefined field formats such as currency and commas, or create your own. Word-wrap character and memo fields within any width you specify.

Print selectively: underline, *italic,* **bold,** **combinations.**

Saved reports work even after file STRUCTUREs are MODIFYed.

Instant on-line HELP. Fully-indexed User's Guide. Tutorial.

Only $99. Satisfaction guaranteed.

Try R&R. If you aren't satisfied, just return it within 30 days for a full refund.

Order now. Call 800-325-9035.

Or call (617) 366-1122. Visa, MasterCard, check, COD, PO. Add $3 shipping, plus $2 if COD and 5% tax in Mass. Refunds only for purchases made directly from Concentric and Concentric Authorized Dealers. Works with dBASE III® and III PLUS.™ Not copy-protected.

Relate and report, then rest and relax — with R&R. A timesaving tool from the authors of 1-2-3 Report Writer™, dB Report Writer,™ and C.I.P® File Manager.

R&R *Relational Report Writer™*

Concentric Data Systems, Inc.
18 Lyman Street, PO Box 4063
Westboro, MA 01581-4063

Trademarks: dBASE, dBASE III, and dBASE III PLUS by Ashton-Tate; 1-2-3 and 1-2-3 Report Writer by Lotus Development Corporation; R&R, dB Report Writer, and C.I.P by Concentric Data Systems, Inc.

Circle 747 on reader service card

ZERO TO 150 IN A SNAP.

The power will shock you.

Imagine. Software that packs the horsepower to control 150 features with the speed and agility of a Ferrari, but at the cost of a single snow tire.

We call it SNAP. A sleek new program pumped with adrenaline, designed to perform. At a price that'll blow you off the road.

One disk, turbo-charged with all the priceless system management utilities you could ever need. Ever.

And, in seconds, performs functions you've known to take minutes.

SNAP copies, deletes, moves, renames, formats, sorts, prints, views, edits, tags, untags, encrypts, decrypts files in any directory on any drive with any system you'll ever use.*

SNAP. The power that drives your hard disk system through unlimited self-customized menus. Menus you create, within menus you create.

And the handling is pure heaven. Just one or two keystroke commands is all it takes to out-perform any system management program available today.

A high-speed viewer drives you from the top of the file to the bottom in less than a second. While SNAP's context sensitive help screens guide you at a moments notice down the hard disk highway.

SNAP. Slide into your seat. Slip it into gear. And a whirlwind of power takes your system where it's never been before. SNAP. A quick move toward the future.

800-992-4992.
800-624-7355. California

Call this number right now to order SNAP for just $99.95, and as a special introductory offer, we'll include one megabyte of invaluable programs with your order. That's three diskettes packed with business, personal and game programs for you to use with new SNAP. Just by calling our number today.

The Mt. Whitney Group
Natural Software

See us at COMDEX/Fall '86
November 10-14, 1986
Las Vegas Convention Center-West Hall
Las Vegas, Nevada

*SNAP requires IBM PC, XT, AT or compatible MS/PC-DOS 2.11 or greater, 256K.

Circle 749 on reader service card

A CROSSTALK XVI
SuperKlone™

MIRROR™ provides:
- Crosstalk XVI compatibility
- Background communications
- Built-in text editor
- Automatic logon script generation
- Transaction log

AND MUCH MORE...

SOFTKLONE™
1210 E. Park Ave. • Tallahassee, FL 32301
For information call 1-904-878-8564
TLX: 6714280 KLON
The Age of KloneWare Has Arrived

Shipping/handling 5.00
(COD orders add $3.00)
International shipping/handling 18.00
Florida residents must add 5% sales tax

COD To Order Call (904) 878-8564

MIRROR™ $69.95
Site Licensing Available
60-Day Money-back Guarantee
Not Copy Protected

Distributed in Canada by:
Saraguay Software Distributors
Telephone: (416) 923-1500

Distributed in the UK by:
Trisoft Ltd. Telephone: (0629) 3021

Distributed in the Scandinavia by:
UNIC (Norway)
Telephone: 02 38 39 10

Distributed in Australia by:
Delta Computer Systems Pty. Ltd.
Telephone: (02) 633-4055
P.C. Extras Pty. Ltd.
Telephone: (02) 319-2455

MIRROR is available for the IBM PC/XT/AT and compatibles running MS DOS 2.0 or higher.
MIRROR™, KloneWare and Softklone are trademarks of Softklone Distributing Corporation. Crosstalk XVI and Microstuf are registered trademarks of Microstuf, Inc.

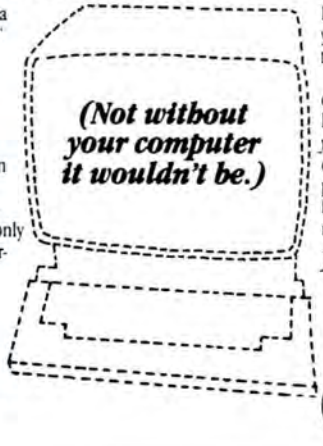
Circle 711 on reader service card

Business as Usual?

Business as usual these days means a computer that's up and "humming." But if your computer were stolen or damaged, you wouldn't have business as usual.
YOU'D HAVE TROUBLE!

You can get fast replacement for your entire system and be back in business in a hurry by protecting your computer with SAFEWARE Personal Computer Insurance. It's the only coverage designed specifically for personal computers used for business—in your office, shop or home.

SAFEWARE protects ALL hardware, ALL purchased software and ALL media against theft, accidental damage, natural disaster, power surge, etc., regardless of use, after a low $50 deductible.



Fast, courteous claims handling prevents your losing valuable business computing time.

Find the premium price for the coverage you need listed in the table below, *available for as low as $39 per year.* Fill in the coupon today. Your coverage will begin as soon as your payment is accepted. Or, for even faster coverage, call our toll-free number.

1-800-848-3469
(In Ohio call 1-614/262-0559)
Phones open 8 a.m. to 8 p.m. Monday through Friday Saturday 9 a.m. to 5 p.m.

SAFEWARE

Total Hardware, Media & Software System Value	Annual Premium
Up to $ 2,000	$ 39
$ 2,001-$ 5,000	$ 69
$ 5001-$ 8,000	$ 89
$ 8,001-$11,000	$109
$11,001-$14,000	$129

Call toll-free for rates on higher coverage.

It is an underwriting requirement that you insure your system for its full value.

Not available in all states

Mail to: SAFEWARE, The Insurance Agency Inc.
P.O. Box 02211, Columbus, OH 43202

Before I'm out of business,
please issue my SAFEWARE Insurance Coverage.

Name _____
Street _____
City _____ State _____ Zip _____
System value $ _____ ☐ Check Enclosed ☐ VISA ☐ MasterCard
Card # _____ Exp. Date _____
Signature _____
No risk. You may return contract for full refund within 10 days. Coverages and limits are subject to the terms, conditions and exclusions in the contract.

rank, major (U.S. Air Force reserve), and nickname, "Wild Bill," are correct and for real.

As mentioned in the article, MicroProse has produced a Libyan Update, which is currently being inserted into product packages and will become a permanent portion of the manual in future printings. However, there are no plans to alter the software as implied in the article.

Fred K. Schmidt
Director of Marketing and Communications
MicroProse Simulation Software
Hunt Valley, Maryland

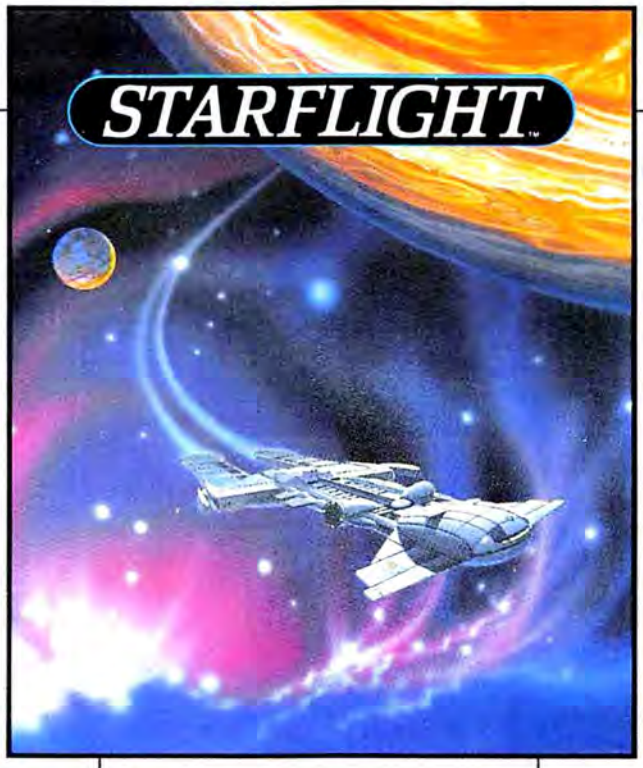
Correction Correction

In a recent review of Hewlett-Packard's 9142A tape backup system ("Protection Money," *PCW*, August 1986), *PC World* mistakenly attributed the drive's sluggish performance in file-by-file transfers to the PC/T error-correction scheme (originally developed by Tallgrass Technologies). According to technical sources at HP, HP's particular implementation of PC/T—which allows users to access tape files using DOS commands—is responsible. *PC World* regrets the error.

Letters should be mailed to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD, CompuServe 74055,412, or The Source STE908. All letters must include the writer's name, city, and state and should not exceed 300 words. We reserve the right to edit letters.*

(Boldly go where no game has gone before.)

Turn Your Computer Into a Starship.



Beam Aboard, Captain.

Your starship is fueled and ready. Your crew is fully trained. You launch from Starport, heading toward the galaxy's core on a hunch. You've been chosen to seek new worlds to colonize. New resources for a homeworld gone stale.

Your navigator zeroes in on a red dwarf star. Long-range scans show three planets: a gas giant, a frozen ice world, and a blue-oceaned paradise that looks just like heaven. A good place to land.

Suddenly a klaxon sounds. "Captain, we're being scanned," says your Science Officer. A giant hologram of a squid-like creature appears on your view screen and hisses, "Prepare to die, air-breathers."

Your space odyssey has just begun.

State-of-the-art Outer Space Simulation.

- Stunning graphic simulation of rotating planets, landing sequences, laser battles, and more.
- Explore 270 star systems and 800 planets with unique ecosystems. Each planet contains almost 2 million different locations.
- Choose your own crew—Science Officer, Communications Officer, Navigator, Chief Engineer, Medical Officer, and Captain.
- Includes full starmap and security decoder.
- The state-of-the-art in entertainment software. Over 15 man-years in development.

Explore Strange New Worlds

Land on different planets to collect valuable minerals, lifeform specimens, and artifacts from ancient civilizations. But keep your laser on stun—not all the locals will be glad to see you.

Talk to Aliens

Each alien race, like this Veloxi, has a unique culture, personality, and language. They can give you clues—if you can get them to trust you.

"Standard Orbit, Captain."

From hull-crushing gas giants to frozen dwarves, each star system is unique. Study your sensors carefully—there's a stiff fine for recommending colonization of boiling lava planets.

ELECTRONIC ARTS™

For the IBM,® Tandy, and all 100% compatibles. 256K RAM required. Not copy-protected.

How to Order: Visit your retailer, or call 800-245-4525 for direct VISA or Mastercard orders (in CA call 800-562-1112). There is a 14-day, money-back guarantee on direct orders. The price for direct orders is $49.95. To order by mail, send check or money order to Electronic Arts Direct Sales, PO Box 7530, San Mateo, CA 94403. Add $3 for shipping and handling ($4 Canadian). Allow 4 weeks for delivery. For a complete product catalog, send 50¢ and a stamped, self-addressed #10 envelope to Electronic Arts Catalog Offer, 1820 Gateway Drive, San Mateo, CA 94404. IBM is a registered trademark of International Business Machines, Inc. Starflight and Electronic Arts are registered trademarks of Electronic Arts.

Starflight Cluebook also available $12.95 direct.

Circle 840 on reader service card

INTRODUCING

PC TALK®4

the easy way to make your PC more talkative

Communications Software that doesn't require a Ph.D.

In 1981 Andrew Fluegelman had a practical mission: to get his PC to "talk" to other PCs without a lot of confusing chatter. After all, telecommunications shouldn't require a Ph.D.! He made PC TALK® easy to use, yet sophisticated enough to work with a variety of computers and modems.

PC TALK4 includes $29 discount membership to The Source™ + On-Line Airline Guide™ for 30 days free

Now PC TALK®4 includes new features that meet the most demanding telecommunications requirements without sacrificing simplicity. PC TALK4 uses two-stroke commands for virtually every function and includes an easy-to-read manual with everything you need to know to make your PC more talkative.

Turn your PC into a powerful communicator

PC TALK4 includes powerful features for the most demanding audience.

XMODEM.CRC provides error checking for binary and data file accuracy no matter what your speed limit (300 to 9600 baud).

EXPANDED MACRO CAPABILITY expands the mind of your function keys with macros up to 126 characters, and direct access of macros from DOS.

TERMINAL EMULATION gives your PC a new identity to talk with the best of them, including VT 100/52.

FULL DOS SUBDIRECTORY support gives you quick access to subdirectories and path commands as well as access to alternate programs through DOS from PC TALK4.

SPLIT-SCREEN MODE gives your PC a split personality to segregate your input from the connected computer's input.

Join the community of over 100,000 very happy (and highly opinionated) users.

PC-TALK gave our users the unique opportunity to tell us what they wanted, with our commitment to respond. PC TALK4, our most advanced product, is the result of thousands of suggestions from people like you. Now with support from our electronic bulletin board and the PC TALKLINE™, plus a free subscription to PC TALK FORUM™, our commitment continues.

A phone call you can make to start PC TALKing!

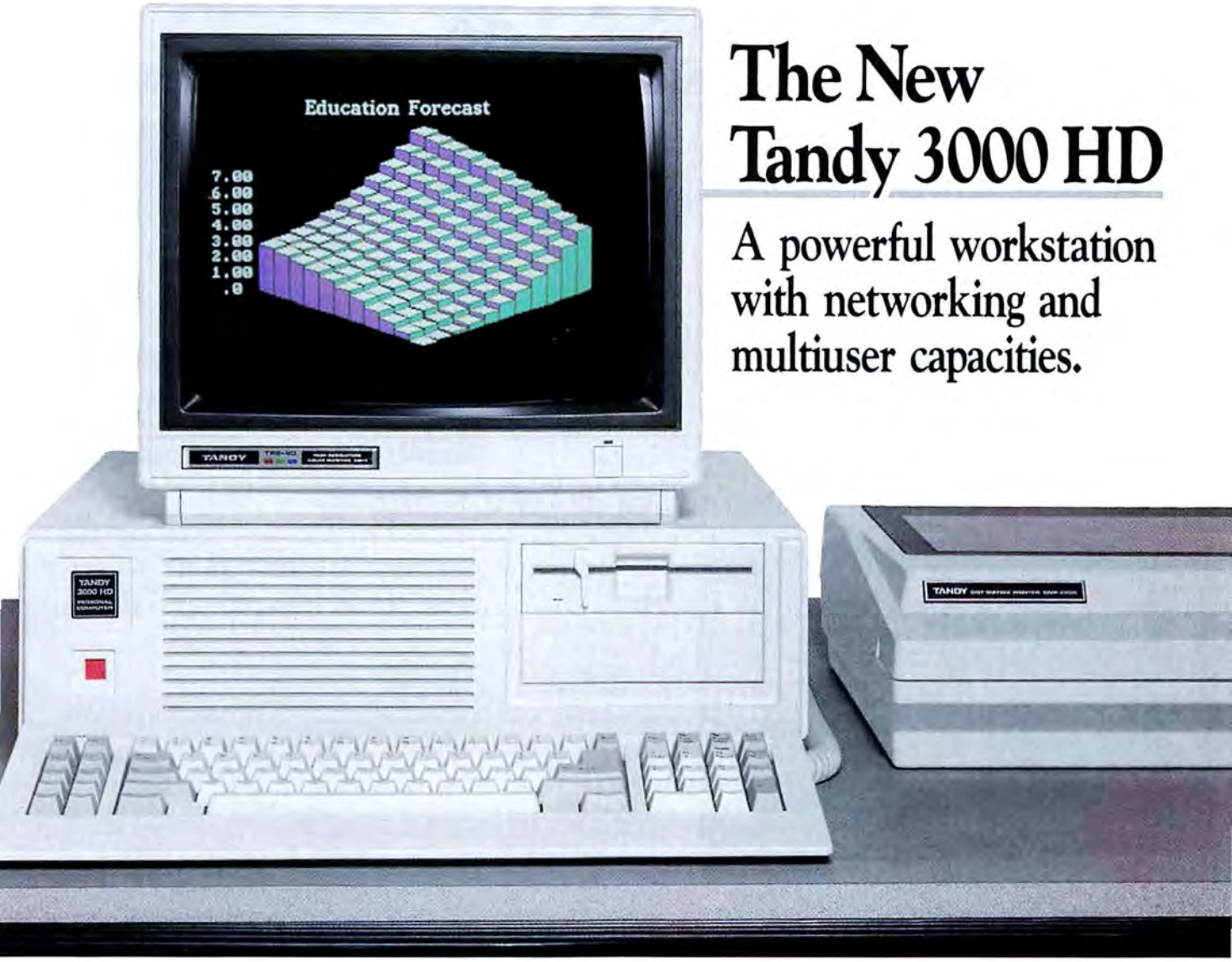
For local PC TALK4 dealers, contact Software Resource™ at:

800-851-9009 CA
800-851-9010 USA

PC TALK®, PC TALK®4, PC TALKLINE™, and PC FORUM™ are trademarks of Headlands Press, Inc.; The Source™ is a trademark of Readers Digest Corp.; On-Line Airline Guide® is a trademark of Dun & Bradstreet Co. © 1986 Headlands Communications Corp., P.O. Box 8, Tiburon, CA 94920 (415) 435-0770.

Circle 824 on reader service card

TANDY®... Better Again™



The New Tandy 3000 HD

A powerful workstation with networking and multiuser capacities.

The 3000 HD is compatible with the IBM PC/AT®, offers greater hard disk storage (40 megabytes vs. the PC/AT's 30), yet is priced at only $4299 (vs. $5295 for the PC/AT).

Based on the 16-bit Intel 80286 microprocessor, the Tandy 3000 HD (25-4001) operates at 8 megahertz—33% greater than the industry standard. The Tandy 3000 HD features 640K main memory and a high-capacity 5¼" slim-line floppy disk drive which has been designed to read both 1.2-megabyte and 360K formats, allowing it to run either IBM PC/AT or IBM® PC software.

The high-performance design of the 3000 HD makes it a natural for use in a local area network such as ViaNet®. ViaNet can link together multiple MS-DOS® computers into a powerful office automation system.

The Tandy 3000 HD also uses the forthcoming XENIX® System V multiuser operating system. Up to five users with low-cost display terminals are capable of tapping the power of the Tandy 3000—permitting each to work independently on such projects as accounting, word processing and electronic filing. Each remote user has all the power of a fully configured computer system . . . for the price of a terminal.

The Tandy 3000 HD is quality-designed and built by Tandy in the U.S.A. We back the 3000 HD with full support, nationwide service, commercial leasing and professional training. Come see it today!

Available at over 1200 Radio Shack Computer Centers and at participating Radio Shack stores and dealers.

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Circle 371 on reader service card

Send me a Tandy 3000 brochure.

Mail to: Radio Shack, Dept. 87-A-477
300 One Tandy Center, Fort Worth, Texas 76102

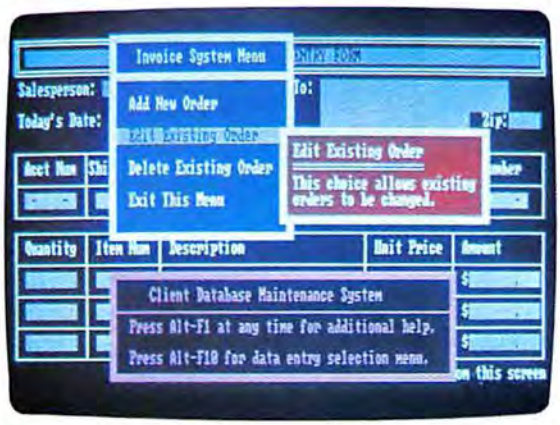
Name _____
Company _____
Address _____
City _____
State _____ ZIP _____
Phone _____

Price applies at Radio Shack Computer Centers and participating stores and dealers. Monitor sold separately. IBM price is manufacturer's suggested list as of April 2, 1986. IBM and IBM PC/AT Registered TM/International Business Machines Corp. MS-DOS and XENIX/Registered TM Microsoft Corp. ViaNet/TM ViaNetix, Inc.

Make Flashy Programs.

In dBASE, Turbo Pascal, BASIC, C, COBOL, Fortran, 1-2-3, DOS.

New! Flash-Up™ Windows.



Instantly flash-up menus and help windows.

From within almost any program language or application program. When the user makes a menu selection, a sequence of keystrokes is sent to the running program as if the user were typing it at the keyboard.

A keyboard macro utility that your programs can control!

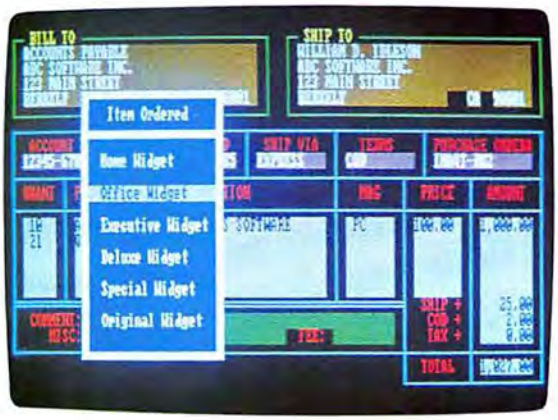
Just like keyboard macro utilities, Flash-Up Windows can be used to send repetitive keystrokes and simplify commands for your users.

But Flash-Up Windows can do more. Your programs can send commands directly to Flash-Up. Powerful commands that control when and how windows appear. Flash-Up is a perfect tool for controlling programs and entire systems via menus.

The powerful window editor allows you to create windows, change their size, location, and color — all automatically.

Works with DOS, BASIC, Turbo Pascal, C, COBOL, Fortran, dBASE, 1-2-3, R:BASE ...and most other software. $90.

Flash Code.™ For dBASE II, III and III+.



The most powerful, most complete program developer for dBASE II, III, and III+.

Use Flash Code's advanced screen design editor and see how incredibly easy screen design can be. Draw boxes, lines, and select colors. Specify special parameters for edit checking, initial values, calculated fields, etc. All within one, easy to use editor.

Then tell Flash Code to write the program. Based on your screen designs, Flash Code can generate a full database program. Well written code that you can use as is, or merge with your own programs.

Menus and help windows add a new dimension to your dBASE applications.

Flash Code includes its own dBASE window editor. Use the window module to flash-up windows and screens instantly. The windows are easily converted when you move to the added power of our Flash-Up Windows product.

"...a truly remarkable product. Brand new, state-of-the-art and actually fun to use. The windows make it an even more amazing product."
— Gary N. Prague, Author, "The dBase III Programming Handbook"

Flash Code. $150.

Screen Sculptor.™ For IBM BASIC, Turbo Pascal, and Quick Basic.

Create screens in minutes, then Screen Sculptor writes the program.

In IBM BASIC, Turbo and Microsoft Pascal, and Quick Basic. Simply "draw" your screens with our advanced screen design editor and replace hours of tedious work with minutes of creative design.

Move pieces of the screen around, select colors from a menu, draw boxes, lines, paint, repeat last character. And more! Specify variable names, data types, acceptable data ranges, pictures for edit checking, etc., and you're ready to go.

Generate tested program source code to merge with your own program.

Based on your screen design. The generated program flashes up the screen, allows data to be entered by the user, and edit checks the input data.

"...so well done that you may not need to refer to the manual."

"...an exceptional product that fills a real need in the development of new programs."
— Computer Language

Screen Sculptor. $125.

No Risk Demo Offer!

Order any package and receive a separately sealed demo disk of the product. Use the demo and the manual for 30 days. If you're not satisfied — for any reason — return the entire package for a full refund.

Credit card orders call 24 hrs/day:
1(800) 824-7888, operator 268.

All other orders and inquiries call or write Software Bottling Co., 6600 L.I. Expwy., Maspeth, NY 11378. 718-458-3700.

Requires an IBM PC, XT, AT or true compatible, 256K.

Not copy protected.

THE SOFTWARE BOTTLING COMPANY OF NEW YORK

Circle 862 on reader service card

Is the cost of presentation slides catching up with you?

Slides are a vital part of professional presentations. Unfortunately, the cost of having them prepared at slide houses is becoming prohibitive.

Bell & Howell has an alternative. We call it the Bell & Howell Color Digital Imager. It's a complete, in-house system that teams up with your PC to deliver professional quality slides quickly and confidentially. And because it's designed to work directly with Lotus 1-2-3,® WordStar,® and most popular business programs, there's no need to learn any new software.

But even more important, you can prepare slides inexpensively. In fact, compare us to slide houses and you'll find we can save you over 90% per slide. That means you can use slides in almost any presentation.

The Color Digital Imager includes software and film recorder. It lets you compose word slides, charts and graphs. Add a graphics tablet and you can draw free form graphics. And with an optional printer or plotter, you can even generate overhead transparencies or hard copies for pass-outs or leave behinds.

To find out how the Bell & Howell Color Digital Imager can put you way ahead of the game, write Bell & Howell, Quintar Division, 411 Amapola Ave., Torrance, California 90501. Or call (213) 320-5700. We'll send you sample slides, complete information and the name of your nearest dealer.

BELL + HOWELL **800-223-5231**

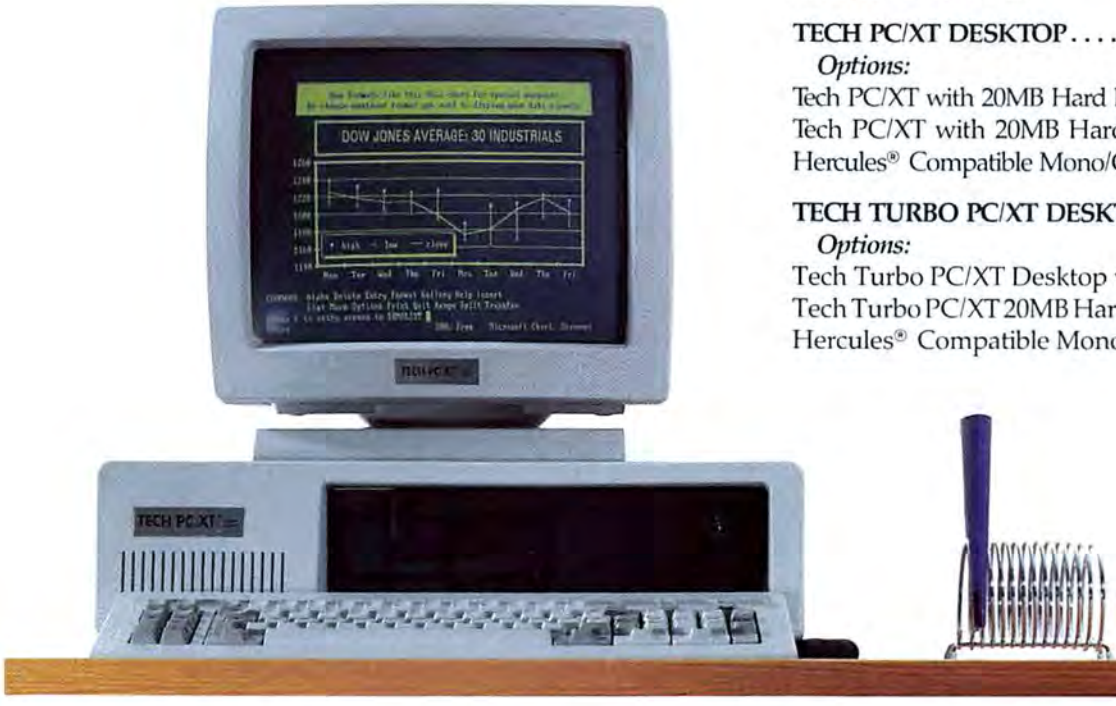
Seen at great presentations everywhere.

© 1985 Bell & Howell Company, Quintar Division. All rights reserved, 411 Amapola Ave., Torrance, California 90501 • Bell & Howell and Bell + Howell are trademarks of Bell & Howell Company. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. WordStar is a registered trademark of MicroPro International Corp.

Circle 833 on reader service card

STATE OF THE

Tech PC Desktop Computers are designed for survival. The XT's leave your desktop looking comfortably empty with their slim non-obtrusive profile; The AT's give you a powerful presence with a clean lined sturdy chassis. Combined with a 14 inch, 800 by 400 line amber monochrome monitor or a 14 inch, 1280 by 800 black and white monochrome monitor you've got **State of the Art** staring straight back at you. If 8 MHz 80286 power isn't fast enough for you... try the Tech Turbo PC/AT with its 10MHz 80286 and 10 MHz 80287 math co-processor socket. The Tech Turbo PC/AT gives you the **strongest, most powerful** 80286 performance available from anyone, anywhere... available with up to 16 megabytes of memory and hard disks up



TECH PC DESKTOP COMPUTERS are available now in 4 different base models:

TECH PC/XT DESKTOP ..... **$ 529**

Options:

Tech PC/XT with 20MB Hard Disk $979

Tech PC/XT with 20MB Hard Disk, Monochrome Monitor, Hercules® Compatible Mono/Graphics Card $1179

TECH TURBO PC/XT DESKTOP **$629**

Options:

Tech Turbo PC/XT Desktop with 20MB Hard Disk .. $1079

Tech Turbo PC/XT 20MB Hard Disk, Monochrome Monitor, Hercules® Compatible Mono/Graphics Card $1279

ART DESKTOPS

to 1 gigabyte with our new optical storage disk, the Tech Personal Computer Desktops represent the cutting edge of desktop microcomputer technology.

Tech Personal Computers, Inc. is a full service manufacturer of Micro Computer Products and offers a complete line of Desktop, Portables and Multi-User Computer Systems as well as an accessory line of over one hundred enhancement products. **Tech Personal Computers, Inc.** are all backed by a full one year warranty with additional maintenance coverage and extended maintenance contracts available through Momentum Service Corp. For more information concerning hundreds of Service Centers throughout the United States, contact **Tech Personal Computers, Inc.** at **(714) 754-1170.**

TECH PC/AT DESKTOP **$1399**

Options:

Tech PC/AT with 20MB Hard Disk $1799

Tech PC/AT with 20MB Hard Disk, Monochrome Monitor, Hercules® Compatible Mono/Graphics Card $1999

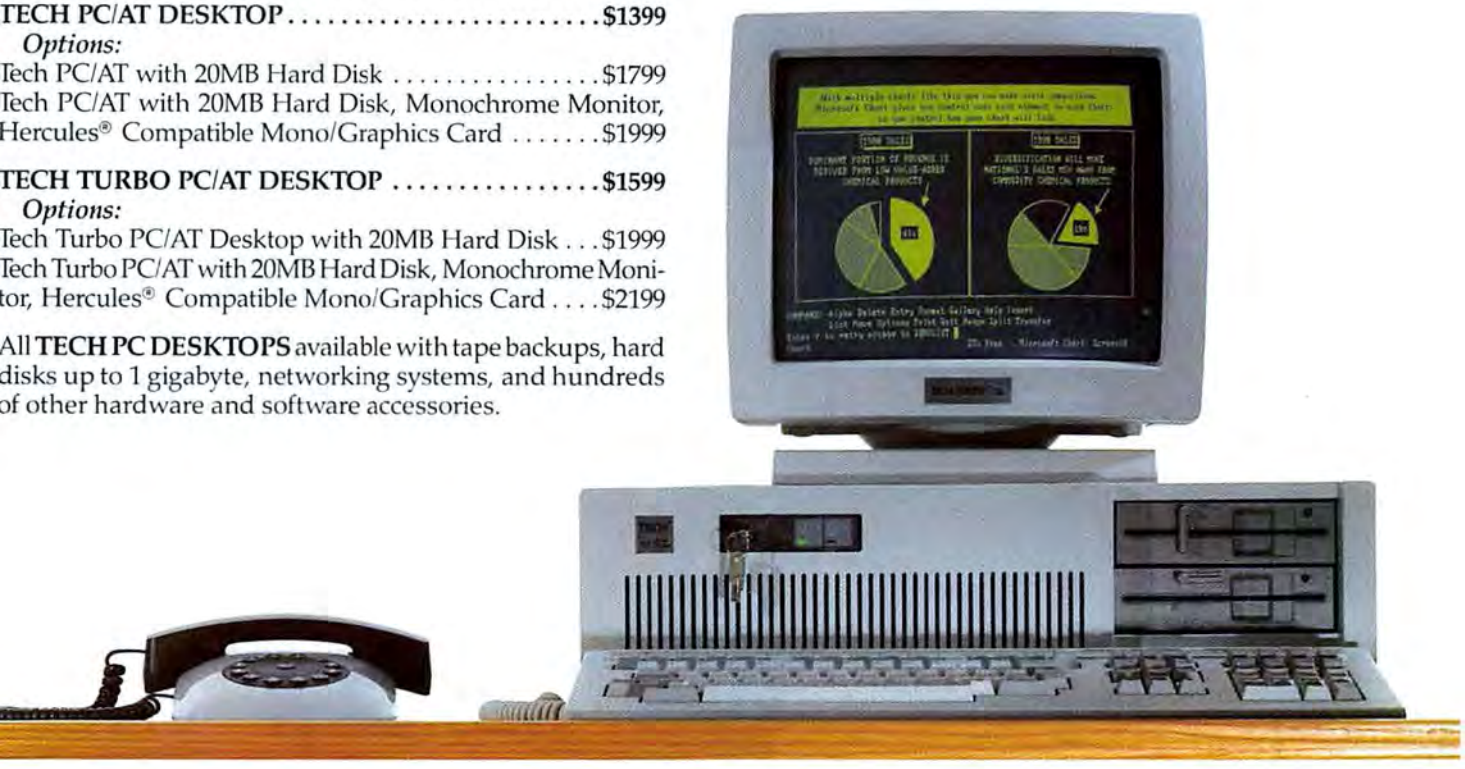
TECH TURBO PC/AT DESKTOP **$1599**

Options:

Tech Turbo PC/AT Desktop with 20MB Hard Disk ... $1999

Tech Turbo PC/AT with 20MB Hard Disk, Monochrome Monitor, Hercules® Compatible Mono/Graphics Card $2199

All **TECH PC DESKTOPS** available with tape backups, hard disks up to 1 gigabyte, networking systems, and hundreds of other hardware and software accessories.



TECH PC (714) 385-1711

1911 Betmor Lane, Anaheim, California 92805

Telex 272006 Answer Back - TECH FAX: 7143851523

Dealers circle 329 End users circle 331

RAM-Resident Program Users...

IT'S EASY TO WIN WHEN YOU BUY THE REFEREE™

With Referee, you make the rules.

If you use desktop organizers, spell checkers, keyboard enhancers or other RAM-resident programs, you may have already discovered the horror of "RAM Cram."

RAM Cram occurs when memory-resident programs compete with each other (and with applications programs) for control of your keyboard or other computer resources. It's a fierce competition that can cause your computer to lock up completely. Then *you* pay the penalty—in lost time and lost data.

Referee, by Persoft, is a new type of software that puts you in total control of your RAM-resident programs.

And that puts Referee in a league all its own. You can create your own RAM Teams™ for specific applications programs. Team Superkey™ and Sidekick™ with Lotus 1-2-3™. Or call in Prokey™ and bench the others when you switch to dBASE III™.

Load all the programs you need at the beginning of your workday. Referee automatically activates and deactivates the ones you need according to *your* set of rules. Instantly. Invisibly. You can also use Referee to unload programs from memory—even those with no unload option of their own.

Referee's Sideline™ menu enables you to control RAM-resident programs from within an applications program!

It's ideal for integrated packages like Symphony™. You can use a keyboard enhancer with the spreadsheet module. Or deactivate it, enter the word processing module and activate your favorite spell checker. It's easy. And you never have to back all the way out of the program!

Referee puts an end to RAM-resident program conflicts. At $69.95, it solves a very big problem for a very small price.

It's easier to win with the Referee on your side. For more information, and for the dealer nearest you, contact: Persoft, Inc., 465 Science Drive, Madison, WI 53711, (608) 273-6000—Telex 759491.

Referee™

persoft

© Copyright 1986 Persoft, Inc. All rights reserved.
Referee, Sideline, and RAM Teams are trademarks of Persoft, Inc.
Sidekick and Superkey are registered trademarks of Borland International, Inc.
Lotus 1-2-3 and Symphony are registered trademarks of Lotus Development Corp.
Prokey is a trademark of RoseSoft, Inc.
dBASE III is a registered trademark of Ashton-Tate.

Circle 142 on reader service card

Visit Booth #8624
Hilton Pavillion West
COMDEX/Las Vegas

Harry Miller

In Praise of the Commodity Blues

If the personal computer industry is driven by user needs rather than technological capabilities, the action is in commodity computing.

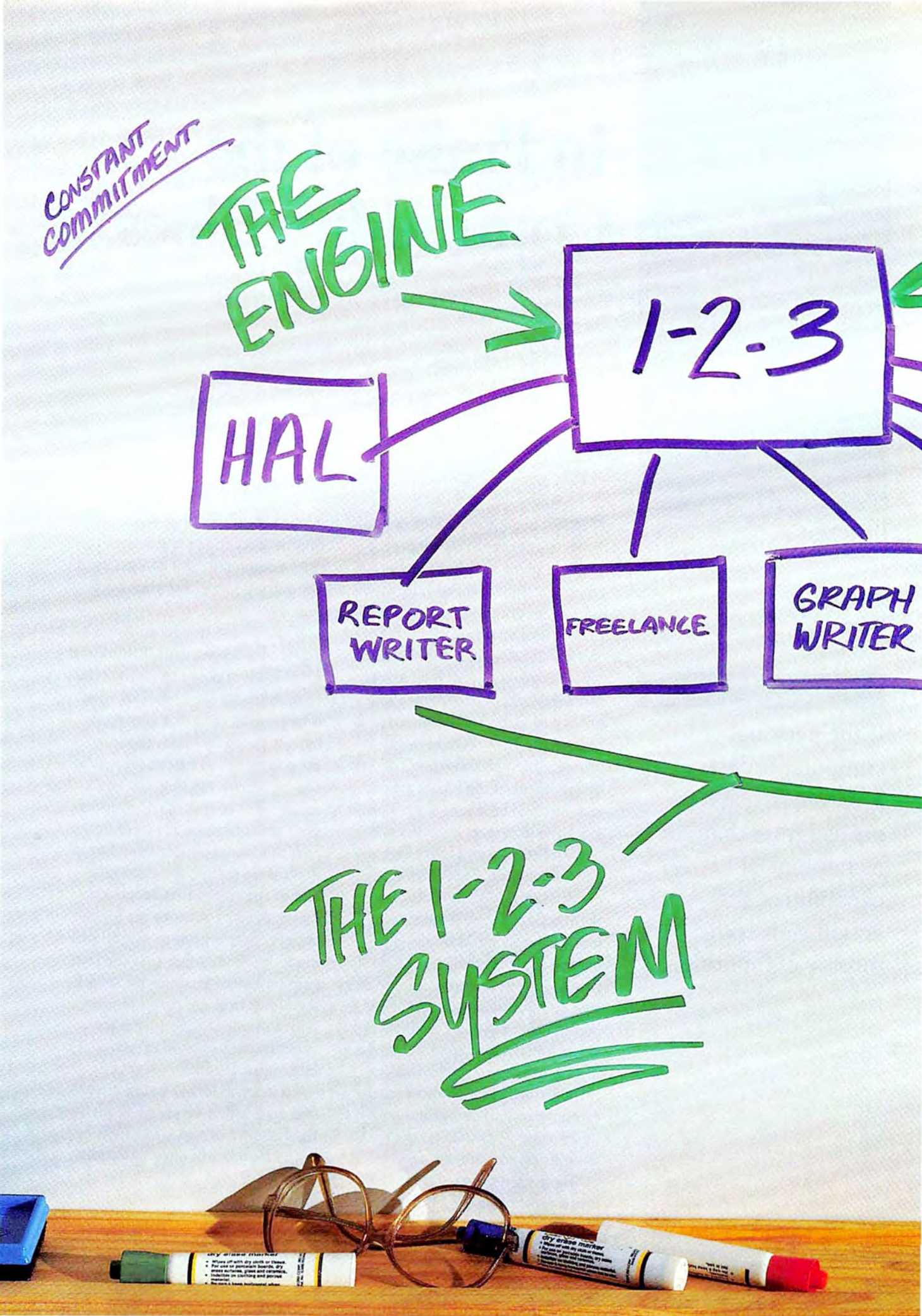
That software lags behind hardware in development is a given within the personal computer industry. But hardware companies continue to raise customers' expectations that a machine will solve their problems. Obviously, machines don't solve problems without software. The quality of software design affects how well a hypothetical business problem may be solved; it's almost independent of the hardware environment. Hardware simply provides the necessary resources. In terms of real productivity enhancements, the breakthroughs aren't at our doorstep; they'll be delivered by the next substantial innovation in software development. However, the good news is that today's low-cost, "commodity" computing is functional enough that we don't need to waste much time dreaming of the next generation. Those breakthroughs may just be more interesting to technologists and computer journalists than to the computing community at large.

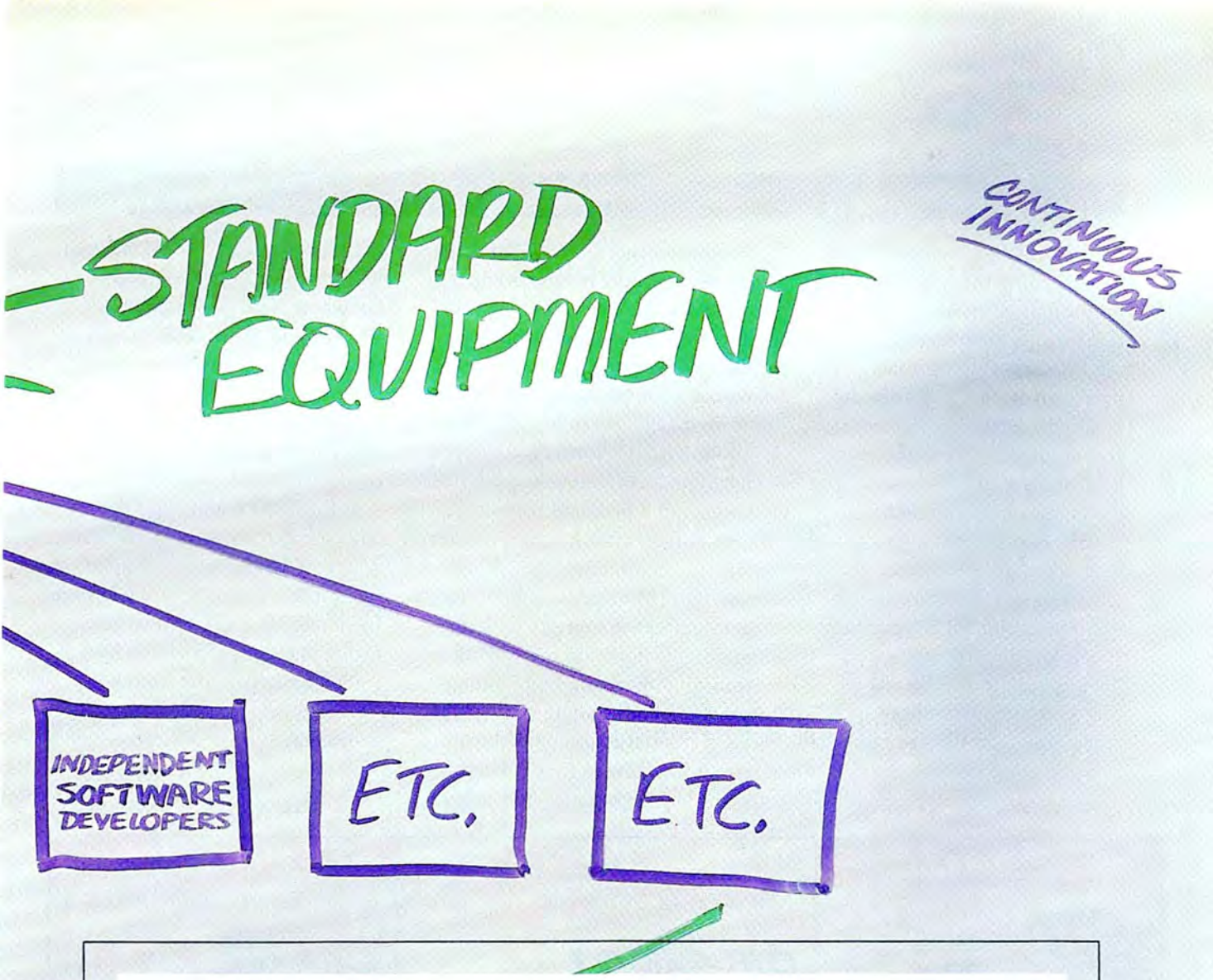
'Tis the season to eke the last drops out of those capital expense budgets, and judging by the prices in the ads in this magazine and the opportunity to get real bargains in used equipment, you can get more computing power for your buck than ever before.

With all due respect to Apple's marketing department, I think the $500 PC will prove to be the real "computer for the rest of us." Isn't it interesting how that enormous barrier posed by "learning how to use the thing" can be cut down to size by a price tag that you can't refuse? If "the rest of us" are running small businesses or are in jobs that could benefit from but don't require PCs, the economy end of the computing spectrum may indeed be responsible for the largest contribution to overall productivity. Remember that the bargain basement beauties we're talking about here are turbo models, with innards and performance comparable to Compaq's once-innovative Deskpro.

I'll bet you forgot to cry crocodile tears when you read about IBM chairman and CEO John Akers bemoaning the commodity

(continues)


CONSTANT COMMITMENT
THE ENGINE
1-2-3
HAL
REPORT WRITER
FREELANCE
GRAPH WRITER
THE 1-2-3 SYSTEM



When 1-2-3® was first introduced it quickly became the best-selling, best-working software in the industry. Today it's practically an industry all by itself.

An example: there are more than 1000 independent software developers who have created and continue to create specialized applications for 1-2-3. . . steadily adding value to the product for people in all areas of business. Today 1-2-3 is the engine that drives an industry full of software tools designed for such specialized jobs as construction management, tax planning, business modeling and more.

Add to this Lotus supported companion products such as 1-2-3 Report Writer,™ Freelance,® Graphwriter®—and soon-to-be available products such as Lotus HAL™ and others—and it's clear that you're looking at an entire *system* of products to help you work more productively with 1-2-3.

All of which makes 1-2-3 better than it ever was.

About a *thousand* times better, in fact.

Learn about the 1-2-3 system and how it can work for you. Talk to an authorized Lotus dealer.

Lotus 1-2-3

The business software integrating spreadsheet, graphics and database.

© 1986 Lotus Development Corporation. Lotus, 1-2-3, Freelance and Graphwriter are registered trademarks of Lotus Development Corporation. 1-2-3 Report Writer and Lotus HAL are trademarks of Lotus Development Corporation. "Lotus HAL is distinguished from HAL, which is a trademark of Qantel for its Hotel and Leisure Software."

nature of the PC market. There may be cause for concern as one of our nation's largest corporations seems to be helplessly watching its market share erode in the one segment that promises the healthiest future growth; still, the commodity nature of the marketplace certainly bodes well for the computing community.

IBM has historically protected its market share via product differentiation and customer control. (Customer control is mainframe-speak for "the first one's free.") However, in this arena IBM's products are open, not proprietary or technically distinguished, and the essence of personal computing is simply incompatible with centralized control. (Did you really think it was just technology that was keeping local area networks from catching on as quickly as predicted? Scratch a complaint about LAN performance and you may find a reluctance to surrender control of a *personal* computer.)

A minute into the conversation and any market analyst will tell you that IBM's great hope to regain market share rests with an 80386 machine. To my way of thinking, that's anything but a safe bet. The strength of the MS-DOS standard has enabled Compaq and others to move ahead with their 386 plans with little regard for what IBM's 386 machine will look like (see "Compaq Spawns a New Generation," *PC World View*, in this issue). And all those young upstarts may have a wide window of opportunity if, as seems likely, IBM holds back its 386 efforts to avoid encroaching on its System/36 product line.

While IBM could close the architecture of its 386 machine, the company would have to implement it as a superset of the current Intel and MS-DOS standard to avoid abandoning its large installed base. And the MS-DOS

(continues)

TAPE BACKUP

	External	Internal
■ 60MB WANGTEK Tape Backup	$879	$794
■ 20MB Cassette Tape Backup	$699	$599

- Backup 20MB in less than 5 minutes
- Image/file-by-file backup and restore
- Menu driven software
- Interchangeable DMA, port address and interrupt

HARD DISK

■ 20MB Seagate 1/2 Ht. hard disk (with controller)	*$379
■ 30MB Seagate 1/2 Ht. hard disk (65 Ms with controller)	$499
■ 20MB Seagate full Ht. hard disk (40 Ms)	$528
■ 30MB Seagate full Ht. hard disk (40 Ms)	$628

* C.O.D., VISA, MC only.

INCREDIBLE MACHINE-INCREDIBLE PRICE! Made in the USA

QIC-286-QT

Thousands of systems installed proven reliable

Quality is what we stand for. Special dealer and corporate discount **$1125**

- Fully IBM AT compatible, runs all major software
- 80286 CPU, 6/8 MHz clock calendar
- 512K RAM on mother board, expandable to 1024K
- 1.2MB or 360K floppy disk drive
- Combined floppy/hard disk controller
- Clock/calendar with battery backup
- Documentation and setup program
- 72-Hours Burn-In test
- FCC Class 'B' approval
- Large Quantity in stock
- AT style keyboard
- 192W power supply
- 8 Exapansion Slots

MODEM

Made in U.S.A.

$128

EVEREX EVERCOM

- Comes with Bit-Com Software
- 1/2 size 300/1200 Baud Modem
- Fully Hayes, Bell 103 & 212A compatible
- Supports Com 1,2,3 & 4

■ 1200/2400 Baud Internal 1/2 size modem	$289
■ Modem, multifunction card	$289

ACCELERATOR 80286 TURBO BOARD

$399

FCC Class 'B' Made in USA

- Runs with IBM PC, XT and compatibles
- With the Turbo card, your PC will run 7 times faster than IBM, PC, XT or 33% faster than 6 MHz IBM AT
- 16 bit 80286 design
- Accepts optional 80287 Math Co-processor

QIC RESEARCH INCORPORATED

800-843-0806 (Sales)
(408) 942-8086 (CA)
Tech Support
(408) 942-3177
489 Valley Way
Milpitas CA 95035

POWER SUPPLY

$79

- PC, XT Compatible
- 4 Power leads for drives

Circle 983 on reader service card

INFORMATION PIPELINE

LOTUS SUPPORT ↓↑ CUSTOMER →

M E M . N D U M

Lotus TO: Product Support Managers

FROM: Steve Crummey, VP Sales & Service

RE: New Service Idea — We're calling it "PROMPT."

New research indicates that our customers would be interested in a "premium-value" service arrangement. Please put together a program. Here are some things the customers said they would find valuable:

*A toll-free telephone line that provides rapid access to Lotus Service and Support. Customers want answers to their questions quickly. And they don't want to pay for the cost of the calls.

*Rapid access to Lotus' Senior technical support personnel. For detailed, specialized help -- when they need it.

*A quarterly newsletter. They want to know more about us -- products, services, technical information, where we're heading, etc. Not hot air, either -- real substance!

*Timely information. Let's start a Preferred Mailing List and send them news releases, and advanced information about products and special offers.

*A discount on our 1-2-3 and Symphony Companion products. We want our users to grow with us. Figure out the best possible discount on the Companions. — 50% is do-able.

Also, keep the price down. Obviously, we can't do all this for free. But let's be sure they get their money's worth. Think in terms of a zero net investment.

These customers are our life blood. Let's keep them happy!

Customer should be able to recoup cost in savings.

Lotus PROMPT™ is a new value-added service plan. Its unique combination of benefits (see memo) assures you the fastest, most complete service available. You'll save time—and you'll ultimately save money. Because in addition to time-saving product support and other information services, PROMPT also includes 50% discounts on all Lotus Companion products that enhance Lotus® software.

In fact, PROMPT will likely pay for itself.

You can get more information about PROMPT using the card provided.

Or call 1-800-361-6161 (ext. 4912)

to order PROMPT—you'll be enrolled the same day you call.

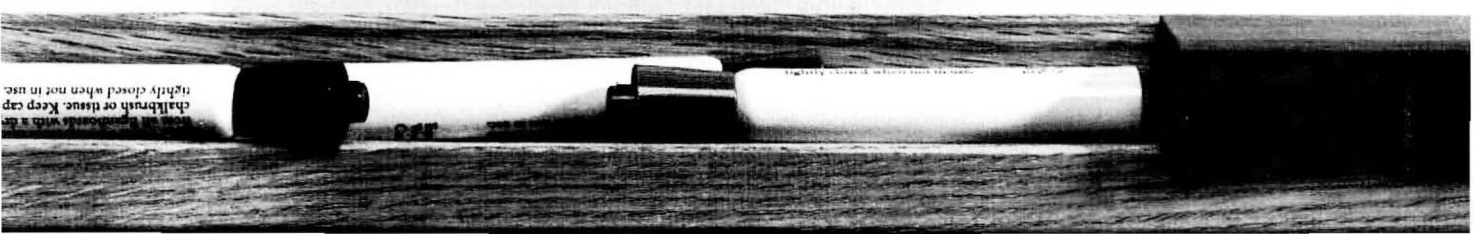
Lotus PROMPT—it does for service what 1-2-3® did for spreadsheets.

Lotus PROMPT™

A complete information and support plan for users of Lotus software

© Lotus Development Corporation. 1-2-3, Symphony, and Lotus are registered trademarks and Lotus PROMPT is a trademark of Lotus Development Corporation.

$150 MORE THAN WORTH IT



You can eat 37% more carrots.
Or you can get our new VEGA Deluxe™ EGA card.

Despite its improvements over CGA, today's garden-variety Enhanced Graphics Adapter can still be a strain on the eyeballs.

May we introduce you to a sight for sore eyes: the new VEGA Deluxe EGA card. A short-card video adapter that goes beyond standard EGA to bring you as much as 37% higher screen resolution.

In pure pixels, that means 640 x 480. *And* 752 x 410. With as many as 16 on-screen colors from a palette of 64.

That, in turn, means sharper lines. More brilliant colors. And less strain on your eyes.

(Of course, you can't see more than your monitor will display. So for more than 640 x 350, the VEGA Deluxe requires a

High resolution modes require TTL color monitors capable of 25 KHZ and 29.4 KHZ. Trademarks: VEGA Deluxe, Video-7 Inc. Hercules-Hercules Computer Technology; MultiSync-NEC

Multisync® or equivalent.)

The VEGA Deluxe combines our advanced surface mount technology with 28% fewer ICs to give less heat build-up and greater reliability. And, it's 100% compatible with every other video mode: EGA, CGA, Hercules and MDA. (We guarantee it, or your money back.) It even *automatically selects* which mode is right for your software's needs.

The VEGA Deluxe is the next in a line of high-performance EGA cards that have made us the largest volume IBM-compatible EGA card manufacturer in the business, with over 100,000 shipped.

And at only $599, the new VEGA Deluxe won't set you back a bunch.

Want more information? Call 1-800-238-0101 for the name of the Video-7 dealer nearest you. (In California, call 1-800-962-5700.)

And get ready for a real eye-opening experience.

Video-7 Inc., 550 Sycamore Drive, Milpitas, CA 95035.

video7®

Information Systems, Inc.: Registered trademarks: IBM-International Business Machines Corporation. Video-7-Video-7 Inc. Video-7 reserves the right to change specifications without notice.

Circle 681 on reader service card

standard now has enough momentum to provide a healthy market for non-IBM 386 machines.

Another, and potentially much more significant, factor in this quandary is that there's a lot of life and value left at what's now the low end of the PC spectrum. Meanwhile, we can only hope that IBM will opt to garner a market advantage by creating innovative products rather than by shutting their competitors (and those competitors' customers) out of a proprietary environment.

It hardly seems that the world is just waiting for a new generation of hardware. These days, AT-compatible computers are more or less standard fare. But it took almost two years before that was true. Most of the ATs and compatibles were purchased in that time for one of two reasons: speed or ego (not necessarily in that order).

For the vast majority of PC users, the benefit of the 80286's speed is largely psychological. Some tasks that take too long to be fun on a PC or an XT become useful and convenient when performed on an AT or a compatible. But we may be very near the limit of perceptible improvements in speed.

Once you get past the initial awe that more speed inspires, will faster computers really increase your productivity? Unless you're dependent on a local area network for transaction processing, involved in CAD, frequently compile long programs, or index large data bases, the answer is probably no. Even when the operating system can overcome the 286's inherent design flaws and make use of its multitasking resources, the increase in convenience and productivity will be only incremental.

The other oft-mentioned benefit of the next generation of hardware is that application programs will take advantage of almost unlimited amounts of RAM and include enough AI techniques to make them truly easy to learn and

(continues)

"IF YOU'RE LEARNING C AND NOT USING ECO-C88, *YOU'RE WORKING TOO HARD!"*

New Release 4.1 **Microstat**

Eco-C88 is a full C compiler for MSDOS machines. Everything you need is included in the low price of $59.95, including a full-screen editor. Here's what some reviewers are saying about the Eco-C88 C Compiler:

"Eco-C performed well on all the benchmarks, generating code that was quite comparable to that of compilers 10 times as costly."
Christopher Skelly, Computer Language, Feb., 1986

"This compiler does handle syntax errors much better than average - no avalanche of spurious messages here."
William Hunt, PC Tech Journal, Jan., 1986

"Eco-C88 is a high-quality package... convenient to use..."
Dr. David Clark, Byte, Jan., 1986

"Eco-C is definitely a bargain... it includes both the compiler and an excellent Turbo-style editor... a useful compiler for advanced applications, and will serve far beyond the beginning phase."
Gary Entsminger, Micro Cornucopia, April-May, 1986

The compiler comes with a standard library of over 200 functions, cc and "mini-make" utilities, ANSI language enhancements (e.g., prototyping), expanded user's manual, plus much more, all for the low price of only $59.95. Also ask about our support products!

If ordered with the compiler, the C library source code (excluding transcendentals) is $10.00 and the ISAM file handler (as published in the **C Programmer's Library,** Que Corp) in OBJ format is an additional $15.00. Please add $4.00 for shipping and handling. To order, call or write:

We've continually improved Microstat since it was introduced in 1978, and the latest release includes many new features you've wanted.

- Interactive and Batch Processing
- Expanded Data Management Subsystem with New Data Transforms
- Reading data files created by other programs (e.g., Lotus)
- 3 types of Analysis of Variance
- Time Series
- Crosstabs and Chi-Square
- Factorials, Permutations, and Combinations
- Hypothesis Tests
- Data sets that can exceed memory
- Multiple Regression (including Stepwise)
- Scatterplots (including best fit regression)
- Correlation Analysis
- 12 Nonparametric tests
- 8 Probability Distributions
- Descriptive Statistics
- Easy Installation

Microstat's algorithms have been designed to prevent numeric overflow errors and yield unsurpassed accuracy. Microstat's price is $375.00 including the user's manual and is available for the Z80, 8086, 8088 CPU's and CP/M80, CP/M86, MS-DOS, and PC-DOS. To order, call or write.

Ecosoft Inc.
6413 N. College Avenue
Indianapolis, IN 46220
(317) 255-6476 · 8:30-4:30

1-800-952-0472
(orders only)

ECOSOFT INC.

MasterCard VISA AMERICAN EXPRESS

Trademarks: Eco-C88, Microstat (Ecosoft), CP/M (Digital Research), MSDOS (Microsoft), PC-DOS (IBM), Z80 (Zilog), 8086, 8087, 8088 (Intel).

Circle 493 on reader service card

PANASONIC® PRINTERS. THEY'RE GENERATING A LOT OF GOOD PRINT.

The good reviews keep rolling in. And, as you can see, the critics agree: Panasonic printers are real winners!

But that shouldn't come as too big of a surprise. After all, Panasonic printers offer the advanced features and ease-of-use you've come to expect from Panasonic.

> ...ly bad. ...like their co...petition, the Panasonic machines are well made, sturdy printers that should serve well in the various applications for which they were designed. ...bolds are ... letter-quality text. About the ... be sai...
>
> **PC WEEK—JUNE 17, 1986**

So, whether your business is big, small or in-between, you'll find a printer with features to love every bit as much as the critics. Like—as one reviewer observed—extraordinary near-letter-quality on our dot matrix models. They also come standard with impressive high-resolution graphics capability. So you can add graphs, charts, illustrations—even your company's logo.

> ...with this litt... printer.
> As far as I'm concerned, the KX-P1091 produces not near letter quality but rather true letter quality in this mode. You'd really have to strain to distinguish it from typewriter quality. Knowing that the test out... printed the company produced fast, courteous, and knowledgeable answers. ... about ... seems ... call
>
> **PC—SEPT. 17, 1985**

Not to be outdone, all our daisy wheel printers give you sophisticated advances like boldface, shadow and underline.

Of course, we've put just as much care into the human side of our printers, too. You'll find switches and buttons that let you change print sizes and styles right on the printer rather than through the computer. And, with our continuous, self re-inking ribbons, you'll find yourself changing ribbons less often. When you do, our snap-in cartridge makes it a snap.

> ...and per...mance of the KX-P3151. It is a well-built product that promises to deliver many hours of trouble-free operation. The print quality is clear and well-defined. The alignment of characters on adjacent lines is also excellent, a sign of a well-designed paper and printwheel transport system.
>
> **PC PRODUCTS—APRIL, 1985**

Finally, just when you thought all this would be hard to top, there's more: all our printers are backed with an unprecedented two-year limited warranty.

Now that you've reviewed all of this for yourself, call toll-free 1 (800) PIC-8086 for the name of the dealer nearest you. Or you can write to: Panasonic Industrial Company, Computer Products Division, Two Panasonic Way, Secaucus, NJ 07094. You'll see how easily Panasonic printers generate good print for you.

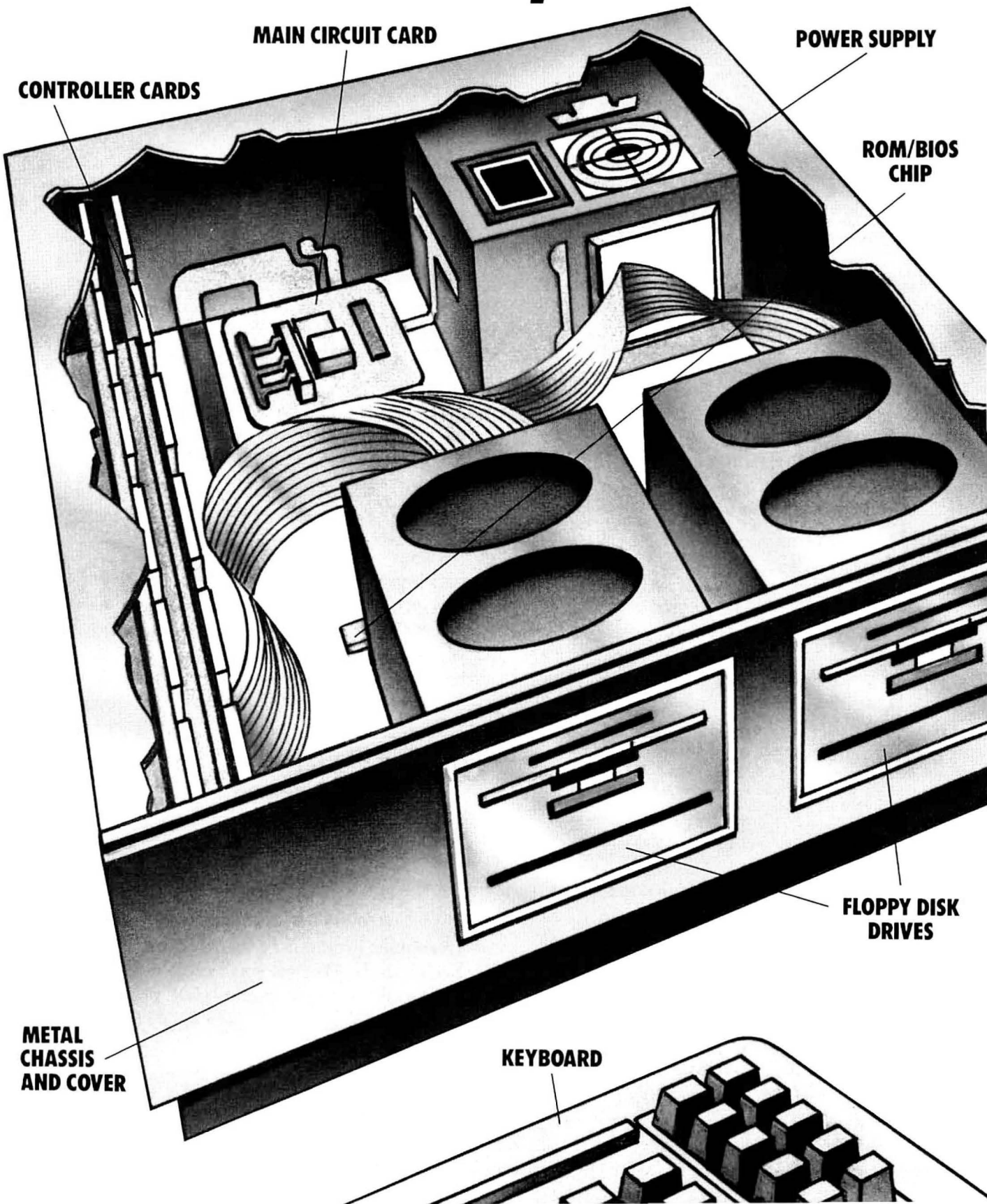
> ...ed. ...as- ...iap- ...ere is ...r in- ...gns 30.1 pounds. Like all the Panasonics we tested at, the 1592 comes with the company's exceptional two-year warranty. And like all of them, it definitely rates a look.
>
> **PRINTERS BUYERS GUIDE & HANDBOOK #3**

And you'll agree: **THE EASIER, THE BETTER.**

Panasonic Office Automation OA

Circle 588 on reader service card

ANYONE CAN BUILD A CLONE, BUT...



ONLY PANASONIC® GIVES YOU A BUSINESS PARTNER.™

Everyone seems to be jumping on the bandwagon. Today, companies that weren't there yesterday, and may not be there tomorrow, are building computers from easily assembled components.

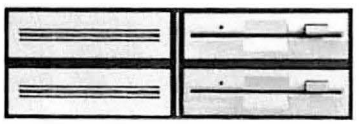
The result is a sea of computer clones with little to distinguish one from another.

THE PANASONIC DIFFERENCE—A POWERFUL BUSINESS ALLY. Our approach to offering you a computer was entirely different. We looked at what would work best for you and your business.

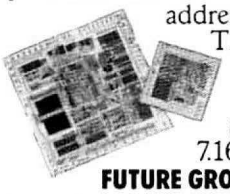
The result is the Panasonic Business Partner and Panasonic Business Partner 286. Two powerful business allies, designed to answer your most demanding computer requirements.

YOU CAN SEE THE DIFFERENCE PANASONIC MAKES. With our long, unparalleled heritage in video technology, you get high-quality, high resolution monitors. An optional Panasonic CGA PLUS board is switchable to let you use a color or monochrome display for both graphics and text.

BUILT-IN FLEXIBILITY. No two businesses run exactly the same way. So you can configure the Business Partners to your own individual needs. In addition to their built-in floppy disk drives, you can add a hard disk drive, additional half-height drives—even a magnetic tape drive.

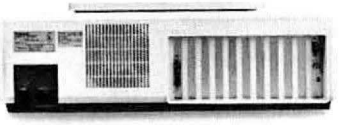


SPEED AND PERFORMANCE. The Business Partner 286 is built with maximum power and speed. Its 80286 processor runs at 6 MHz or 8 MHz, with the ability of addressing up to 15Mb RAM.



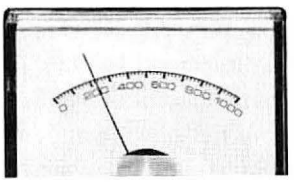
The Business Partner, with its 8086-2 processor, runs at 4.77 MHz, and for projects that need added acceleration, it will run up to 7.16 MHz.

FUTURE GROWTH. Both Business Partners have been designed to grow as your business grows. Extra slots are built in to offer you the flexibility—now and in the future—to add on cards for high resolution graphics, communications accessories and other peripherals.

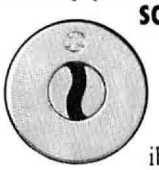


*IBM is a registered trademark of the International Business Machines Corp.

POWER TO SPARE. As your business grows, you'll put greater demands on your Business Partner. Don't worry, it can handle it. With 130 watts on the Business Partner and 220 watts on the Business Partner 286, you'll be able to drive additional peripherals and expansion boards.

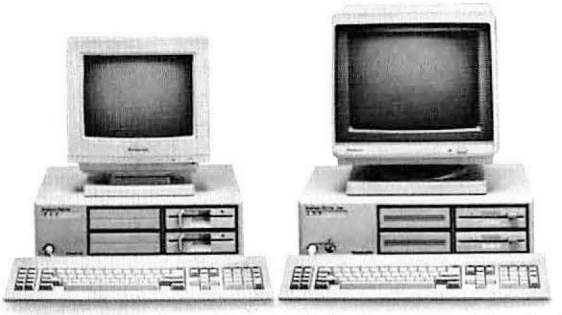


IMPORTANT DESIGN CONSIDERATIONS. The deluxe, detachable keyboards on both models have been designed for comfort and ease of use. We've separated the cursor keys and numeric keys for quick, convenient access. Swivel monitors adjust for each operator. On the Business Partner 286, you can lock the cabinet with a key to help prevent tampering and prying.



SOME REASSURING LAST WORDS. You'll find the Business Partner compatible with the IBM* PC/XT. And the Business Partner 286, with the PC/AT. So you'll be able to run the most popular software. You'll also get compatibility with Panasonic's wide range of quality peripherals, for the complete Panasonic office.

And more importantly, both Business Partners are from Panasonic, the company firmly committed to building a high-quality and dependable reputation in computer products. So both are backed with a full-year limited warranty.



For more information, and the location of the dealer nearest you, call **1-800-PIC-8086.** Or write: Panasonic Industrial Company, Computer Products Division, Two Panasonic Way, Secaucus, NJ 07094. And discover how the right Business Partner can make running your business easier. You'll see: **THE EASIER, THE BETTER.**

Panasonic
Office Automation OA

Circle 694 on reader service card

use. It wasn't all that long ago that 64K was considered an almost decadent amount of memory. I wish I could be more optimistic, but it seems that as memory capacity grows exponentially, the increase in ease of use is merely linear. Further, two years after the AT was introduced, we still haven't seen software that truly exploits its resources. The software lag strikes again.

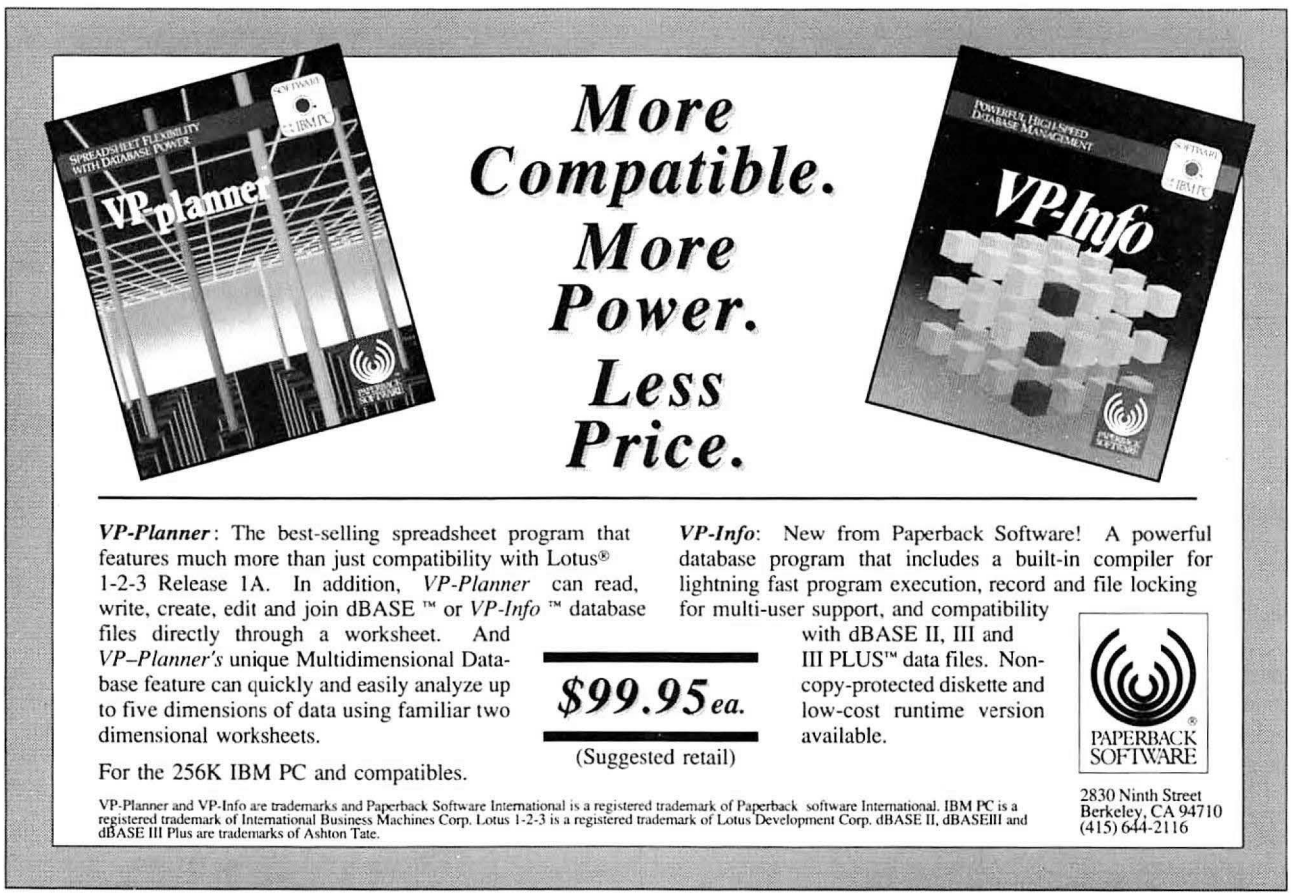
What's been happening in the mainstream software community while the back-room labs are working on breakthrough software for 80386-level hardware? The surprisingly logical answer is that developers have been exploiting the existing hardware resources to extract more productivity. This effort takes the form of refining and improving coordination of existing application software, providing new add-ons and utilities, and opening new avenues of customer support.

If we're honest, most of us admit we use only a small portion of the capabilities of the software currently installed on our machines. That fraction is all it takes to achieve a productivity payback (where increased productivity equals or exceeds the capital cost of the system plus the more significant cost of getting over the learning curve). Most people use one primary application and two or three secondary ones—word processers, spreadsheets, and data managers are the most common.

As the hooks and transfer capabilities that integrate those applications are developed and improved, ancillary applications take on more importance and are more quickly added to a user's repertoire. Communications and presentation graphics are clearly next in line when that repertoire is expanded.

The next step to help the commodity end of the hardware market flourish is more fully developed vertical market software. As

(continues)



Circle 229 on reader service card

AMT-286: More Than An IBM® Look Alike.

AMT-286. $1199.

The IBM PC AT® laid the foundation. AMT accepted the challenge, and put its AMT-286 into orbit. Now you can get the best of both worlds at a fraction of IBM's price!

Speed. The AMT-286 cruises at 8MHz, with optional clock rates of 10MHz and 12MHz. That's 30% to 40% faster than the IBM PC AT.

Main Memory. User-friendly programming takes lots of RAM. The AMT-286 comes with 640K, but can be expanded to an incredible 6 MB. IBM can't say that.

Mass Storage. Up to 60,000 pages of words and numbers—a full 120 MB of storage—can be crammed into the AMT-286 hard disks. That's twice what the IBM PC AT can handle.

Other Goodies. Intel's fabulous 80286 16-bit microprocessor chip on an American-made motherboard. 1.2 MB floppy disk; and accommodations for an 80287 math co-processor. The system runs all software and accepts all hardware designed for the IBM PC AT.

For $1199, how can you lose?

®Registered trademarks IBM, IBM PC/XT, IBM PC AT: International Business Machines Corporation

AT jr. $599.

This feature-packed model has an Intel 8088-2 running at 4.77MHz or 8MHz, selectable—many times faster than the IBM PC/XT®. Also has a "0" wait state on memory, and provides 640 KB of RAM on the motherboard. Offers eight expansion slots, an LED indicator for the turbo mode, and a security key lock. Optional features include a hard disk, up to 40 MB (38 ms), EGA, and an 8087-2 math co-processor.

Case style may vary from photograph

With any order of $1,000 or more, AMT will send you, absolutely FREE, a Micro brand dress wristwatch. Finest precision Japanese quartz movement. Specify male or female size. Only one watch per customer.

REACH FOR YOUR PHONE.

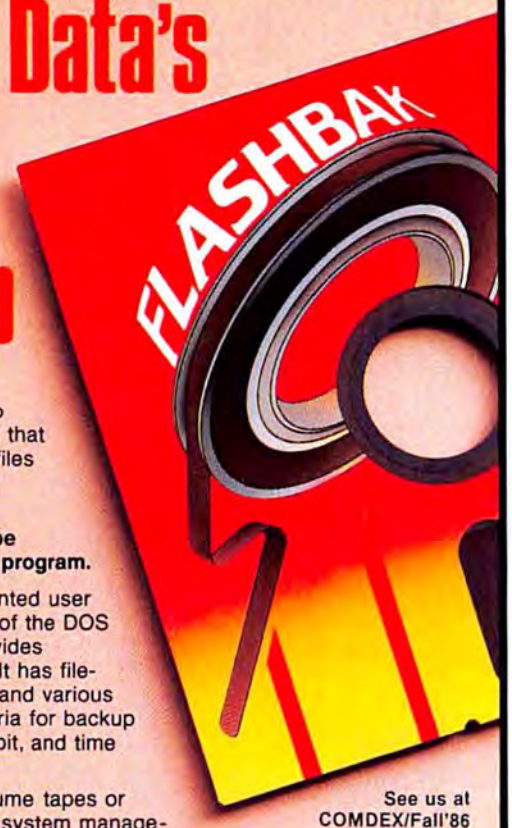
An AMT-286 or AT jr. is yours by dialing one of our convenient numbers. All orders filled immediately, following complete systems checkout and 72-hour factory burn-in.

AMERICAN MICRO TECHNOLOGY
14751-B Franklin Avenue
Tustin, California 92680
Phones: In Orange County call (714) 731-6800
In LA call (213) 477-6320
In Bay area call (415) 490-7967
TWX 5106003265 AMT USA

*Prices and availability subject to change without notice

Circle 814 on reader service card

Overland Data's Answer to Backup



FLASHBAK™ makes backup so fast and convenient, users find that they actually *do* back up their files as regularly as they know they should.

A new high-speed, 9 track tape backup and file management program.

FLASHBAK has a window-oriented user interface, offers a tree display of the DOS hard disk file system, and provides context-sensitive help menus. It has file-oriented backup and retrieval, and various selection and deselection criteria for backup and restore, including archive bit, and time and date stamp.

FLASHBAK supports multi-volume tapes or floppy disks, and provides file system management commands such as copy and delete functions.

See us at
COMDEX/Fall'86
Bally's Las Vegas
Booth M319

FLASHBAK backs up MS-DOS files to 9 track tape.
Overland Data includes FLASHBAK with Tape Linx, a 9 track tape subsystem for the IBM PC, XT, AT and compatibles.

FLASHBAK backs up MS-DOS files to floppy disk.
Overland Data offers stand-alone FLASHBAK, a complete floppy-based backup system for personal computers.

Call today for your answers on backup.

Overland Data, Inc.
Answers on Tape

5644 Kearny Mesa Road
San Diego, CA 92111
Tel. (619) 571-5555
Telex 754923 OVERLAND

IBM PC, XT, AT are Registered Trademarks of International Business Machines Corp.
MS-DOS is a Registered Trademark of Microsoft Corp.

Circle 272 on reader service card

Your PC Market-Maximizer Account

The *PC World* Directory is a highly cost-effective way to enter the profitable IBM PC market—available in three- and six-month contracts. This comprehensive listing is your best bet for high returns with a minimal advertising investment. See this month's Directory for details.

personal computing penetrates smaller businesses and more specialized departments in corporations, the market will support the development of software that is increasingly tailored to its users' specific needs. In the past, when those needs were sufficiently demanding, many companies devoted in-house resources to generating applications based on existing software products; smaller firms hired consultants or systems houses to perform those functions.

Lest this praise of practicality give you the wrong idea, let me freely confess to being a technologist and computer journalist who is impressed by ever faster personal computers and intrigued by the possibilities of virtually limitless RAM resources. Research and product development that increase speed and capabilities are great, and absolutely necessary for the industry that supports us all—let's just keep it in perspective. The current trend of fully exploiting available hardware capabilities is a healthy one.

One aspect of the maturation of the personal computer market is that it's forming into two segments: power users with advanced equipment and new, relatively naïve users with commodity PCs or AT clones. As those of us in the former segment are increasingly responsible for advising the latter group, we should appreciate and respect the effort being applied to basic applications. In other words, the commodity blues are soundin' sweet and ringin' true.

AT jr. NOW $599.

FREE! A $185.00 VALUE. With any order of $1,000 or more, AMT will send you, absolutely FREE, a *Micro* brand dress wristwatch. Finest precision Japanese quartz movement. Specify male or female size.

LAUGH, CLONE, LAUGH! Who would guess that our AT jr. has more on the ball than his big brother?

AT jr. not only delivers fantastic features at fabulous prices, but gives you **top quality** in design, components, materials, and construction!

And for reliability, every AT jr. is burned-in at the factory prior to shipment.

No IBM® compatible system gives you more capability and value for your dollar than our incredible AT jr.

AT jr. $599. This feature-packed model is based on an Intel 8088-2 (or NEC V20-8) CPU, running at 4.77 MHz or 8 MHz, selectable; handles PC DOS,® MS DOS,® XENIX,® and other operating systems, plus a full range of IBM-compatible software.

The standard system has a "0" wait state on memory, and operates many times faster than the IBM PC/XT.® Offers 640 KB of RAM on the motherboard; 360 KB floppy disk drive; eight expansion slots; LED indicator for the turbo mode; AT-style keyboard; 135-watt integral power supply; and security key lock. Optional features include a 40 MB hard disk (38 ms), EGA, and an 8087-2 math co-processor.

LAP TOP. $1699. AMT's compact Lap Top system gives you full IBM compatibility in less than 12.2 pounds of high-powered computer.

Features an 80C86 microprocessor, giving you twice the speed of IBM's lap top; 640 KB of memory; two 720 KB, 3.5-inch disk drives; an 80-by-25 LCD display with 640 x 200 resolution; RGB and printer ports; and a 1200 baud internal modem, optional.

AMT-286. $1199. AMT's top-of-the-line AT system outperforms the IBM PC AT® at a fraction of the price. Tagged "Best Priced" by PC Week, March 1986 issue.

Our phenomenal AT has a 16-bit Intel 80286 CPU running at 8 MHz (10 MHz or 12 MHz optional); 640 KB of RAM, expandable to 1 MB; 1.2 MB floppy disk drive; accommodations for 20, 30, or 40 MB hard disk drive; a socket for an Intel 80287 math co-processor; and a "0" wait state on memory, optional.

DON'T WAIT—CALL NOW

Pick up your phone now and get full details or place your order.

AMT

AMERICAN MICRO TECHNOLOGY
14751-B Franklin Avenue
Tustin, California 92680
Phones: (714) 731-6800;
in LA call (213) 477-6320;
in Bay area call (415) 490-7967
TWX 5106003265 AMT USA

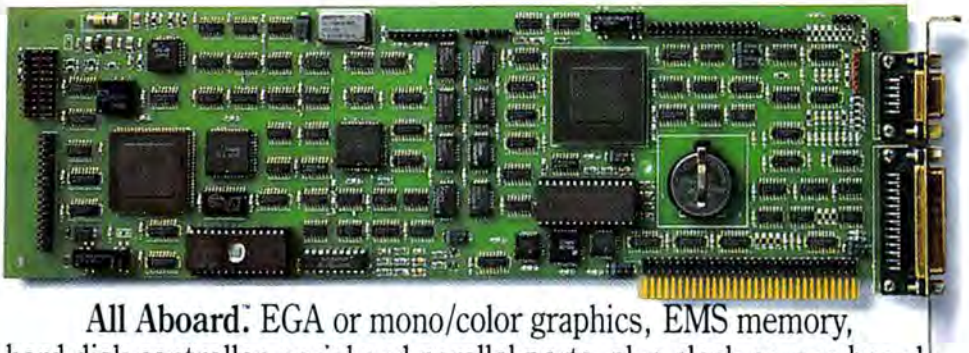
*Prices and availability subject to change without notice.

®Registered Trademarks—IBM, IBM PC, IBM PC/XT, IBM PC AT, PC DOS: International Business Machines Corporation; MS DOS, XENIX: Microsoft.

Circle 318 on reader service card

We opened up the XT by filling a single slot.

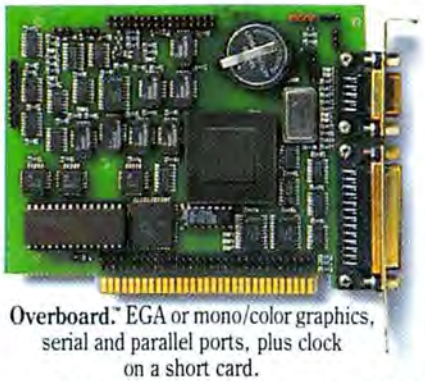
See us at Comdex, Booth 1060.



All Aboard.™ EGA or mono/color graphics, EMS memory, hard disk controller, serial and parallel ports, plus clock on one board.

What do you do when you buy an IBM XT and you want more power and versatility? You buy more boards.

Problem is, the more you buy, the more you spend. And the more XT board slots you fill up.



Overboard.™ EGA or mono/color graphics, serial and parallel ports, plus clock on a short card.

Well, we have a better way to use an XT. With All Aboard and Overboard. Two cards for the IBM XT. Each utilizes surface mount technology to give you all the functions on one board that you'd typically find on four. So you get everything you need in a single slot—and a single purchase. With open spaces for future options.

All Aboard is the first to combine mono/color or EGA graphics, 2MB of EMS memory, multifunction capability and a disk controller.

It is the right card to buy if you are installing a hard disk.

If you don't need a disk controller, Overboard is the perfect alternative. This short card is double-sided to combine graphics and multifunction capability for the XT, AT and even the IBM PC.

Now when you buy an XT, you have only one decision to make. You can go All Aboard. Or you can go Overboard. Either way, you go with the company that's perfecting PC technology while the competition is merely talking about it. IDEAssociates.

Call 800-257-5027.

IDEAssociates™

IDEAssociates, Inc., 29 Dunham Road, Billerica, MA 01821, (617) 663-6878, Telex 4979780; France, Switzerland, Germany, United Kingdom.
IBM is a registered trademark of International Business Machines Corporation. All Aboard and Overboard are trademarks of IDEAssociates, Inc.

Circle 200 on reader service card

The Power of Simplicity.

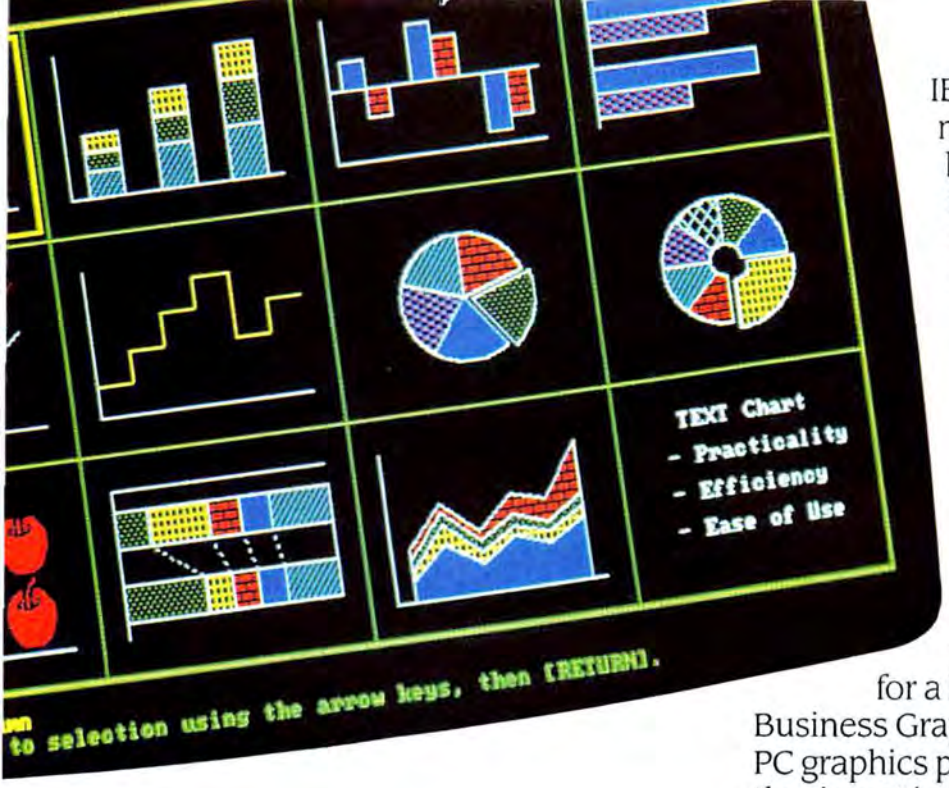
Until now, if you wanted to create powerful business graphics simply, you needed a mainframe computer, a graphics department, or a compromise on your PC. Stella Business Graphics™ just changed that.

Your first Chart in five minutes.

1

Boot your PC. Type SBG. When the menu screen appears use the cursor to select any of 12 formats for your graph. Then press (RTN).

TRADEMARKS STELLA BUSINESS GRAPHICS, STELLA SYSTEMS, INC.; 1-2-3, LOTUS DEVELOPMENT



Works with everything. Your IBM™ PC or compatible. EGA, CGA, monochrome or Tecmar™ graphics boards. Dot matrix, color dot matrix, ink jet and laser printers, plus color and monochrome plotters for professional printout and crisp overheads. And for presentation quality slides, Stella works with Polaroid Palette™ and other film recorders. It's simply a graphics department on a diskette. At an introductory price of $199.

A new standard for business graphics. See for yourself. Ask your computer dealer for a hands-on demonstration of Stella Business Graphics. You'll see why it's the first PC graphics program that deserves to have "business" in its name.

StellaBusinessGraphics™

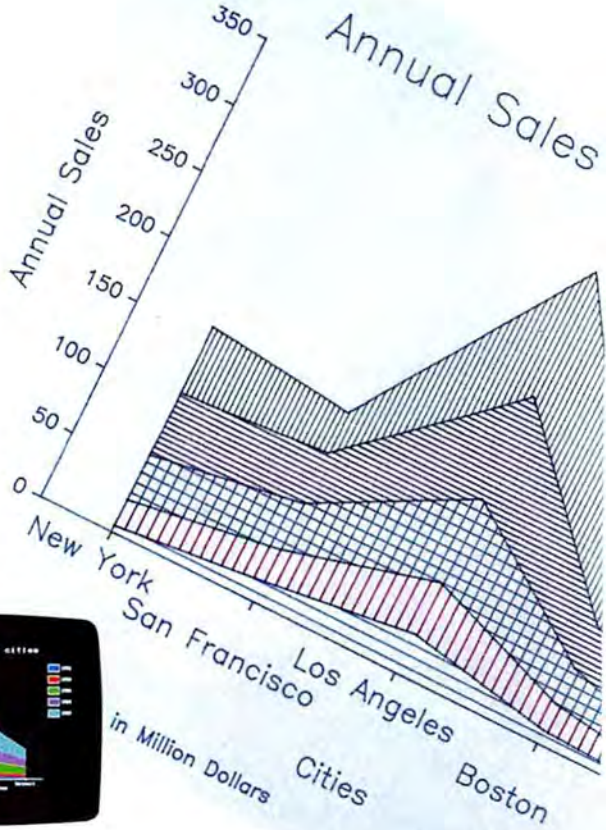
Stella Systems, Inc.
10430 South De Anza Blvd.
Cupertino, CA 95014

For information and the name of your nearest dealer, call CSSL Sales Toll Free: (800) 654-5301.
In California: (213) 493-2471 Dept. A.

The power of graphics. Charts and graphs communicate in a way numbers can't. Trends. Relationships. Progress. Comparisons. Stella Business Graphics can turn a table of dry numbers into powerful graphics. In any of twelve formats. In seconds.

The simplicity of power. With Stella Business Graphics, almost anyone can use a PC to create powerfully effective charts and graphs. Even a two-finger typist. It's as simple as choosing the type of graph you want, entering data and labels on the Stella Data Spreadsheet, or importing data from another file, and selecting functions from a menu. Stella does the rest.

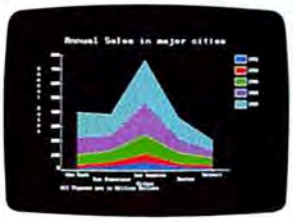
Stella goes 1-2-3™ one better. Stella Business Graphics adds enhanced business graphics to spreadsheets like 1-2-3, Multiplan,™ or SuperCalc III.™ Or, to your numerical databases. It can even import data from tables in a word processor. ASCII, SYLK, DIF, or SDF files, Stella works with them all.



2

Press F4 and (RTN) to bring up the Stella Data Entry Spreadsheet. Enter data and labels. Or, select an existing graph file and press the (RTN) key. Then press (ESC).

3



Your graph will be on-screen, like this. To print it out, just turn on your printer and press F5. That's the power of simplicity.

CORP; MULTIPLAN, MICROSOFT CORP; SUPERCALC III, COMPUTER ASSOCIATES INTERNATIONAL; POLAROID PALETTE, POLAROID CORP; TECMAR, TECMAR INC.

Circle 763 on reader service card

Now, nothing can keep you from your appointed rounds.

Laugh at the weather. Putt in the middle of the night. Tell your secretary to hold all calls. With Accolade's MEAN 18, all the excitement and challenge of real golf is right on your computer.

MEAN 18 delivers the kind of realism and playability you've come to expect from Accolade. This is golf the way it was meant to be enjoyed... without spending your day decoding the instruction manual. You can hit a bucket of balls at the driving range, play from the pro or regulation tees, even ask your caddy to suggest your clubs.

Once you've mastered MEAN 18, there's the challenge of playing on three of the world's legendary golf courses, all capable of bringing any touring pro to his knees. With The Course Architect, you can even design your own grueling course complete with menacing bunkers and greens on the edge of an ocean.

Available for IBM, Atari ST and Amiga systems.

Accolade, 20833 Stevens Creek Boulevard, Cupertino, California 95014. Telephone 408-446-5757.

Mean 18.

Circle 822 on reader service card

The Authoritative New Magazine From the Publishers Of PC World and Macworld

Publish!

The How-To Magazine of Desktop Publishing

If you use a Macintosh or PC system to publish reports, newsletters, books, ads, brochures, or any other printed material, then you need *Publish!*, the Magazine of Desktop and Personal Computer Publishing.

Act Now for Charter Subscriber Savings—33% Off!

Publish! is a new magazine that is written, edited, and produced on personal computer–based systems. Because *Publish!* is on the cutting edge of this exciting new technology, you can depend on us for the expert information you need to set up and manage your own personal publishing operation.

Each colorful, feature-filled issue is easy to read and understand, yet comprehensive and authoritative. *Publish!* will answer all your questions about how to use personal computers with laser printers and page makeup software—and even how to drive commercial typesetters with a personal computer. What's more, *Publish!* covers both stand-alone systems and networks.

Publish! shows you the shortcuts and tricks of the trade that can help you get the most from the hardware and software available. You'll learn fundamentals of graphic design and other publishing basics, and you'll save time and money, too.

In coming issues of Publish!...

- Getting the manufacturer support you need
- Advice on designing your pages for maximum impact
- Major New York graphic designers discover desktop publishing
- Cost-saving ways to prepare pages for outside printing
- Hardware and software reviews
- Hundreds of new product listings

All this and more comes to you in *Publish!*, six times a year—and at a low Charter Subscriber price if you act now.

Fast action saves you money!

For a limited time, Charter Subscriptions are available for just $19.95 for a full year (six bimonthly issues). You save 33% off the basic subscription price others will pay when the Charter offer closes.

Take advantage of this limited-time Charter Subscriber offer now and get the full benefit of *Publish!*'s expertise as soon as possible. Mail the attached postpaid card or the coupon below. Or for faster service, call TOLL-FREE (800) 222-2990.

Charter Subscription Savings

YES, *I want to be among the first to take advantage of* ***Publish!****. Enter my Charter Subscription for 1 year–6 bimonthly issues–at only $19.95. I save 33% off the basic subscription price.*

☐ *Payment enclosed* ☐ *Bill me later*
Charge my ☐ *Visa* ☐ *MasterCard*

Card no. (please print)

Expiration date

Name

Company (if applicable)

Street

City

State *Zip*

Mail to: ***Publish!****, Subscription Department, P.O. Box 51966, Boulder, Colorado 80321-1966*

Guarantee: If you're ever dissatisfied with ***Publish!****, let us know, and we'll promptly refund you for every issue remaining on your subscription. No questions, no problems. We guarantee it.*

Offer valid in the U.S. only. Premier issue will be mailed in August 1986. 4C2P3

PC WORLD

Compaq Spawns a New Generation

The other shoe has dropped. The surprise isn't that it's a racing shoe, but that genteel Compaq was wearing it.

Compaq Computer is, in the best sense, the quintessential follower. While laboring assiduously to improve on established industry standards, it still adheres tightly to those standards.

Or it did, until the Deskpro 386.

In introducing its latest Deskpro line this fall, Compaq broke out of the gate with uncharacteristic ferocity—and flirted with setting a few standards itself. The Deskpro 386 is a powerhouse whose brute strength just may overwhelm Compaq's gift for engineering finesse. Still, the machine boasts nuances aplenty: a genuine 32-bit bus, built-in expanded memory support, and absolute consistency with PC and AT software. And along with the Deskpro 386, Compaq has finally introduced an EGA-compatible graphics board and color monitor.

For Compaq, it only seems like business as usual. "We've always been committed to innovation within the industry standard," says marketing chief Michael Swavely. "The Deskpro 386 is a conservative, safe step because it moves to the next generation of technology, but it's fully within the standard—and we know that standard better than anyone else in the industry."

In the Deskpro 386, power users have a potent new plaything. Ditto, in Compaq's marketing scenario, small business users (via Xenix 286 and, early next year, Xenix 386), software producers, the computer-aided design market, offices in need of network file servers, and eventually, artificial intelligence developers. The firm also figures to dent the minicomputer and dedicated workstation businesses as the 386 picks up speed within corporate America.

Compaq has managed to make money hand over fist by competing on functionality, not price; the Deskpro 386 continues that tradition. The bidding on the Deskpro 386 Model 40 opens at $6499, the Model 130, $8799. The Deskpro 386 owes its specific shape less to input from dealers than to the company's own marketing and technical sense—and to an intense collaborative effort with Microsoft and Intel. The new Deskpro was 18 months in the making, triple the length of a typical Compaq development cycle.

"Prodigious" best characterizes the Deskpro 386. "We've pushed the technology to its absolute limits," says head engineer Gary Stimac. The machine's looks are familiar but deceiving: "Absolutely everything on the Deskpro 286 has been expanded," Stimac reports.

At the heart of the matter is the 32-bit 80386, running at 16 MHz. Both models include 1MB of RAM expandable to 14MB (10MB of which can be interfaced via the 386's single 32-bit bus connector), a single 1.2MB floppy disk drive, and seven expansion slots. Like all previous Deskpros, the 386 offers four compartments for storage de-

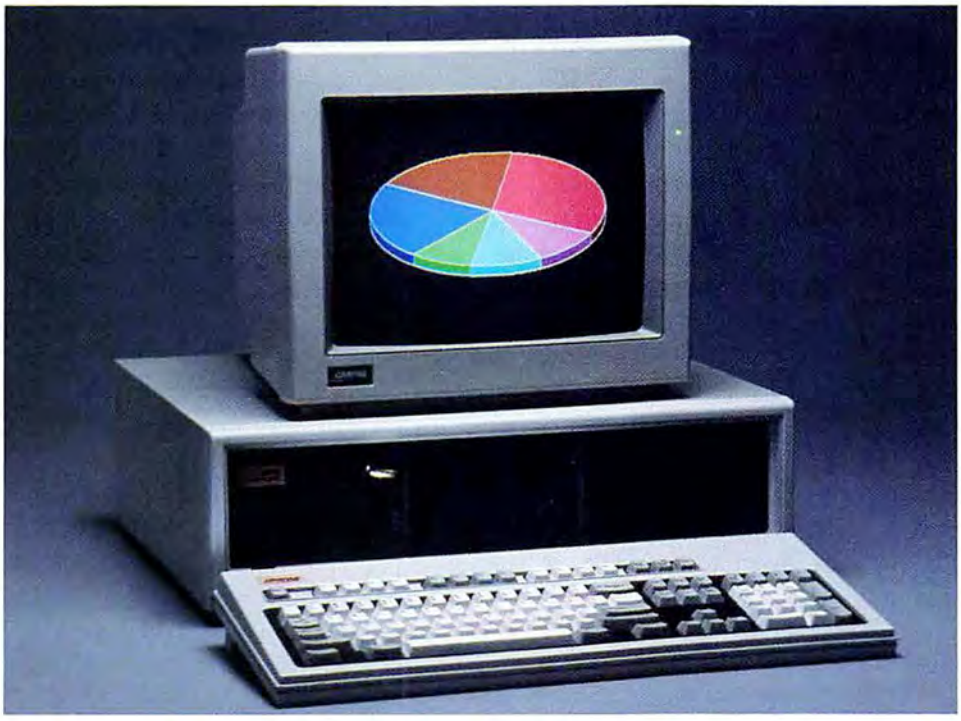
PC World View *reports new developments in computer technology, items of interest to computer enthusiasts, and the most significant and enticing insights about industry trends and personalities.* —*Eric Bender*

vices. The Model 40, not surprisingly, houses a custom half-height 40MB hard disk drive with an average access time of 28 ms; the Model 130's 130MB drive cuts access time to 19 ms.

Setting aside a 32-bit slot for system memory and a 16-bit slot for a versatile new multipurpose board, the Model 40 offers three free 16-bit slots and three 8-bit slots, one of which is half-size; the Model 130 requires the extra slot for its hard disk controller, leaving two 16-bit and three 8-bit slots available. (The Model 40's hard disk controller sits directly behind the drive.)

Both models feature the seemingly misnamed Multipurpose Fixed Disk Controller Board, which supports one or two floppies, either 1.2MB or 360K; one 40MB tape backup unit; and one or two 40MB drives, depending on whether a tape unit is present. (The board is not a hard disk controller; it supplies address decoding, buffers, and connectors for the 40MB drive's rear-mounted controller.) The multipurpose board also contains a 25-pin parallel port and a 9-pin serial port. Also under the Deskpro 386's lockable hood is a beefy 192-watt power supply, a socket for a 4- or 8-MHz 80287, and a real-time clock with battery-powered system configuration memory (à la AT). Users can choose from an IBM-like enhanced 101-key keyboard or rely on an 84-key AT-

(continues)



With the Deskpro 386, Compaq won the race to build a next-generation personal computer around Intel's 80386 chip.

Compaq's New Generation
(continued)

compatible keyboard–both of which retain the somewhat flimsy touch of the Deskpro 286 keyboard.

Compaq has unbundled the video adapter and offers a choice of monitors. The company's new EGA compatible is built around the Chips and Technologies chip set; the venerable Compaq Video Display Controller, capable of displaying text and graphics, remains available. Users can opt for the usual green or amber dual-mode monochrome monitor or try Compaq's EGA-compatible monitor, the company's first color tube; the Compaq EGA will drive either unit.

Choices aside, there's little question the Deskpro 386 is optimized for the EGA. The machine copies the EGA's BIOS ROM (as well as the system BIOS ROM) to a reserved area of memory on the 32-bit-wide bus, where it is mapped to the ROM addresses (and protected), thereby doubling EGA performance. Compaq's EGA even includes a Microsoft mouse interface.

For virtually all applications, memory expansion can be confined to the single 32-bit slot. The 1MB main memory board sports sockets for an additional 1MB of high-speed RAM. Either a 2MB or an 8MB 32-bit memory expansion board can be attached to a fully loaded (2MB) system memory board. (The 2MB expansion board uses 256K-bit static-column RAM chips; the 8MB expansion board uses 1-megabit static-column RAM chips.) Because either expansion board can be attached half-populated, the 32-bit slot can hold 1, 2, 3, 4, 6, or 8MB.

On CPU performance alone, the Deskpro 386 inhabits another league. When running code that's optimized for a 32-bit processor, the 386 is a "4 MIP" machine. That is, it can execute 4 million instructions per second–three times what the RT PC can muster, and about twice that of the 32-bit Motorola 68020. When running 16-bit DOS code, the 386 triples the AT's throughput. The Deskpro 386 memory architecture enables the system to operate at an average of less than one wait state per clock cycle. Unlike previous Deskpro models, you can't adjust processor speed from the keyboard; instead, a MODE command enables the Deskpro 386 to run at 4.77, 6, 8, or 16 MHz. Compaq has even built in a nifty copy-protection detection routine that brakes the CPU when time-sensitive copy-protection operations occur, automatically opening the throttle once that check is completed.

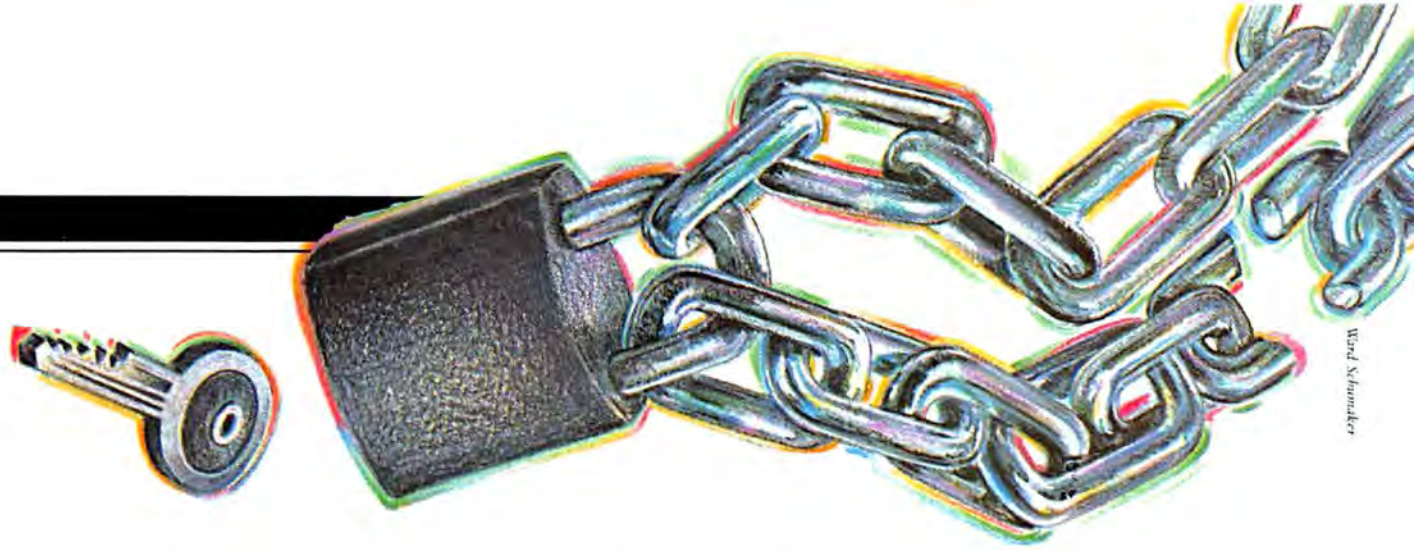
Perhaps the most striking element of the Deskpro 386 is Compaq's creation of a 32-bit memory bus. In refusing to wait for IBM to set a 386 bus standard, Compaq voted for performance–and common sense. In that respect, the

Hard Knocks for Locks

Two years ago, a group of leading software companies unveiled a master plan to lock up PCs across the country. Recently, that proposal was buried without fanfare–but with shovels handed vendors by disgruntled users.

The so-called "lock-and-key" method was aimed at resolving a knotty and seemingly never-ending problem–how to halt unauthorized duplication of software without inconveniencing legitimate users. The scheme first emerged in October 1984 under the wing of the Association of Data Processing Service Organizations (ADAPSO), an industry trade group. Lotus Development, Microsoft, Quadram, and other key players gave the proposal strong public backing and technical support (see "Copying Software: Who's Right?" *PCW*, September 1985).

Under ADAPSO's approach, each program on the PC would combine a built-in software lock with an individual hardware "key." Keys fit into a portable "key ring" that plugged into an RS-232C port by means of a pass-through connector (thereby eliminating the need for a dedicated port). The software lock would check the key and key ring for authorization before letting the program run.



Ward Schumaker

Vendors saw the idea as a potential weapon in their ongoing battle against software piracy and extolled the plan's advantages to users: The lock would simplify legal copying for backup and archiving, permit trial usage of software, and let packages run on a local area network. The scheme was also a good building block for data encryption.

But once developers distributed locks for real-world tests, users found the arrangement to be too much trouble. And as ADAPSO polished its technical proposal and requested antitrust clearance from the Justice Department, proponents listened to their customers and quietly backed off. Ironically, that reversal occurred despite Justice Department approval. The federal sanction apparently wasn't enough to shake increasing vendor ambivalence. The trade group finally disengaged from the lock-and-key idea last summer.

While piracy remains a sore point for software vendors, the issue evidently lacks the emotional firepower it once had. Suppliers in increasing numbers have concluded that anticopying cures are worse than the disease, stripping away previous software-based protection schemes and endorsing various site license options.

risk of going it alone may be minimal. Furthermore, Compaq is publishing the 32-bit specs in a voluminous Technical Reference Guide. "The 32-bit bus issue is vastly overblown," contends Swavely, noting that speed bottlenecks other than memory—that is, in communications, graphics, and storage—lie outside the bus. "By keeping 8-bit and 16-bit bus structures, we're encouraging maximum use of existing devices," Stimac adds. "But we don't consider the 386 bus proprietary. It's a feature."

With the Deskpro 386, Compaq has also subtly introduced its own DOS extension in the guise of a software driver called CEMM—Compaq Expanded Memory Manager. CEMM, the company's version of the Lotus-Intel-Microsoft expanded memory specification, nominally offers access to 256K above the 640K limit but can address up to 8MB as memory is added. Because bank-switch operations are directed by the processor, the virtual (or protected) mode of the 386 effectively replaces the memory management chips that give Intel's AboveBoard and the like their special cachet. And CEMM operations occur at twice AboveBoard's speed. Says Stimac enthusiastically, "We're exploiting the 386 almost to its fullest."

Compaq reportedly beat on various editions of the 80386 for PC and AT compatibility, discerning (and helping Intel eradicate) several bugs. During *PC World*'s time with the Deskpro 386, *1-2-3* release 2, *Microsoft Windows*, and DOS 3.10 loaded and ran without a whimper. "We've long considered compatibility one of our family jewels," says Stimac. "Compatibility is not a commodity item. If you don't understand that, you can't innovate within the standard."

Innovation unbound. *—Ken Greenberg*

Jet-Setting's Colorful Future

The inventor of the dot matrix printer gets serious.

Seth Resnick

Robert Howard at Howtek headquarters

"We've needed a new way of putting marks on paper," Robert Howard declares. "People have been fascinated with color graphics on screen, but they had no real way of printing it out on paper."

Howard, who invented the dot matrix printer and founded Centronics in the 1960s, began grappling with that new challenge in 1982. Today he brandishes what he claims is "the printing press of the future." So enamored of his new brainchild is Howard that he maintains there's "no real way of getting color, text, graphics, and images onto paper other than with our technology."

By mid-1987, PC users will see that technology in action, embodied in a $2995 color ink jet printer dubbed the Pixelmaster. The device quietly shoots up to 20 million dots of ink per page with an accuracy of within $^{15}/_{10,000}$ inch. The result is 240-dot-per-inch "near offset quality" output, with black-and-white pages turned out in 30 seconds, full-color pages in 4 minutes.

Offered by Howard's Howtek startup in Hudson, New Hampshire, the Pixelmaster represents a radical departure from the existing ink jet printers that pose its strongest competition for general-purpose color output.

Conventional ink jet printers spray a mixture of ink and liquid "carrier." The carrier may evaporate too quickly (thus clogging the jets) or not quickly enough (which leaves you with soggy paper). The Pixelmaster, by contrast, melts special plastic inks and fires them drop by drop from a rotary printhead. On paper, the drops instantly revert to their natural solid state, creating print that feels embossed and won't smudge.

Bypassing the maintenance problems that plagued previous generations of ink jet printers, Howard claims his scheme ensures a mean time between failures of 20,000 pages. Additionally, the Pixelmaster need not be fed custom paper. To prove his point, Howard shows samples printed on toilet paper.

"The design is very simple mechanically and very complex electronically," says Howard. He and his associates ran computer models of ink behavior for almost a year, he notes, and the Pixelmaster incorporates seven custom VLSI chips that make it several times as powerful as a PC AT. "I've never seen a technology as complex as this," the 63-year-old scientist notes. "It's far more complex than xerography, for example."

The technology is also proprietary, guarded by a wall of exper-

tise and patent applications. For the inks, Howard reports, "we've created molecules of substances that never existed before, and we've patented those substances."

Howard discounts the competitive potential of such possible newcomers as color laser devices. While sales of black-and-white laser printers are skyrocketing, he notes that the underlying technology of these devices is xerography, and that given inherent cost and technical limitations, color copiers have yet to really take off.

Built as an OEM product, the floor-standing Pixelmaster accepts a variety of interface modules that enable it to support many computers and communications protocols. Howtek will also sell related equipment, including a $1995 system that converts 35mm slides for display on a TV or a PC monitor, and a $5995 color scanning and image manipulation device.

What does all this mean for PC users? "Pixelmaster will give users a new tool that adds an entirely new dimension of color, images, graphics, and text to their communications," Howard says. He anticipates particularly big things for desktop publishing.

"You can't overestimate the impact of color entering any black-and-white world," he sums up, recalling his days in the TV industry—and the pervasive impact of color on that medium. "This is as revolutionary as xerography or the printing press."

Tecmar—On the Boards?

Competition in the board business has never seemed keener. The onslaught of boards manufactured abroad has been manna for small companies that sell expansion devices. And the resulting dive in prices has been embraced by users hungry for memory, graphics, and communications.

But it has also meant lean times for some traditional board manufacturers, particularly the venerable Tecmar. One of the Big Three domestic board makers (along with AST and Quadram), the Solon, Ohio, supplier found itself on the ropes earlier this year. Tecmar responded with layoffs that swept through its organizational chart. The crunch also prompted founder Martin Alpert, who had excused himself from management chores more than a year ago, to return to day-to-day operations.

Trying to pack more punch into the troubled company, Alpert entered negotiations to sell Tecmar to Rexon, of Culver City, California. Rexon board chairman Q. T. Wiles is highly regarded as a turnaround expert, and Hambrecht & Quist, his investment firm, has salvaged several ailing high-tech companies, including MiniScribe, WangTek, and Rexon itself.

Rexon quickly put its own people in charge of daily operations, finance, sales, and marketing at Tecmar. "Tecmar grew very rapidly in a volatile market," says Whitney Lynn, vice president of sales and marketing and part of the new Rexon team. "Things got out of control from a financial and manufacturing standpoint. We're here to pare things down for a turnaround by the first of the year."

"We were just plain too fat," Alpert says bluntly. But even a leaner Tecmar won't single-handedly deflect foreign competition. Analysts cite the Far Eastern influx as a major reason board manufacturers are slimming down. Says analyst Brian Jeffery of International Technology Group, "Boards are a vanilla technology, just inexpensive ICs." Even more than systems, boards have become commodities, and empires can crumble when commodity pricing sets in.

The move to diversify is well advanced at AST and Quadram, where communications gear, networks, subsystems, and printers now give noticeable girth to product catalogs. And even AST hasn't been immune to a round of layoffs. But compared to its principal competitors, Tecmar "has been slow to adapt to a changing marketplace," Jeffery maintains.

Alpert believes that the realignment places his company in the right groove. "Tecmar will be in a high-growth period by the end of the year," he predicts. Lynn likewise is confident that a revitalized Tecmar will meet the challenge. "Tecmar will most likely trim down the product line to create a more focused view."

With Alpert and Rexon in its corner, Tecmar has made it through this round. But the question remains about whether it will last the fight. —*Wes Nihei*

State of the RT

Inquiring after the health of certain IBM products is much like inquiring about the well-being of aging Soviet premiers. Both are always fit as a fiddle right up until they die of a horrible, lingering illness.

Rumors about the demise of IBM's RT PC have been floating around almost since the day the unit was unveiled.

The RT is a 32-bit engineering workstation that relies on what's called RISC (Reduced Instruction Set Computer) architecture. RISC is supposed to make a computer cost less and run faster, and the RT's chip is the equivalent of the Intel 80386 CPU "with a two-year lead time," according to one buoyant IBM official.

Announced last January but available only since spring, the RT is costly, with its price tag usually exceeding $16,000. It's compatible with the rest of IBM's PC line only by virtue of an AT coprocessor on a separate board. Some expect the RT's proprietary architecture to position it as a potential successor to the Intel-based PC family. As a predator, the RT stalks not Compaq, AT&T, or even DEC, but engineering workstation suppliers like Sun Microsystems and Apollo Computer.

Last July word spread that slow sales had virtually stopped the RT's assembly line in Austin. Although IBM declined to confirm or deny the report, the company did say that its automated assembly lines are often halted, started, and retooled according to demand for a given product. One IBM spokesman noted that a second RT assembly line was already in operation near Milan. He added that IBM is "quite pleased" with the RT's reception and described the machine as a "strategic first step" into the 32-bit workstation market.

While Big Blue remained mum on RT shipments, the Silicon Valley market research firm International Technology Group estimates that a mere 3000 units have been purchased worldwide. Claire Fleig, ITG's director of systems research, calls the RT a "niche product." She predicts that IBM won't

Garlands and Glitches

PC World View's *picks and pans in the PC parade.*

▲ ***Garland*** Ashton-Tate, for removing copy protection from all software packages the firm sells in the United States, thus simplifying life for hundreds of thousands of users. "We still believe in copy protection," president Edward Esber commented. "The problem is that there's no copy-protection technology that doesn't get in the way of the legitimate user."

▲ ***Garland*** Ashton-Tate and Lotus, for finally offering a smorgasbord of support options and for hiring a lot more people to staff the help-line phones. The much-promised support plans differ substantially from one another and need considerable fine-tuning, but they show that the dominant PC data base and spreadsheet suppliers actually are hearing what their customers are saying.

▼ ***Glitch*** IBM, for its inability to get the PC Convertible out the door. Introduced just after April Fools' Day (in time for scheduled June delivery to dealers), the long-awaited laptop remained difficult or impossible to buy in retail stores through the

push the RT into the business mainstream because of the machine's dependence on UNIX, AT&T's multiuser operating system.

So whither the RT? The combination of its youth, an absence of software, and the stratospheric price won't do much to spur lagging sales. And, too, IBM's reputation in the engineering world doesn't match its following among corporate users.

But while the RT isn't about to lord it over the PC, it's true that it was never meant to do so, given its pricing and customer base. If the premier isn't completely healthy, at least he's still making public appearances. *–Daniel J. Rosenbaum*

summer. Whether due to production snags, commitments to large corporate customers, or (could it be?) widespread apathy, IBM's smallest PC couldn't be found.

▼ ***Glitch*** Kaypro, for its "Kay-bo" advertisements. Featuring a Rambo-style cartoon figure clutching a rocket launcher, wearing a PC as a helmet, and threatening vendors who build PCs overseas, the promotional campaign is the nadir for a company once distinguished by its delightfully proletarian approach to computer marketing.

Keys to the Kingdom

IBM has forged a new set of keys for its kingdom, with a revamped keyboard design that will be standard not only for PCs but across Big Blue's office automation line.

Introduced last April as a regular feature on new PC ATs and XTs, the revised keyboard offers a layout patterned after the IBM Selectric typewriter–the stuff of typists' dreams. It extends the keyboard frontier to 101 keys, including separate cursor and numeric keypads, a double set of control keys, removable keytops that enable users to customize the keyboard, and 12 function keys rather than the usual 10.

But the inevitable questions arose: Would this truly become the new standard for keyboards? Would it require software developers to rewrite code?

On the software compatibility front, the answer seems to be a qualified all clear. According to Cary Ziter of IBM Entry Systems Division, 190 of the 200 programs tested passed with flying colors. (Ziter declined comment on the unfortunate 10.) Response from a quick survey of software developers was overwhelmingly positive. Ashton-Tate, Lotus Development, Microsoft, and Software Publishing all reported complete compatibility with their products.

"Our programs run fine on the keyboard," notes Microsoft's Marty Taucher. "We just have to make allowances in future revisions of our software to take advantage of the additional keys." Danielle Beaudry, section manager in Software Publishing's product development laboratory, waxes enthusiastic over the enhanced keyboard's feel and its wider backspace and shift keys. "IBM," she offers, "has done a spectacular job of human engineering."

Where Big Blue goes, others usually follow. "We believe the new IBM keyboard is better," says Tandy spokesman Ed Juge, who describes a revamped keyboard from his firm as "an exact duplicate of the IBM keyboard, right down to the extra weight, to make it feel heavier and more stable on the desk." Several other major vendors declined comment–but all are rumored to have similar enhanced keyboards in the works.

There is, however, one potential barrier to replicating IBM's design: IBM is seeking worldwide patents for its AT keyboard. If granted, such rights might prevent other manufacturers from offering products that are "substantially identical," according to an IBM spokesperson.

Will people flock to buy the enhanced keyboard? Current XT and AT users aren't likely to, because the BIOS ROM in each doesn't support the revamped input device. But for new users, it's a different story. "If you give people enhanced VCRs or toothbrushes or keyboards, they're going to go for it," Juge predicts. *–Marina Hirsch*

Bringing AI on Board

In the old days, any self-respecting artificial intelligence program could bring a mainframe to its knees. Attacking this problem, powerful workstations specially designed to run LISP and other AI-oriented languages began rolling out of the labs in the early 1980s. But these dedicated "LISP machines" were big-ticket items, some selling for more than $100,000. Prices are dropping, but most are still hovering in the minicomputer range.

Soon after the PC came along, expert systems of modest size began to blossom. Unimpressed, AI buffs generally dismissed these packages as toys; they maintained that the PC lacked sufficient processing speed and memory for real artificial intelligence work. The advent of the AT gave most AI experts little reason to change their minds.

But personal computers based on Intel's new 32-bit 80386 chip may have won a few converts to the cause of down-sized AI applications. That, indeed, is the word from this year's premier AI gathering, the American Association for Artificial Intelligence conference, which convened recently in Philadelphia.

Among a number of 386-based products that formally debuted at AAAI was the Hummingboard, a plug-in adapter for the XT or AT. Offered jointly by Gold Hill Computers and AI Architects, both of Cambridge, Massachusetts, the board quadruples the AT's speed and carries roughly as much internal memory as a typical LISP machine.

The Hummingboard packs an impressive amount of processing clout on a single board, with a 16-MHz 386, cache memory, and up to 6MB of RAM. And early next year, when suitable 1-megabit chips are on the street, maximum memory will balloon to 24MB.

Gold Hill is packaging the Hummingboard with a 386-tailored version of its Golden Common LISP. (The language runs under DOS 3.20 but, as with the firm's existing 286-based product, takes some shortcuts around DOS memory limitations.) The combination gives the turbocharged XT or AT performance that is equivalent to the average LISP machine. And unlike most dedicated machines, an enhanced XT or AT can run standard PC software.

At $7000, the Hummingboard is far from your standard retail package, and the souped-up machine really deserves more than a standard XT monitor and hard disk. A fully loaded AT with 6MB of memory, a 19-inch high-resolution monitor, and an Ethernet connection will run about $14,000—but that's still far below the cost of a dedicated machine.

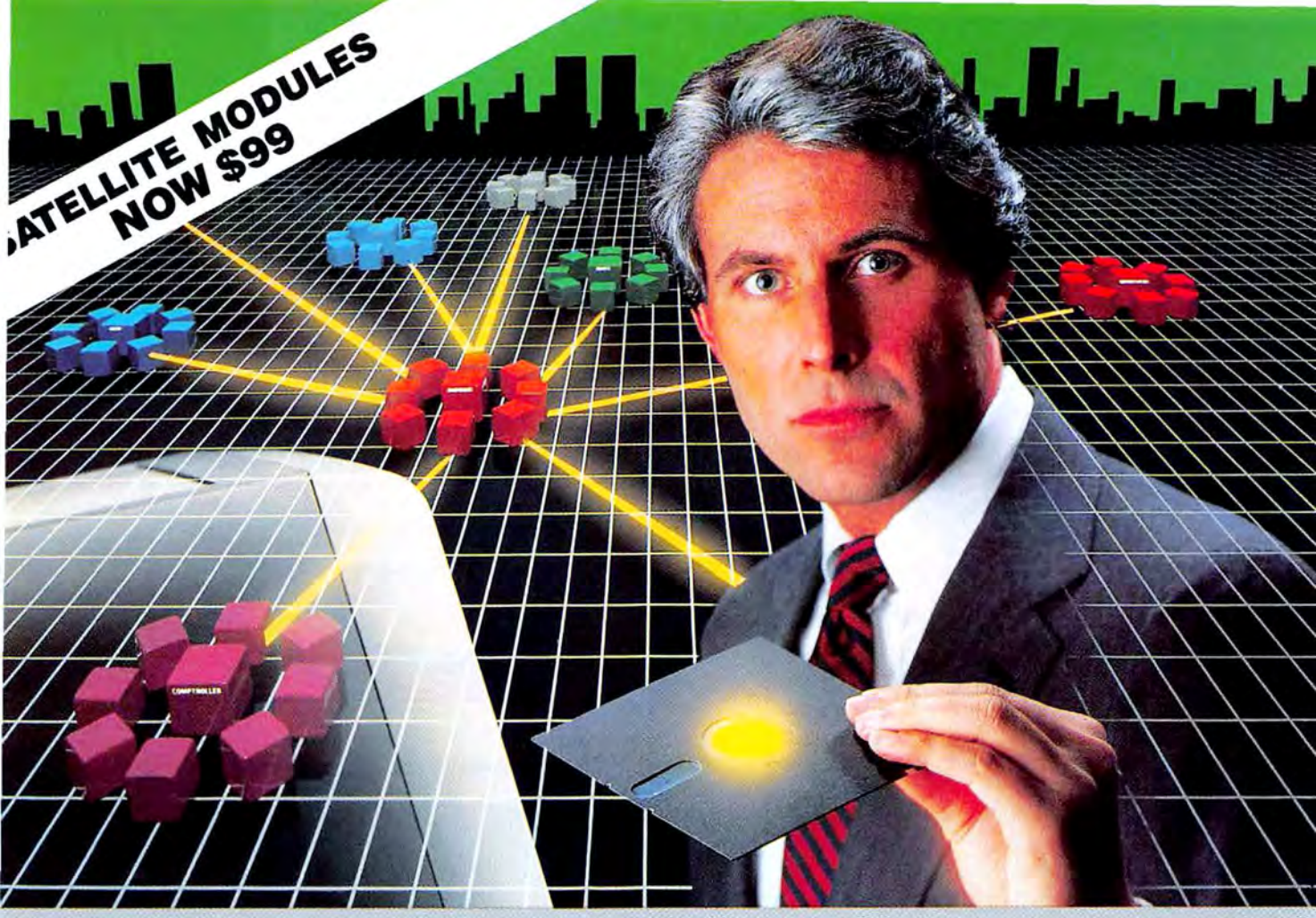
Hummingboard
Gold Hill Computers
163 Harvard St.
Cambridge, MA 02139
617/492-2071
List price: $7000
Requirements: hard disk with 2.8 MB free space available, DOS 2.00 or later version

A Few Minutes With . . .

Richard Gorgens, president of Alloy Computer Products: "AT does not connote IBM anymore, it connotes $2000."

Mitch Kapor, founder of Lotus Development: "Of the five million PCs out there, only 10 percent have 80286 CPUs in them today. Unless there's an incredibly clever way that everybody with a PC or an XT can upgrade to a compatible 286 for $500—and I don't know if that's possible—there'll be a long period of time when most people won't be able to run great new software. The transition is going to be a huge mess; it could take four or five years."

Ken Greenberg is PC World*'s Southwest Editor; Marina Hirsch is an editor at Autodesk; Wes Nihei is* PC World*'s Editorial Assistant; and Daniel J. Rosenbaum writes on computers and communications from the marshes of northern New Jersey.*



The Most Powerful LAN Fits on a Disk.

Network Power. You knew that someday there would be a powerful LAN that didn't need old-technology network boards. It would be fast, easy to install, and run 99% of PC-DOS software. It would be expandable, provide remote access, password-protection, and enable you to use inexpensive terminals as workstations in a PC-DOS environment.

Dream no more, because the power is here.

Its name is LANLink™

A Software-Driven LAN Powerful Enough To Use RS-232 Ports for Network Communications. In development for over three years, LANLink™ represents the next generation of local area networks. All of the logic which has traditionally resided on network boards is on LANLink's Satellite and Server Diskettes.

No additional hardware is required. Inexpensive serial ports replace "Kilobuck" Network Interface Boards making installation costs one-third that of a board-driven network.

How To Configure a Smart Network...With Dumb Terminals, But Without Dedicated Servers. Boasting a wide variety of configurations, LANLink™ is most often set up as a "Star" having up to eight satellites connected to a central, nondedicated server. Larger networks can have multiple servers, supporting a total of 73 or more network users.

R-LAN™ (Remote-LAN) gives users the ability to interact with a LANLink™ network in real time via modem. Plus, if MultiLink Advanced™ is run on a Satellite, inexpensive dumb terminals can be used to access network disks, files, and programs.

99% of PC-DOS Applications Run In a Totally-Transparent Network Environment. If you know DOS, you already know how to use LANLink™ COPY transfers files among users, and a 2-drive PC Satellite boots 1-2-3 from the Server's hard disk with the entry c:lotus. Each satellite's access can be limited to specific disks, printers, and subdirectories. A wide variety of software including Lotus 1-2-3, dBASE III, and WordStar 2000 is fully compatible. LANLink™ has a collision-free data transfer rate which exceeds 115,000 BPS.

Power Up Your PCs Today. For complete details and the authorized dealer nearest you, call The Software Link TODAY. The LANLink™ Starter Kit is $495 and includes modules for both a Server and a Satellite. For a limited time, 50 feet of shielded RS-232 cable will be included free of charge. Additional Satellite Modules are only $195, each.

LANLink™ is immediately available and comes with a money-back guarantee. VISA, MC, AMEX accepted.

See us at **Booth #W230**
COMDEX/**Fall '86**
Las Vegas Convention Center
West Hall

LANLink™

THE SOFTWARE LINK, INC.
Developers of LANLink™ and MultiLink Advanced™
8601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK
CALL: 404/998-0700
Dealer Inquiries Invited

THE SOFTWARE LINK, INC./CANADA 250 Cochrane Drive, Suite 12 Markham, Ontario L3R 6B7 **CALL: 416/477-5480**

LANLink™ MultiLink Advanced™ & R-LAN™ are trademarks of The Software Link, Inc.

IBM, PC, & PC-DOS are trademarks of IBM Corp. WordStar 2000, dBASE III, and Lotus 1-2-3 are trademarks of MicroPro, Ashton-Tate, and Lotus Development Corp., respectively.

Circle 526 on reader service card

The art of business communication.

Introducing Concorde™ • Total Graphics.

Business Graphics Text **Draw & Paint Runtime Shows** **Capture Image Database** **Animation Interactive Training**

Now, with a single software package, you can present all the information, explain all the facts, express all the ideas that words alone cannot convey.

Concorde gives you every tool needed to create crisp, clear, colorful presentations with your CGA, EGA or Hercules monochrome PC. To combine text and images on one screen. To import data directly from Lotus 1-2-3,® Multiplan,® Symphony® and DIF spreadsheets. To capture screens from word processors as well as images from other graphics software, then edit them right on screen. And to call on the Concorde Image Database of over 2000 professionally created images, or create your own in a flash.

It's the fastest, most brilliant way to make commanding slides, compelling overheads, persuasive printouts and more. And thanks to our revolutionary new image overlay technology, you can make changes in the blink of an eye.

To see more, send a $10.00 check or money-order and we'll send you an information kit and a demo disk designed to show you just how good Concorde can make you look. Call or write today.

Concorde, total graphics software from the makers of ExecuVision.™ It may not change the way you do business. But it certainly will look that way.

Visual Communications Network, Inc.
238 Main Street
Cambridge, MA 02142
(617) 497-4000

TM and ® signify manufacturer's trademark and manufacturer's registered trademark, respectively.

Circle 855 on reader service card

A Star Is Reborn – Full Nelson +

Tens of thousands of satisfied Full Nelson users are probably wondering how we could make it better. Voila! Introducing the Full Nelson + , the rebirth of a star performer.
Computers have changed, printers have changed, systems have changed.... So, we've changed. The new Full Nelson + has been redimensioned to accommodate all of the latest hardware.

First, we've added a full 4 inches to the printer compartment height without adding to the overall height. Now printers with tractor feed can fit easily into the Full Nelson + . Or you can use the extra space for a Bournelli box expansion chassis, or plotter.

Then, we made it easier to assemble and adjust. Thirty minutes is all you will need to ready your Full Nelson + for action.

Finally, after making it better, we slashed the price! Affordable value, complete with all standard features.

+ MODULAR – You set it up so the printer exits from any one of four directions, whichever fits your workspace. Easily reconfigured if your requirements change.

+ RUGGED – Heavy duty construction throughout including high density laminates, solid hardwoods, steel bearing roll-out shelves, cam-loc connecting system, and our exclusive one-piece shock isolation steel base. We back it with a full 10-year warranty.

+ MOBILE – Large twin wheel casters attach to the steel base for true fail-safe movement.

+ SECURE – Roll-up tambour doors lock to protect your computer and printer. There is even an optional locking monitor cover.

+ OUR GUARANTEE – If, for any reason, you are not completely satisfied with your new Full Nelson + , return it within 30 days for a full and courteous refund.

ACT NOW and SAVE $100 on your new Full Nelson+! Available through your favorite computer supplies catalog, participating distributor, or direct from the factory!

(714) 598-2502

OUTSIDE CALIF. **1-800-255-5069**

VISA MasterCard

SIMONTON INDUSTRIES
803 Tucker Lane • Walnut, CA 91789

NATURAL OAK

WITH MONITOR COVER

ENGLISH OAK

LOCKED

Circle 520 on reader service card

A MEGABYTE FOR DOS!

MicroWay is the world's leading retailer of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run from 5 to 12 MHz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business – one year! We also offer daughterboards for socketless computers (NEC PC) and 287Turbo which increases the clock speed of the 80287 from 4 to 10 MHz. Our NUMBER SMASHER/ECM™ runs at 12 MHz with a megabyte of RAM and achieves a throughput of .1 megaflops with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software and 8087 expertise as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same-day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available. For more information call us at

617-746-7341

NUMBER SMASHER/ECM™
THE FASTEST ACCELERATOR CARD AVAILABLE

gives you 12 MHz speed in two modes: 704K or one megabyte of "Extended Conventional Memory." MEGASWITCH MMU and MegaDOS software make it possible to run DOS applications with up to 1015K using PC compilers, AutoCAD and Lotus 1-2-3. Does not require EMS software. Totally compatible . . . from **$599** for 512K and 9.54 MHz to **$1199** with one megabyte and 8087-12.
Cooling Fan (for 12 MHz)..... **$80**

SPEED UP YOUR AT OR AT COMPATIBLE WITH 287TURBO™ 10 MHz

MicroWay® 8087 Support

For the IBM PC, PC XT, PC AT and Compatibles.

A2D-160™ MicroWay's Data Acquisition Board performs 160,000 12 bit Analog to Digital conversions per second! Includes software drivers. The fastest 12 bit A to D board available. For the IBM PC XT and compatibles..... **$1295**

87SFL™ Accurate and fast **Scientific Subroutine Packages.** More than 145 functions: 34 Elementary Fcns, 18 Probability and Statistical Fcns, 15 Random Number Generators, Ei(x), $E_n(x)$, li(x), Si(x), Ci(x), $\Gamma(x)$, $\psi(x)$, $B(x,\omega)$, $I_x(a,b)$, erf x, S(x), C(x), $J_n(z)$, $Y_n(x)$, $I_n(z)$, $K_n(x)$, Ai(x), Bi(x), Ai'(x), Bi'(x), ber x, bei x, ker, x, kei' x, K(x), E(x), $F(\rho|a)$, $E(\rho|a)$, $\Pi(\rho|a,b)$, $\Lambda(a,b,\rho)$, $\mathcal{P}(z)$, $\mathcal{P}'(z)$, $P_n(x)$, $H_n(x)$, $L_n^{(\alpha)}(x)$, $J_n^{(\alpha,\beta)}(x)$, $G_n(p,q,x)$, $C_n^{(\alpha)}(x)$ and many more. Callable from FORTRAN, Pascal, BASIC and C. 1st module $250, 2nd on $100.

MATRIXPAK™ manages a **MEGABYTE!** Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from RM or MS Fortran, MS Assembler, or 87BASIC/INLINE..... each **$99**

87FFT™ Written in assembly language, performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512 Kbytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from most 8087 compatible compilers..... **$200**

87FFT-2™ performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT **$100**

FASTBREAK™ 8087 support for Lotus 1-2-3™ Version 1A or 1A*..... **$79**
Microsoft Fortran V 3.31..... **$209**
IBM Professional Fortran..... **$565**
Ryan-McFarland Fortran V 2.0..... **$399**
LAHEY Fortran F77L..... **$477**
Grafmatic for Fortran or Pascal..... **$125**
MultiHalo Graphics (1 language)..... **$189**
Microsoft C V 4.0..... **$299**
STSC APL★PLUS/PC..... **$450**
INTEL, JRAM, AST, MAYNARD..... **CALL**

MegaPage™ The only Intel-Lotus EMS board which comes with two megabytes of cool-running, low power drain CMOS RAM installed. Includes RAM disk, print spooler, disk cache, and EMS drivers. For the IBM PC, XT & compatibles.... **$549**

DFixer™ Our disk utility which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly. Solves the AT hard disk problem! ... **$149**

DOptimizer™ Optimizes the way your hard disk or floppy stores its files. Speeds up accesses by recombining fragmented files..... **$49**

DCache™ Our disk caching software speeds up your I/O by storing repetitively used tracks in memory. The amount of memory used can be selected in 64 Kbyte banks..... **$49**

87MACRO/DEBUG™ Contains all the pieces needed for writing 8087/80287 assembly code & MicroWay's 87DEBUG debugger. **$199**

OBJ→ASM™ A multipass object module translator and disassembler. Produces assembly language listings which include public symbols, external symbols and labels commented with cross references. Ideal for patching object modules for which source is not available..... **$200**

87BASIC™ includes patches to the IBM BASIC or MS Quick BASIC Compiler for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendentals, addition, subtraction, multiplication, and division..... each **$150**

87BASIC/INLINE™ converts the output of the IBM BASIC Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines. Requires the IBM BASIC Compiler Version 1 and a Macro Assembler. Includes 87BASIC..... **$200**

RTOS - REAL TIME OPERATING SYSTEM
RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's iRMX-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM-PC, XT, PC-AT and COMPAQ..... **$600**

INTEL COMPILERS[1]
FORTRAN-86..... **$750**
PASCAL-86..... **$750**
PL/M-86..... **$500**
ASM-86..... **$200**
[1]Requires RTOS or iRMX-86. All Intel compiler names and iRMX-86 TM Intel Corp.

8087 UPGRADES

All MicroWay 8087s include a one year warranty, complete MicroWay Test Program and accurate installation instructions.

8087 5 MHz..... **$114**
For the IBM PC, XT and compatibles.

8087-2 8 MHz..... **$149**
For Wang, AT&T, DeskPro, NEC, Leading Edge.

80287-3 5 MHz..... **$179**
For the IBM PC AT and 286 compatibles.

80287-6 6 MHz..... **$229**
For 8 MHz AT compatibles.

80287-8 8 MHz..... **$295**
For the 8 MHz 80286 accelerator cards.

NEC V20, V30..... **$16, $30**
64K RAM Set 150ns..... **$10**
256K RAM Set 150ns..... **$29**
256K RAM Set 120ns..... **$39**
128K RAM Set PC AT..... **$49**

287Turbo™ 10 MHz If you own an AT, Deskpro 286 or AT compatible, this is the card you need to get reasonable numeric performance. It plugs into your 80287 socket and includes a specially driven 10 MHz 80287. The card comes in three configurations. The IBM AT version includes a hardware RESET button..... **$450**

287Turbo 8 MHz..... **$369**

87/88Turbo™ is a stubby card which includes a clock calendar and a speed controller which changes the speed of your motherboard from 4.77 to 7.4 MHz. Its use requires your PC to have a socketed 8284. Typical speed increase is 1.6 to 2.0. The card overcomes slow hardware by slowing up only when such devices are accessed and running at full speed otherwise..... **$149**
Optional 8087-2..... **$149**

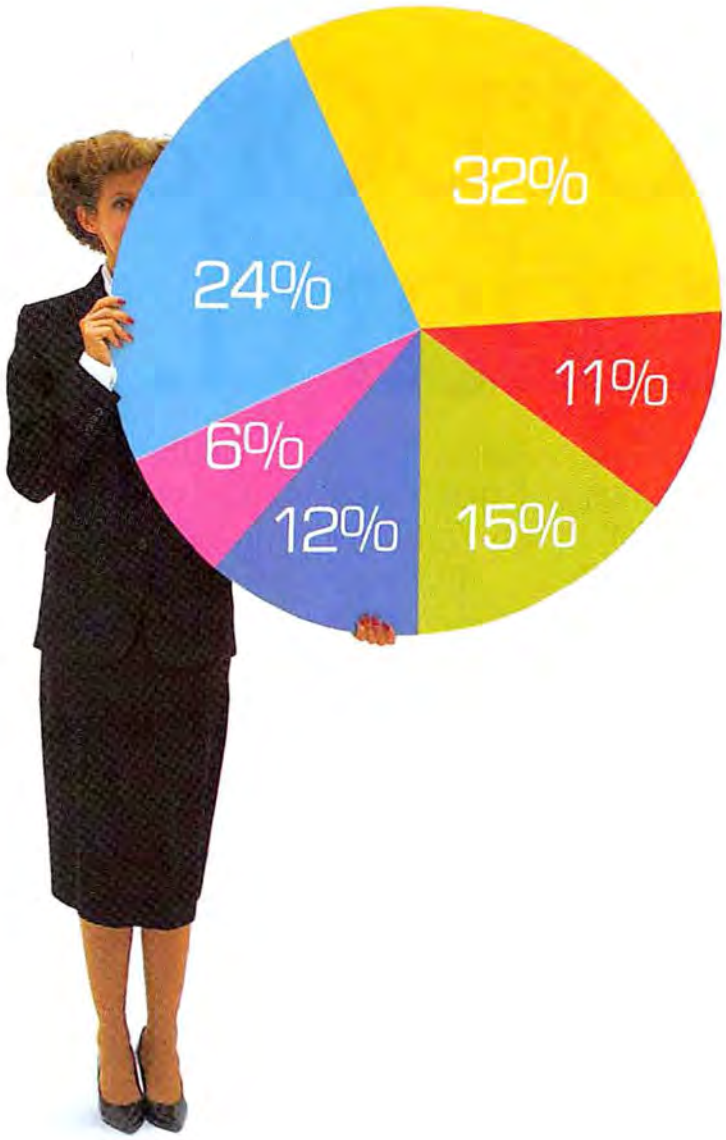
286TurboCache™ This accelerator for the PC or XT uses 8K of cache memory and 80286/80287 processors to provide an average speed increase of 3:1 for most programs. Call for specifications and benchmarks..... **$469**

Call for our complete catalog of software which supports the 8087.

In London, please phone 223-7662

MicroWay P.O. Box 79 Kingston, Mass. 02364 USA (617) 746-7341

Circle 122 on reader service card



Now IRMA's making pies.

IRMA 3279 Graphics™ is here. Now your IBM PC, XT, or AT can fully emulate an IBM 3279 S3G color terminal.

Along with IRMA's capabilities, you get all the graphics resolution and functions of a 3279.

And you can save, redisplay and print host graphics locally.

New IRMA 3279 Graphics is available in a single-slot solution or as an upgrade to your existing IRMA.™ And it works with a wide variety of software including SAS/Graph,™ GDDM, and Tell-A-Graf.™

For immediate delivery, call your local DCA distributor or dealer or or call us direct at 1-800-241-IRMA. EXT. 520

dca®

IRMA and IRMA 3279 Graphics are trademarks and DCA is a registered trademark of Digital Communications Associates, Inc. IBM is a registered trademark of International Business Machines Corporation. SAS/Graph is a trademark of SAS Institute. Tell-A-Graf is a trademark of ISSCO. © 1986, Digital Communications Associates, Inc.

Circle 534 on reader service card

There's nothing standard about this corporate standard.

The standard is MultiMate Advantage.™

The word processing software program found on the "approved" list of most major companies.

Corporate standard aside, MultiMate Advantage also lives up to people standards.

Because it lets you customize to fit your needs.

For example, with the new columnar feature, creating up to eight columns on the screen is no longer wishful thinking.

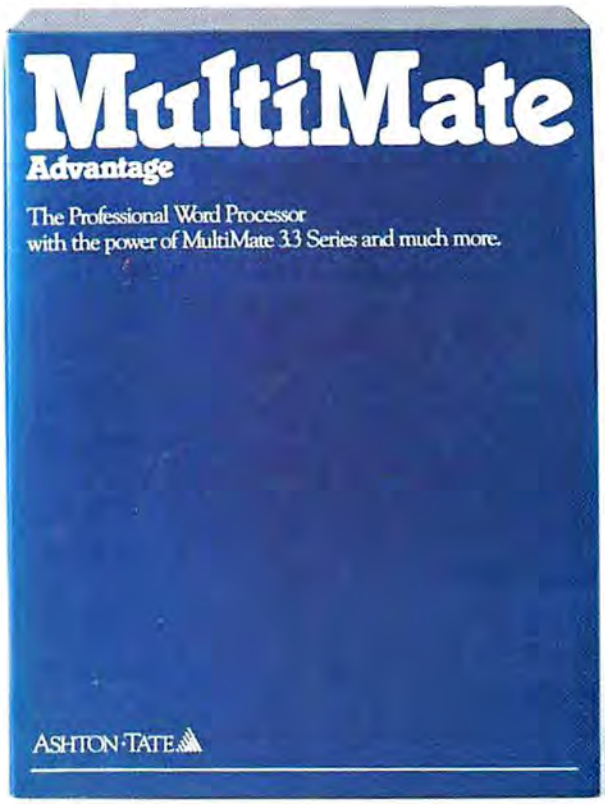
Neither is printing those columns on a single page. In fact, MultiMate Advantage supports over 350 different printers.

It also supports a new 40,000-word thesaurus. As well as a 110,000-word dictionary (complete with medical and legal jargon), which you can easily customize to include your own frequently used words.

And if you still need more reasons why this corporate standard isn't standard, look no further than MultiMate Advantage's keyboard. It's been specially designed just for word processing.

For the name of your nearest authorized Ashton-Tate dealer, call (800) 437-4329, Extension 235. And get your hands on MultiMate Advantage.

It's the first word processing program good enough to live up to everyone's standards.



Requires IBM® PC or 100% compatible. Trademarks/owner: MultiMate/Multimate International, an Ashton-Tate company; Ashton-Tate/Ashton-Tate; IBM/International Business Machines Corp. © 1986 Ashton-Tate. All rights reserved.

Circle 501 on reader service card

See Us at
Booth M333
COMDEX/Fall '86
Bally's Las Vegas

THE FASTEST LINK

FROM MICRO TO MAINFRAME

BARR/HASP: POWERFUL, VERSATILE, EASY TO USE

for the IBM PC, XT, AT and compatibles includes software, synchronous adapter board and manual

The BARR/HASP Intelligent Communications package provides more than just a connection—it's powerful enough to drive multiple high-speed printers for volume printing, yet versatile enough to print checks and invoices on any size printer. With the menu-driven software, you can perform all program functions accurately, easily, and without lengthy training.

BARR/HASP emulates a full function IBM 3777-2 and HASP on the 360/20. Print speeds on single and multiple printers range from 30 cps to beyond 2,400 lpm (7,000 lpm on the PC AT). Line speeds range from 1,200 to 9,600 Baud on dial-up and to 19,200 Baud on a dedicated line. With the PC AT, you can achieve a new speed record for a microcomputer—*56,000 Baud*—and drive even the fastest laser printers at maximum efficiency.

All tasks—printing, plotting, sending jobs, and using the console—operate simultaneously from a single PC. Such high performance translates into instant savings. BARR/HASP now replaces expensive, cumbersome Remote Job Entry workstations —and does it for a fraction of the cost.

Host Systems:	MVS/JES2 MVS/JES3	VM/RSCS VS1/RES	NOS/RBF MVT/HASP
Requires:	128K synchronous modem		

You'll find the BARR/HASP manual complete and refreshingly intelligible. But should you have a question, BARR's technical experts are just a toll-free phone call away.

FREE 30-DAY TRIAL

See for yourself how the BARR/HASP Link can work for you. For a free 30-day trial, call

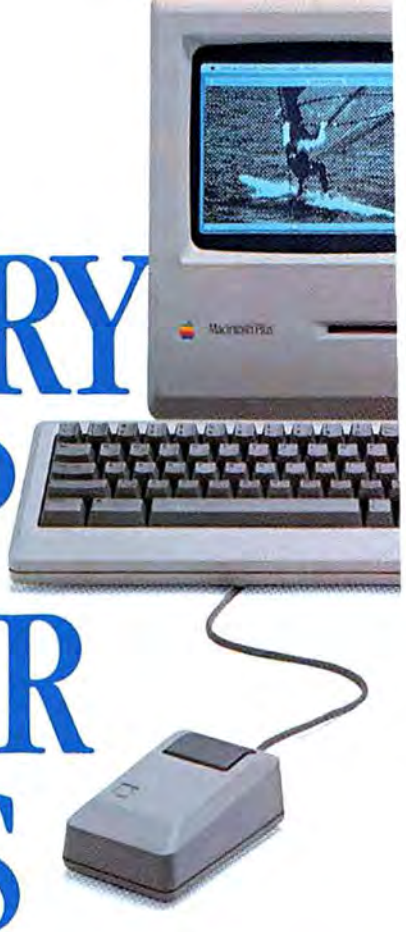
800-BARR-SYS
(800-227-7797)
in FL, call 904-371-3050

$890

BARR SYSTEMS, INC.
Suite M, 2830 NW 41st Street
Gainesville, FL 32606

Circle 317 on reader service card

WHAT EVERY DESKTOP PUBLISHER NEEDS IS A PHOTOGRAPHIC MEMORY.



TAKE A PICTURE. ANY PICTURE.

It can be a photograph, artwork, a technical drawing. Feed it into the Microtek Intelligent Image Scanner, and it's on your computer screen almost instantly. Then you can edit, paint, and cut and paste it, and reproduce the sharpest image your laser printer can handle.

MACINTOSH OR IBM COMPATIBLE.

The Microtek Scanner can be used with either system. And naturally, it works with the most popular publishing software for both.

INCOMPARABLE VALUE.

For a scanner this sophisticated, you'd expect to make a heavy investment. But the Microtek Image Scanner is less than the cost of a laser printer and can pay for itself in no time in saved labor and production costs.

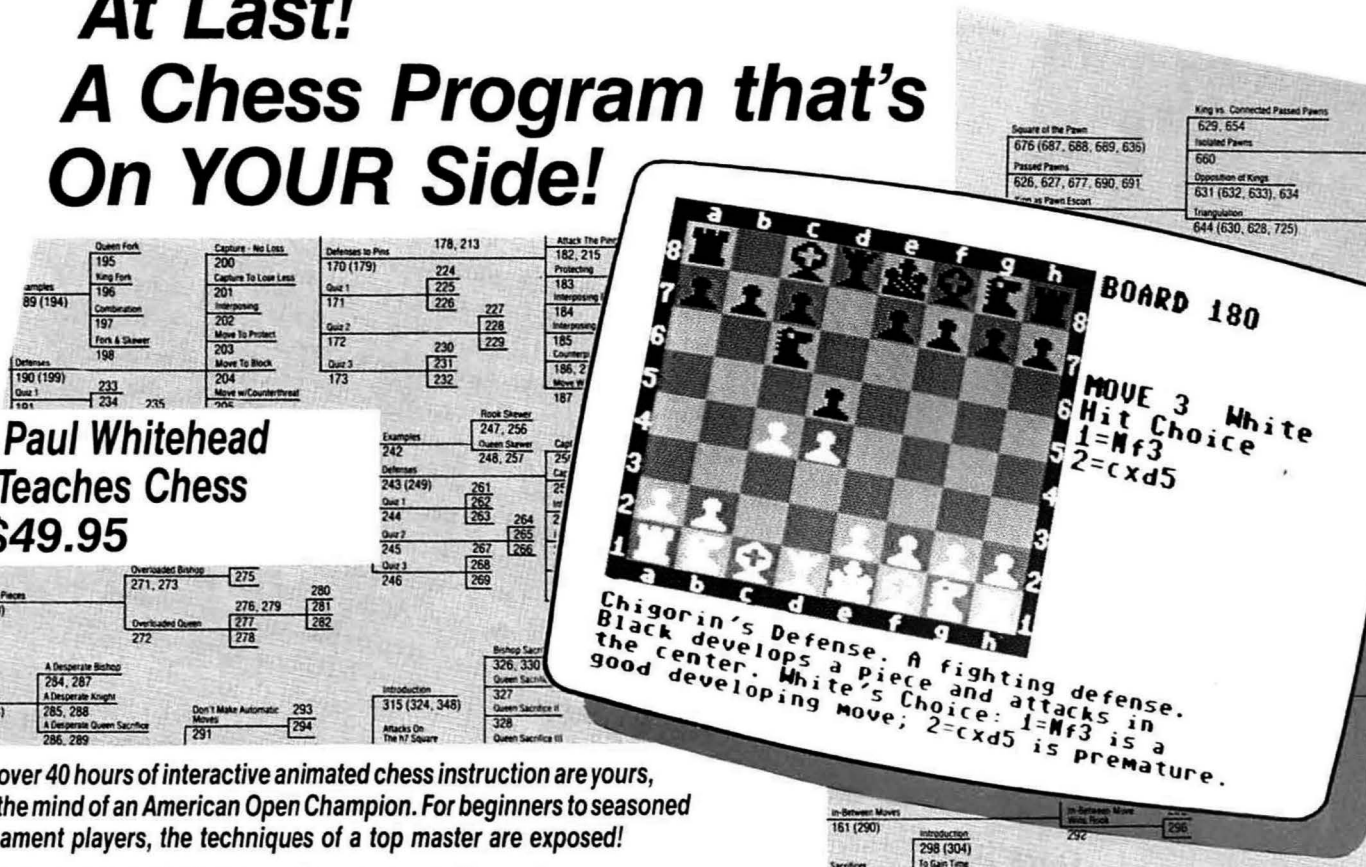
It's simply the best way to improve your publishing image. For more information call 800-654-4160 (Inside California 213-321-2121). And be sure to ask about the Microtek OCR Scanner as well, which integrates text and images.

MICROTEK

16901 S. Western Ave., Gardena, CA 90247.

Circle 818 on reader service card

At Last!
A Chess Program that's On YOUR Side!



Paul Whitehead Teaches Chess
$49.95

Now, over 40 hours of interactive animated chess instruction are yours, from the mind of an American Open Champion. For beginners to seasoned tournament players, the techniques of a top master are exposed!

Here is a sampling of what you will see come to life on the screen:

- *Rules*
- *Chess Notation*
- *Opening Principles*
- *Piece Development*
- *Surprise Checks*
- *Greed*
- *Traps*
- *"Desperado" Moves*
- *Pins*
- *Forks*
- *Skewers*
- *Overloaded Pieces*
- *In-Between Moves*
- *Back-Rank Checkmate*
- *Smothered Mates*
- *Stalemates*
- *Sacrifices*
- *Blockades*
- *Fianchettoes*
- *The Lucena Position*
- *King & Pawn Endings*
- *The Active Rook*
- *Perpetual Check*
- *Tempo & Zugzwang*
- *Isolated Pawns*
- *Passed Pawns*
- *Opposition of Kings*
- *Triangulation*
- *Hypermodern Attack*
- *Classic Openings*
- *Quizzes*
- *Tactics For Each Piece*
- *Weak Points in the Opening*
- *Brilliant Queen Moves*
- *King as a Pawn Escort*
- *The 3-Pawn Breakthrough*
- *Opposite Color Bishops*
- *Good & Bad Pawn Positions*
- *Converting a Material Advantage to a Win*
- *Forcing Checkmate Using Various Piece Combinations*

. . . and more!

OPENINGS:

- *King's Gambit*
- *Ruy Lopez*
- *Scotch Game*
- *Giuocco Piano*
- *Petroff's Defense*
- *Alekhine's Defense*
- *French Defense*
- *Sicilian Defense*
- *Caro-Kann*
- *Pirc Defense*
- *Center Counter*
- *English Opening*
- *Bird's Opening*
- *Larsen Attack*
- *Sokolsky's Opening*
- *Benko's Opening*
- *Grob's Attack*
- *Queen's Gambit*
- *King's Indian*
- *Benoni Defense*
- *Nimzo-Indian*
- *Queen's Indian*
- *Dutch Defense*
- *Gruenfeld Defense*
- *The Dunst Opening*

. . . and others!

IBM PC/PC jr (color or mono)
Apple II (64K)
Commodore 64
Atari ST (December 1st)

Each package includes a detailed two-sided ROAD MAP that lets you keep track of your journey through the tutorial database. The Road Maps label the parts of the tutorial both by topic and by Board Number. Using the Board numbers and the EXPRESS DEPOT feature, you can hop around the tutorial at will. You can also skip over material you already know.

When you want to test your new knowledge against an opponent, a single key calls the COFFEEHOUSE CHESS MONSTER opponent program. It will automatically set up the position you were viewing in the tutorial, offer you a new game, or let you enter a game from a newspaper listing. This is a fully-featured opponent program, which allows you to save an unlimited number of your own games onto disk, modify them, print them out, and re-animate them later.

ORDER TOLL FREE! 1-800-621-0851 x 100

Enlightenment, Inc.

Circle 852 on reader service card

YES! Please rush me PAUL WHITEHEAD TEACHES CHESS!

Name _____

Address _____

City _____ *State* ____ *Zip* _____

Please enclose $50.50 (outside Calif.) or $53.75 (Calif. residents - includes sales tax) per unit. . . includes shipping & handling. Please send to: ENLIGHTENMENT INC., 1240 Sanchez St., San Francisco, CA 94114.

DELIVERY: *5 days from receipt of order.*

☐ *IBM PC/PC jr.* ☐ *Apple II* ☐ *Commodore 64* ☐ *Atari ST*

*Enclosed is: $*_____

From the Software Shelf

PC World offers first impressions of recent software releases

This month: a black hole for your spreadsheet files, a Shareware program grows up, words words words, a do-it-yourself TSR program, on-line investment, and Alice through our looking glass

Edited by Robert Luhn

SQZ

Occasionally a remarkable product comes along that satisfies a need we didn't know we had. In consumer electronics, the Walkman clicked so well with today's lifestyles that it was an instant hit. *VisiCalc*, *1-2-3*, and *SideKick* were immediate sensations because they made personal computing so much easier. *SQZ* may not evoke such huzzahs, but it can compress *1-2-3* and *Symphony* worksheet files by as much as 95 percent—and that ain't chopped liver.

There's virtually no penalty when using *SQZ*. This memory-resident program operates unobtrusively, automatically compressing any *1-2-3* or *Symphony* worksheet file when it's saved to disk and "unsqueezing" it when it's retrieved. *SQZ* occupies only 30K of RAM, supports EMS boards, and is compatible with *SideKick*, *Note-It*, and other memory-resident programs.

SQZ is also installation-free: Type *SQZ* (for *1-2-3*) or *SQZ Symphony* at the DOS prompt before loading either program or insert the relevant command in an AUTOEXEC.BAT file. When you retrieve a worksheet, a small message appears at the bottom of the screen indicating that *SQZ* is active and that file operations (retrieve, combine, extract, or save) will be performed in compressed mode. To turn *SQZ* off or to change program defaults, simply press the definable <Alt>-! hot key. This superimposes a status window and a *1-2-3*-like command line over the worksheet (see Screen 1).

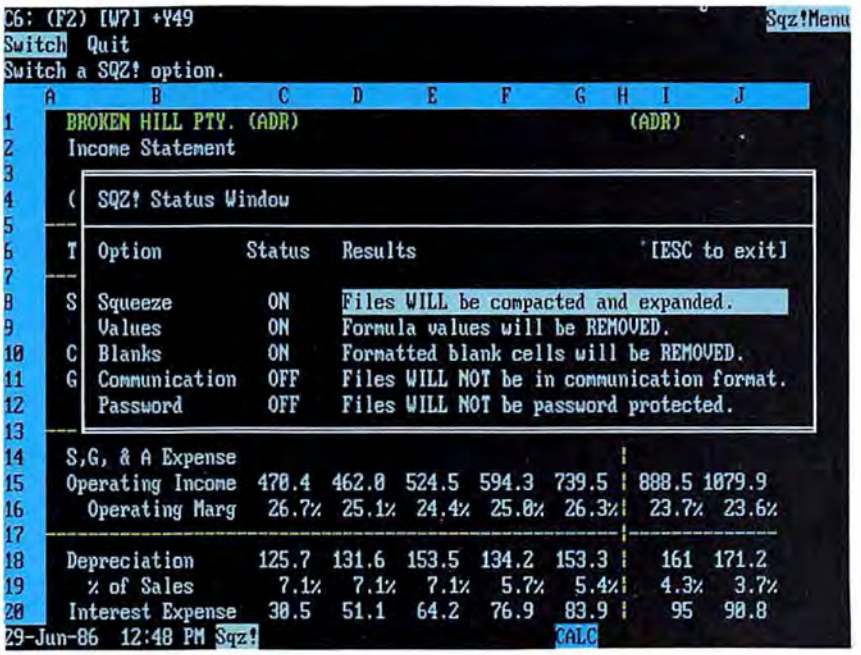
At this point you can put *SQZ* to sleep or flick on several useful options. *1-2-3* and *Symphony* normally save both formulas and resulting values to disk. By setting *SQZ*'s Values function on, only formulas are saved, freeing up a significant amount of disk space. When the worksheet is later retrieved, you merely recalculate it to restore the values.

Another space-saver is the Blanks option, which ignores empty formatted cells when compacting a worksheet. However, the disk real estate gained may not be worth the bother of reformatting an unsqueezed worksheet. Far more

useful is the Communications function, which condenses a worksheet file into a form that can be telecommunicated over text-only electronic mail services such as MCI Mail. A squeezed file is much smaller, so any communications session is briefer and less expensive. Naturally, anyone downloading the file will need *SQZ* to read it.

As an extra bonus, you can protect *1-2-3* release 1 and 1A worksheets with *SQZ*'s password function. You can also combine *SQZ*'s password protection with that offered by *1-2-3* release 2 and *Symphony*. All of these options can be installed as standard *SQZ* defaults with an accompanying utility program.

I tested *SQZ* with releases 1.A and 2 of *1-2-3* and *Symphony* release 1.1 (see Figure 1). Although *SQZ* doesn't always speed up retrieving or storing a worksheet, the disk space savings are dramatic. On my 20MB hard disk, I have 30 *Symphony* worksheets totalling nearly 4MB. Because the worksheets are mostly filled with data, *SQZ* packed the files into about 1MB. If you figure the cost of a 20MB hard disk at about $600, *SQZ* saved me 15 percent of $600, or $90. Given *SQZ*'s $79.95 price tag, you might even say I made a $10.05 profit. Chopped liver, indeed. –*Richard Ozaroff*



Screen 1: From SQZ's pop-up menu, you can turn on automatic worksheet squeezing, exclude blanks and values from the process, pack worksheets into a format compatible with electronic mail services, or slap a password on a worksheet.

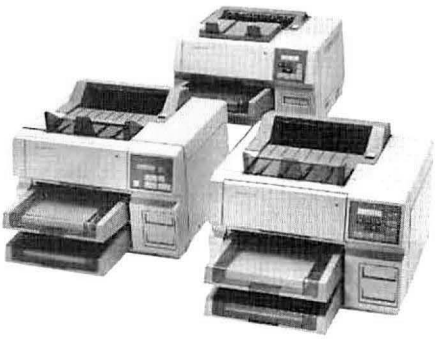
SQZ version 1.0
Turner Hall Publishing
10201 Torre Ave.
Cupertino, CA 95014
408/253-9607
List price: $79.95
Requirements: 30K, one disk drive, DOS 2.00 or later version
Not copy protected

(continues)

Mark Farbin

DICTIONARY
TEXAS INSTRUMENTS
BLACK BOOK ILLUSTRATION, PRINT, TV
50 WEST COAST ARTISTS
BLACK BOOK PHOTOGRAPHY
BLACK BOOK ILLUSTRATION, PRINT, TV
TEXAS INSTRUMENTS
IBM
IBM
AD ANTAGE

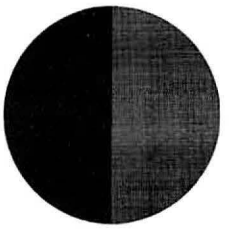
TI's new OmniLaser™ page printer can turn your PC into a desktop publishing system.



Combined with the right software, you can now have a publishing house right on your desktop.

TI's OmniLaser with any IBM®-compatible, Apple® or virtually any PC, and the right software, can help you reduce costly typesetting, outside design work and printing. The quality of your business communications will be greatly enhanced and more eye appealing, lending more credibility to your message. At 300 dots per inch resolution, the difference between laser printing and daisy wheel or dot matrix is more than mere improvement. It's light-years ahead.

The OmniLaser Series 2000 family from Texas Instruments is available in three desktop models designed to address workstation and shared-resource environment needs (8 or 15 pages per minute depending on model). Both the 2108 and 2115 feature the PostScript™ page description language which allows full integration of text, graphics and scanned images on a single page. And the Model 2015 was designed to handle text and business graphics in a shared-resource environment. All three OmniLasers, with their standard interfaces and emulators, allow you to take full advantage of your present business computer applications as well. And they'll give you unparalleled resolution in both text and graphics. Blacks are black, whites are white, and you control the shades of gray.



Ours Theirs

The OmniLaser uses the direct positive-imaging exposure process as opposed to the reverse-imaging exposure process used by many other laser printers. The difference, as shown above, is obvious.

The second generation can do more, but costs less.

Overall, TI's second generation laser printers offer up to 10 times the duty cycle, 15 times the machine life and five times the paper capacity offered on their first generation counterparts. These advances, coupled with lower maintenance costs and user-replaceable consumables, significantly reduce the costs of ownership. In fact, at pennies per page, the OmniLaser's per page cost is among the lowest in the industry.

TI OmniLasers and the power of PostScript.

PostScript is a description language that can drive OmniLaser Models 2108 and 2115 printers to their full capabilities. Whether you're composing newsletters, product data bulletins, ad proofs, business presentations, technical manuals, or any type of document, you'll find that with the power of PostScript, the only limit to what you can do is your own imagination.

OmniLasers. They bring power, flexibility and affordability to the world of desktop publishing.

Turn your desktop into a publishing house. For more information on the new OmniLaser 2000 Series page printers from Texas Instruments, call toll-free 1-800-527-3500.

TEXAS INSTRUMENTS

31638
© 1986 TI
OmniLaser is a trademark of Texas Instruments Incorporated.
IBM is a registered trademark of International Business Machines Corporation.
PostScript is a trademark of Adobe Systems Incorporated.
Apple is a registered trademark of Apple Computer, Inc.

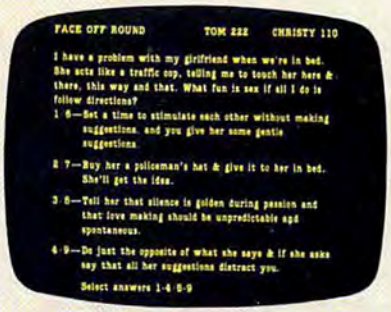
Dr. Ruthware?

The frank down to earth responses to questions on sexuality by Dr. Ruth Westheimer, noted multi-media sex therapist, can now be enjoyed on your IBM PC (or MS-DOS compatible) Apple II series or Commodore 64/128 in an informative software program:

Dr. Ruth's COMPUTER GAME of Good Sex.

$29.95

The perfect gift for your spouse, mate, friend or co-worker.



Available at better computer software outlets or call Toll Free at **1-800-638-9292** for ordering information.

Ask for Operator R

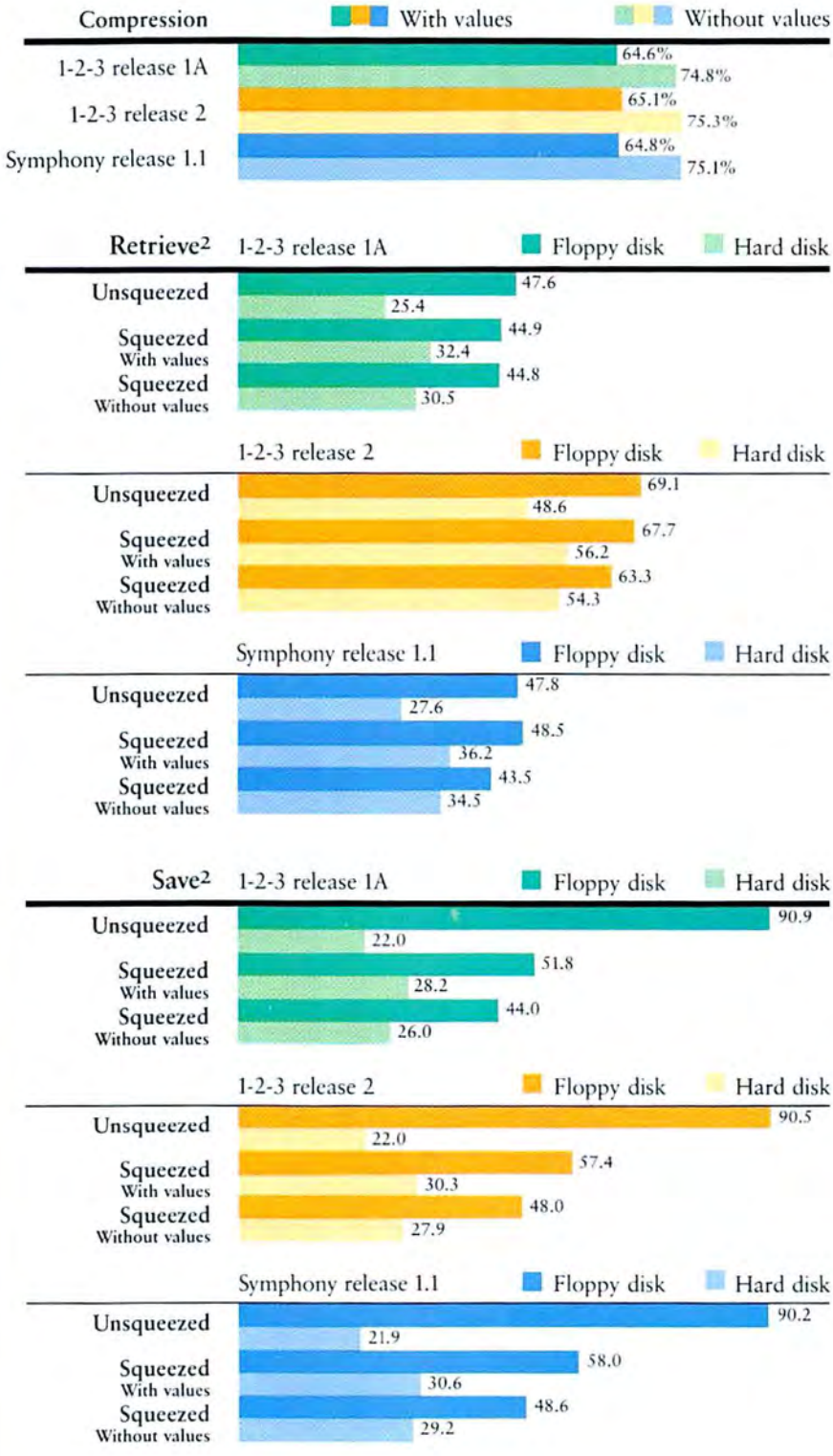
microcomputer games DIVISION

The Avalon Hill Game Company

A MONARCH AVALON INC. COMPANY
4517 Harford Road • Baltimore, MD 21214

Circle 841 on reader service card

Figure 1: Putting the SQZ on 1-2-3 and Symphony[1]



[1]Initial file size respectively 106K, 106.3K, and 105K
[2]All times in seconds

(continues)

INTRODUCING THE NEWSROOM•PRO™

More good news from the makers of The Newsroom™

We're making headlines again.

Over 250,000 people are already using The Newsroom™ to publish their own newsletters at home, at school and in the office. But some of you wanted more. More graphics. More speed. More advanced features. A more professional look. So, for demanding desktop publishers like you, we've created The Newsroom Pro.™

Available for:
IBM PC, XT, AT
and compatibles.

Is not copy protected for your convenience.

Sophisticated features for more efficient use.

Advanced word processing lets you quickly create an entire column on screen at once. Scroll up and down the column as you write, edit and set down graphics. What you see is what you get. Text automatically flows between columns, wraps around graphics and rearranges itself as you design your layout. You can even change type styles, sizes and line spacing. Plus, import ASCII files and convert files from The Newsroom.

Add-on features are standard equipment. Choose from **over 2000 pieces of clip art.** Then resize, flip, overlap and personalize the art with powerful drawing and editing tools.

Get complete details about The Newsroom Pro.™

Mail this coupon to:

Springboard Software, Inc.
7808 Creekridge Circle, Mpls., MN 55435
Attn: The Newsroom Pro Details

Your Name_____

Company Name_____

Address_____

City_____ State_____

Country_____ Zip_____

Phone ( )_____

SPRINGBOARD™

Springboard Software, Inc. • 7808 Creekridge Circle • Minneapolis, MN 55435 • (612) 944-3915

Circle 748 on reader service card

Think Fast.

Now think Toshiba T1100 PLUS. The IBM®-compatible portable PC that puts full desktop PC power in a package small enough to fit in a desk drawer. And light enough to make an office out of any place there's a seat.

SPEED IS OF THE ESSENCE.

Computers can compute many times faster than our brain. But with many portable PCs, you can go out of your mind waiting for them to load a program, move around blocks of text, search through a data base or recalculate a spreadsheet.

Not so with the T1100 PLUS. Our 80C86 16-bit processor has 16-bit data paths and runs at 7.16 MHz. Combined with our 640KB of maximum memory capacity, it runs up to twice as fast. And that means you can get through your work faster. Whatever kind of work you do.

HOW SMALL IS IT?

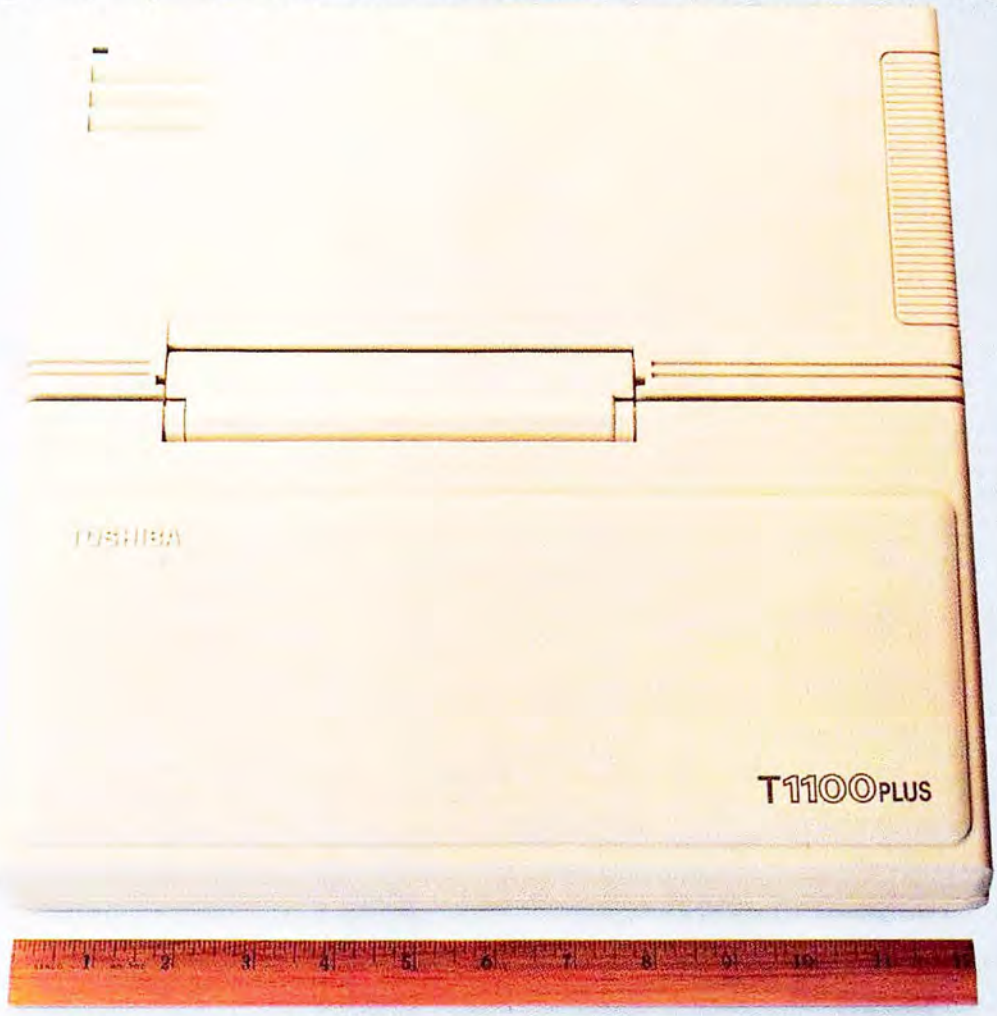
Putting all this speed and power in a package only 12.1″ W x 2.6″ H x 12″ D and weighing under 10 pounds was no small feat. We did it by using our unique gate array technology to reduce the number of ICs. Which gives you exceptional reliability as well as incredible portability.

IT BENDS OVER BACKWARDS.

O.K., it's fast, small and light. Which is enough in itself. But what else does the T1100 PLUS portable computer have going for it, you ask. Plenty, we say.

Ever had to squint or scrunch down to see what's going on with other portable PCs' screens? Our screen is a high-contrast, high-resolution LCD that shows 25 lines by 80 characters of text with 640 x 200 resolution. And it will even bend over backwards to

Now Think Small.



accommodate you by tilting a full 90 degrees.

STANDARDS THAT SET THE STANDARD.

The T1100 PLUS comes with a long list of standards including dual 720KB 3.5″ disk drives, MS-DOS,[2] serial, parallel and CRT ports, an IBM-compatible keyboard with 81 full-size keys, rechargeable NiCad batteries that last up to eight hours per charge, AC adapter, user's manual, MS-DOS manual and soft carrying case.

Also standard is SideKick,[3] the best-selling utility program that includes a notepad, calculator, autodialer, calendar and appointment scheduler. And our exclusive "Exceptional Care" Program. In the unlikely event that anything goes wrong with your T1100 PLUS, we guarantee you prompt delivery of a replacement while yours is being fixed.*

Options for the T1100 PLUS include 300/1200 bps Hayes[4]-compatible internal modem, external 5.25″ disk drive, Floppy Link to a desktop PC's 5.25″ drive, IBM-compatible five-slot expansion chassis and automobile power adapter.

Is there anything we left out? Oh yes, the phone number of your nearest Toshiba computer and printer dealer. It's 1-800-457-7777. Please call to let us know you're thinking of us.

1. IBM is a registered trademark of International Business Machines Corp. 2. MS-DOS is a registered trademark of Microsoft Corp. 3. SideKick is a registered trademark of Borland Int'l, Inc. 4. Hayes is a registered trademark of Hayes Corp. *Requires no-cost enrollment in "Exceptional Care" Program.

In Touch with Tomorrow

TOSHIBA

Toshiba America, Inc., Information Systems Division

Circle 658 on reader service card

"If you think software programs have to cost hundreds of dollars, we want to deprogram you."

We're PC-SIG. The world's largest library of user-supported programs (where authors ask that you send a donation) and free public domain programs. For only $6, you buy software that's been selected from leading authors, thoroughly analyzed, and technically supported. Perhaps that's why we've been referred to as the Robin Hood of software publishers.

Our "Robin Hood" philosophy means software is finally within every PC user's budget.

☐ #310 **QMODEM** "One of the best communication programs I have ever seen." Supports common modems and runs up to 9600 baud.

☐ #499 **PROCOMM** Professional communications program written in compiled MicroSoft C and assembly code.

☐ #523 **SIDE WRITER** Perfect for spreadsheets, this application prints text files sideways.

☐ #528, 529 **NEW YORK WORD** Powerful word processing with split-screen editing, mail merge, auto hyphen, and more.

☐ #574 **FREECALC** Word processing and spreadsheet application for forecasting and budgeting.

"The PC-SIG Library." It should be called the "Fabulous Guide to (Almost) Free Software."
–Richard O'Reilly, Computer File/Los Angeles Times

☐ #78 **PC WRITE** Our most popular word processor. "I'm more at ease with PC WRITE than WordStar."

☐ #5 **PC-FILE III** A best-seller. Great database manager for creating labels, forms, and letters.

☐ #521 **FREE FILE** Easy-to-use and learn relational data base manager.

☐ #405 **DESKMATE** Desk organizational tool with phone dialer, notepad, calendar, and calculator.

☐ #480 **PC OUTLINE** Like Thinktank, this is a great way to organize, outline, and classify ideas.

☐ #575 **PC-STOCK** A stock-analysis program for professional and occasional users.

☐ #515, 516 **THE DRAFTSMAN** Create data graphs or slide shows from Lotus 1-2-3, Symphony, or Visicalc.

☐ #517 **IMAGE PRINT** Get letter-quality characters from dot-matrix printers. 5 typefaces available.

☐ #478 **HARD DISK UTILITIES** The best and most useful utilities for the hard disk user.

☐ #558 **PC-PROMPT** A memory-resident help utility that provides formatting for DOS commands online.

☐ #423 **PROJECT MANAGEMENT** PC management system capable of handling 1000 tasks.

☐ #237 **PC-GENERAL LEDGER** For the serious bookkeeper. All the controls needed for balancing the books. Plus an audit trail.

☐ #105 **PC-PROFESSOR** All the basics about BASIC.

☐ #273 **BEST UTILITIES** A collection of the best PC-SIG utilities. "These are the very best, everybody should have them."

☐ #304 **1-2-3 MACROS** Collection of Lotus 1-2-3 worksheets. Plus macro library.

☐ **The PC-SIG introductory special: any 5 diskettes *plus* 1-year membership...$39.**

☐ 1-year PC-SIG Membership ($35 foreign). Includes printed directory, supplement, bi-monthly magazine....$20.

Try the software you don't have to be rich to own.

Add $4 postage and handling ($10 foreign) CA residents add state sales tax. Dealer inquiries invited

Total Enclosed $_____

by ☐ Check ☐ VISA ☐ MC

Card No. _____

Exp. date _____ Phone # _____

Name _____

Address _____

City _____

State _____ Zip _____

To order, call: **800-245-6717**
In CA: **800-222-2996**
For technical questions or local orders: **(408) 730-9291**
1030-D East Duane Avenue,
Sunnyvale, CA 94086

PC-SIG

Software in the public interest.

Circle 293 on reader service card

PC World Creates a Long Buy-Line for You

Queue up! *PC World* readers mean big business–for you. Call your Account Manager to reserve your advertising space today–please see page 4 for phone numbers.

PC-File/R

Current debate about evolution centers around the lack of any fossilized "intermediates"–the remains of life-forms that evolved halfway between one stable form and another. If the giraffe gradually evolved from the same ancestor as the horse, for example, why is there no fossil record of a horse-like animal with a somewhat longer neck?

Contemporary data management programs raise a similar question. At the low end of the market are cheap, utilitarian file managers such as *pfs:file* and ButtonWare's original *PC-File*. In the loftier price realm lie fully relational, programmable products, such as *dBASE III Plus* and *Revelation*, that can perform virtually any data processing task–provided you have the money, time, and expertise to make them work. But evidence of successful intermediate data management programs is hard to come by.

Some justifiably contend that middle-of-the-road data managers are neither fish nor fowl–and are thus poorly adapted for the needs of both neophytes and data management professionals. So I was doubly surprised to see ButtonWare release *PC-File/R*, a menu-driven intermediate data manager in the tradition of its ancestor, sporting a very un-Shareware-like $149 price tag.

But don't write this program off. Although it's not for industrial-strength data management, *PC-File/R* is just the ticket for those

(continues)

In house.

This slide was made in house in under an hour for under $1.00.

Poor house.

This slide was made by an outside service in over 24 hours for over $20.00.

Presentations are on time, on budget with the Polaroid Palette.

Sending out for slides is expensive. And if you need them in a hurry, the prices can go through the roof.

But now you can change the whole picture with a brilliant solution from Polaroid.

It's called the Palette Computer Image Recorder, and it's a cost-effective way to produce color 35mm slides, as well as overheads and prints. In house. In minutes. For as little as 60¢ per slide.

Just hook it up to a compatible personal computer, and in minutes you can create colorful presentation materials. The Palette system includes a computer image recorder, the Polaroid 35mm Instant Slide System, as well as 35mm and instant print camera backs. All for just $1,999.*

What's more, Palette, as its name suggests, allows you to "paint" your PC images almost any color you want. Even if you don't have a color monitor. Imagine what that can do for your presentations.

And now try Palette for 21 days, satisfaction guaranteed.

For a limited time, you can try Palette for 21 days, and if you're not completely satisfied, we'll refund your money in full. And, since Palette works with so many popular graphics packages, we're offering some of them – Microsoft® Chart,™ LCS/Telegraphics TelePaint,™ and BPS® 35mm Express™ – at a 20% discount – with the same 21 day satisfaction guarantee.

So don't let your next presentation drag you off to the poor house. Stay in house with Palette instead.

For the name of the participating Polaroid Palette dealer nearest you call toll free 800-225-1618, 9 a.m. to 6 p.m. Eastern Time.

Polaroid

For more information, mail this coupon to Polaroid Corporation, Dept. 661, P.O. Box 5011, Clifton, NJ 07015.

☐ I'd like a demonstration

☐ Please send me more information

PC make and model _____

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____ PCW 11/1

©1986 Polaroid Corporation "Polaroid"® "Microsoft" is a registered trademark of Microsoft Corporation. "BPS" is a registered trademark of Business & Professional Software, Inc. * Suggested list price.

Circle 241 on reader service card

AMERICAN CLASS SCHOOLS...

ComputerWise

AMERICAN PC'ERS

LEARN TO MAKE YOUR COMPUTER "FLY"

You can take command of your PC with a pilot's confidence ... through no nonsense, individualized classes.

Even if you have **no** computer background, you'll gain the understanding ... the skills ... the confidence you need to make your PC do what **you** want. And you'll invest a surprisingly small amount of time and money.

You'll have your own individual PC and printers. You'll learn whatever you need to know ... letter writing, mailings, bookkeeping, spreadsheets, databases ... the **easy** way -- in an individualized program tuned to **your** background and needs.

Get the clear and simple instruction you need to put yourself in **command** of your PC ...

Call now for the class information.

PilotWise

AMERICAN FLYERS

GO FROM PC TO P-I-C

When you shut down your PC, shouldn't you become P-I-C (Pilot in Command) and discover the freedom of flying an airplane?

You can get your wings with American Flyers at sites all across the country. You'll benefit from nearly 50 years of flight training experience ... move rapidly through courses tailored to **your** schedule and **your** individual needs ... part-time or full time.

Want an aviation career? You can start from ground level and become a Commercial pilot in as little as 90 days.

Already have your Private license? Move up to advanced ratings faster, more economically, more professionally ...

Fly with the finest -- call for information.

DiverWise

AMERICAN DIVERS

TAKE A WELL-EARNED BREAK UNDERWATER

Come aboard the 53-foot **Sea Eagle,** southern Florida's finest dive boat ... see why scuba diving is one of the fastest-growing recreational pastimes in the world ... bring your own gear or use American Diver's first-rate equipment.

No experience? No problem -- you can become a certified diver in as little as three days ... work with superb, professional instructors who'll help you develop your techniques ... from basic scuba training through advanced certifications.

Put your mind at ease ...

Come dive from the **Sea Eagle** in Florida's bluewater paradise.

NEW YORK	FLORIDA	OHIO	CALL TOLL FREE OR LOCAL	ILLINOIS	TEXAS	CALIFORNIA
800 232-0808	800 327-0808	800 433-0808		800 323-0808	800 433-0808	800 233-0808
516-585-4242	305-772-7500			312-584-4700	817-625-5121	213-390-7878

Circle 697 on reader service card

Electric Pencil PC

Simply the Best Value in Wordprocessing Today

With as many features as wordprocessors selling for 10 times the price, Electric Pencil PC was designed to be sophisticated enough for the professional user yet simple enough for the beginner. Our "Quick Start Guide" will have you writing, editing, and printing in less than 20 minutes. Once you have the basics, any of 500 functions are available with a simple key-stroke. The on-screen help and extensive tutorial windows are like having a manual on disk.

There may be only two methods left for writing: a no. 2 pencil or the power of Electric Pencil PC. You'll be impressed with this full-featured wordprocessing system at a revolutionary price . . . we guarantee it!

• Supports DOS 2.0 (or higher) directory structure • On screen underlining & bold with monochrome (colors on color monitor) • Set screen, text, underlined, bold & marker colors • All prompts in English (no codes or numbers) • Recover last delete from cut and paste buffer • Built in disk file recovery • Definable function keys • All "wordprocessing keys" are used • Designed especially for the IBM PC & compatibles • Definable screen width • Embedded printer control commands • Automatic character translation • Repeat function • Chain disk files when printing • Append files in memory • Include files from disk within text • Verify option with load & exit • Centering • Conditional paging and page numbering • Remark command in text • Print any part of text or range of pages • Over 80 individual on line help screens • DOS or expanded keyboard buffer • Toggle between main/alternate text files • Optional ASCII file save/load • Parallel & serial drivers (RS-232) • "Pause" command in text • On screen print preview • Single word spell check • Customize dictionary • Auto-learn & correct misspellings • Build "specific" dictionaries • Auto hyphenation, user defined • Dvorak, French, German & Spanish keyboard drivers • Automatic file backup • Runs on floppy or hard disk • Keyboard macros • Automatic key entry files • Simple 1 or 2 key command structure • Multiple search & replace functions • User timed auto-file save • 270 page 2 color manual • split screens (up to 6) •

- ☑ FULLY MENU DRIVEN
- ☑ 100,000 WORD DICTIONARY
- ☑ EXTENSIVE ON SCREEN TUTORIALS
- ☑ NOT COPY PROTECTED
- ☑ WORKS WITH ANY PRINTER
- ☑ MULTI-LINE HEADERS & FOOTERS
- ☑ RE-DEFINE ENTIRE KEYBOARD

WINNER OF THE GOLD MEDAL & PROGRAM OF THE YEAR AWARD, CREATIVE COMPUTING MAGAZINE

MONEY BACK GUARANTEE

Electric Pencil PC is unconditionally guaranteed for 30 days (less shipping). There is a $10.00 restocking fee if the disk envelope seal is broken.

For Texas Orders or Additional Information Call (214) 234-8466. Mail in your order today or, for immediate shipment,

CALL TOLL FREE

1-800-445-9004

Introductory Offer

$49.95

*Please Add $5.00 for Shipping and Handling

COD's welcome. Please add an additional $3.00 COD fee. On all foreign orders, shipping cost is assumed by the buyer.

MasterCard VISA

ELECTRIC SOFTWARE CORPORATION

9230 MARKVILLE DR. DALLAS, TEXAS 75243

MINIMUM HARDWARE REQUIREMENTS:
IBM-PC, XT, AT or compatibles and Tandy 1000. 128K memory, one disk drive, PC-DOS, MS-DOS 2.0 or higher. Color or monochrome monitor.

MS-DOS is a trademark of MicroSoft Corp. IBM and PC-DOS 2.0 are registered trademarks of International Business Machine Corp. Tandy is a registered trademark of The Tandy Corp.

Circle 817 on reader service card

Introducing the NEW

"Tape Backup"

For Novell Networks and the new PC/AT (8MHz)

AIC proudly presents the first and only tape backup system that works with the **NEW PC/AT (8Mhz)** and with most network systems. It is available in both internal and portable external unit for operation with both the PC/XT, PC/AT or compatibles.

QUALITY FEATURES:

* 1 Year Parts and Service Guarantee
* Automatically adjusts clock speed for the IBM PC/XT and the PC/AT
* Operates with most local area networks (IBM PCnet, AST PCnet ORCHID PCnet)
* Operates with clock speeds from 4 to 10 Mhz.
* Menu driven, command line or batch file operation
* Backup & restore individual files, groups of files, directories, partitions or complete hard disks
* Works with all brands and sizes of hard disks
* Uses standard ¼ inch data cartridges
* Software configurable DMA channel, interrupt and I/O addresses
* Backup multiple volumes on single tape. Multiple tapes can be utilized for backing up larger hard disks
* Works with IBM PC/XT, AT&T, COMPAQ, ZENITH and most compatibles

SPECIFICATIONS:

* Direct drive instead of belt driven tape drive
* Tape speed: 90 inches per second
* Data transfer rate: 5 Mb per minute
* Recording density: 10,000 FRPI
* Tape drive I/O interface: QIC 44 (QIC 36 available)
* Tape format: QIC 24
* Error detection: CRC error check
* Tape capacity: 60 Mb (600 ft. cartridge)
* Software configurable: DMA Channel (1-3), Interrupt Address (IRQ 2-7), I/O Address (330-33F Hex)

Speed, accuracy, quality engineering and construction, adds up to the very best backup that money can buy...Guaranteed!
For additional information on this and other high quality AIC computer systems and products call.
DEALER ENQUIRIES INVITED.

IBM PC/TT, PC/AT, IBM PC network are trademarks of IBM Corporation.
AT&T, COMPAQ and ZENITH are trademarks of respective Corporations.
AST PC net are trademarks of AST Corp., and ORCHID PC net are trademarks of ORCHID Corp.

AIC

Access Information Concepts, Inc.
"Tomorrows technology today"
Circle 715 on reader service card

Eastern Office:
1372 Broadway, 17th Floor
New York, NY 10018
(212) 221-8764

Western Office:
88 Glen Carran Circle
Sparks, Nevada 89431
(702) 356-2714

who have to manage something bigger than a little black book and less complicated than a company's accounts payable and receivable. The program has all the capabilities of *PC-File III*, plus a scaled-down word processor that makes it easy to turn out personalized form letters quickly, a macro processor that can save keystrokes when making complicated queries, and a surprisingly versatile report writer. From *PC-File/R*'s main menu it's simple work to define, add, modify, delete, or find a record. Because *PC-File/R* is RAM-based (like *1-2-3*), operations are generally swift (see Figure 2). Although you can't work on gargantuan files, the program only soaks up 47K, leaving over half a megabyte of workspace on a 640K PC. Other vital statistics: A file can hold nearly 33,000 records and a record, 42 fields totaling 16K of data.

If you've tried generating mailing labels and form letters with the *WordStar, MailMerge*, and *dBASE* triumvirate, you'll appreciate the seamlessness of *PC-File/R*'s merge feature. You don't have to create a separate data file with names, addresses, and so on delimited by commas (a notoriously error-prone process) because the necessary data is already in a *PC-File/R* data base. You merely insert the field names from the data base (such as *city*) into a form letter and press <Alt>-<F5> to start the merge process.

Data entry is similarly straightforward. Pressing <F1> displays a form listing the current file's fields. As you enter data, you advance to

(continues)

AN OLD RESPECTED NAME.
A BOLD NEW LOOK.

Computer Mail Order is one of the oldest computer mail order companies in the country. We've succeeded where others have failed, because year after year, we've delivered to you the most product performance for your dollar and given you the attentive service you desire and deserve.
This month we launch a new look. We hope you'll find it as easy on your eyes as Computer Mail Order has been on your pocketbook.
We also hope you'll do us the honor of calling us C-M-O.

FINE PRODUCTS.

When you call CMO toll-free, you order from a selection of the finest computer hardware, software and peripherals available. More than 5000 items from the best sources in the business (including PC-TOO,™ the tailor-made clone, direct from CMO!).

FINE PRICES.

Call us. Compare us. Talk to us. We won't hang up. We like talking price as much as we like talking computers.

FINE SERVICE.

We know computers. And we back that product knowledge with our best warranty package ever. And we deliver with next-day shipping on our entire inventory. At CMO, we're committed to keeping you up, running and satisfied.

NO FINE PRINT.

We're CMO. No hot air. No come-ons. No hang-ups. And no fine print.
Turn the page. Explore CMO.

usiness, person to person.

PRINTERS.

Canon
LBP-8A1 Laser, 8 Page/Min...$1899.00
Citizen
MSP-10 160 CPS, 80 Col.....319.00
MSP-20 200 CPS, 8K Buffer.....349.00
Premier 35 35 CPS Daisywheel.499.00
C.Itoh
8510-SEP Epson/IBM 80 Col.....call
Diablo
Model 635 RO Daisywheel.....1089.00
Epson
FX-85 160 CPS, 80 Col.....call
FX-286 160 CPS, 132 Col.....499.00
EX-800 300 CPS, 80 Col.....call
LQ-800 180 CPS, 24 Pin Head.....call
LQ-2500 324 CPS, 24 Pin Head.....call
Juki
6100 10 CPS, Daisywheel.....call
6200 30 CPS, Daisywheel.....call
6300 40 CPS, Diablo Compatible...call
5510C Color Dot Matrix.....call
NEC
P5, P6, P7, Pinwriter Series.....call
3550 35 CPS, Spinwriter.....779.00
8850 55 CPS, Spinwriter.....1099.00
Okidata
ML-192 160 CPS, 80 Col.....319.00
ML-193+ 200 CPS, 132 Col.....call
ML-293 200 CPS, 132 Col.....call
Panasonic
KX-1091 120 CPS, 80 Col.....call
KX-1092 180 CPS, 7K Buffer....339.00
KX-1592 180 CPS, 132 Col.....439.00
Star Micronics
NX-10 120 CPS, 80 Col.....239.00
SR-15 200 CPS, 132 Col.....549.00
Texas Instruments
TI-865 150 CPS, 132 Col.....749.00
Toshiba
P321 216 CPS, 24 Pin Head.....479.00
P351 288 CPS, 24 Pin Head...1049.00

DISKETTES.

Maxell
MD-2 DS/DD 5¼".....$12.99
MD-2HD Hi Density 5¼".....24.99
Sony
MD2D DS/DD 5¼".....11.99
MD2HD Hi Density 5¼".....24.99
MFD-2DD DS/DD 3½" 5 pak.....9.99

MS/DOS SYSTEMS.

AT&T 6300.....from $1699.00
Compaq.....from 1699.00
Cordata.....from 899.00
IBM-PC.....from 1099.00
IBM-XT.....from 1699.00
IBM-AT.....from 2699.00
Leading Edge.....from 999.00
Sperry.....from 1299.00
Zenith.....from 999.00

MULTIFUNCTION CARDS.

AST
Six Pak Plus PC/XT.....$169.00
Six Pak Premium PC/XT.....349.00
Advantage IBM/AT 128K.....339.00
Rampage-PC.....279.00
Rampage-AT.....479.00
DCA
IRMA 3278 I/O.....839.00
Everex
EV-210 Evergraphics Mono.....139.00
EV-640 Edge Card.....259.00
Hercules
Color Card.....159.00
Graphics Card.....199.00
Graphics Card Plus.....209.00
IDEAssociates
IDE-5251 Emulation Board.....579.00
Intel
1110 PC-Above Board.....call
2010 AT-Above Board.....call
8087, 80872, 80287, 802878.....call
Paradise
Modular Graphics Card.....269.00
Color/Mono Card.....139.00
Multidisplay Card.....169.00
Quadram
Quad EGA+ Graphics Adapter.369.00
Quadport-XT I/O Card.....119.00
Silver Quadboard.....239.00
Microfazer II Print Buffer.....259.00
STB
EGA Plus w/Dr. Halo.....299.00
Video-7
Vega Video Adapter-EGA.....299.00
Zuckerboard
Color Card w/parallel.....89.99
Monochrome Card w/parallel.....99.99
576K Memory Card.....59.99

CM Only!
Norton Software
Norton Utilities 3.1
$49

CM Only!
Quadram
Expanded Quadboard
$129

CM Only!
Amdek
Video 410 Green TTL Monitor
$149

CM Only!
Hayes
Smartmodem 1200B Internal
$349

CM Only!
Paradise
Auto-switch EGA Card
$359

CM Only!
CMS
20MB Internal Drive with controller
$379

CM Only!
Toshiba
P341 216cps 24 Pin Printhead
$589

CM Only!
Zenith
Z-181 Portable Computer System
$1849

When you want to talk computers. When you want to talk price. Call toll-free: 1-800-233-8950.

Outside the U.S.A. 717-327-9575 Telex 5106017898
CMO. 477 East Third Street, Dept. B211, Williamsport, PA 17701
All major credit cards accepted

CMO. Doing business-to-b

Person to person.

I have been in the retail business since 1971. I have always required my sales people to work hard, to know the products they sell and to be as helpful and informative as they can be in dealing with clients. The other day I read a letter from a client of ours addressed to my sales manager. The letter described a situation where the client was debating what system he should buy. Then he discussed his conversations with Ken Rinehimer, the sales consulant for CMO.

The following is an excerpt taken from that letter.

"One of the biggest arguments the local retail stores use in arguing against the purchase of goods from a mail order company is that 'you get no personal attention.' In my dealings with your company, I found that to be untrue."

"Recently I purchased a computer system from your company. My salesman was Ken who was the epitome of what a salesman should be...Ken was most helpful and professional. He was informative, giving recommendations as to the configuration the system should take and demonstrated a vast knowledge of what he was selling. In short, my experience with your firm was very good because of Ken Rinehimer who projects an excellent impression for CMO." It was signed Terrence Freeman, Stuart, FLA.

I like reading letters like this. In fact, knowing our staff at CMO, I expect to read letters like this. And you should expect good service from us.

One final note: It's nice to get good news like letters from Mr. Freeman. But it's probably more important to hear about your frustrations. As good as we get at what we do, there are bound to be occasional problems. Please share them with me. We want to keep pushing. To do that, we need your help.

R. Scott Stauffer

Marketing Director
CMO

SOFTWARE.

Ansa
Paradox.....$489.00
Ashton-Tate
d-Base III+.....429.00
Framework II.....429.00
Borland
Reflex.....99.99
Lightening/Word Wizard.....99.99
Central Point Software
Copy II PC.....24.99
5th Generation
Fastback.....89.99
IMSI
Mouse w/Dr. Halo.....119.00
IUS-Sorcim
General Ledger.....299.00
SuperCalc III.....319.00
Super Project Plus.....299.00
Lifetree
Volkswriter III.....119.00
Lotus
Lotus 1•2•3.....329.00
Symphony.....439.00
MECA
Managing Your Money.....119.00
MicroPro
Wordstar 2000+.....299.00
Wordstar Professional w/GL Demo189.00
Microrim
R:Base System 5.....349.00
Micro Soft
Micro Soft Word.....289.00
Micro Soft Mouse/Serial.....139.00
Micro Soft Mouse/Bus.....139.00
Microstuf
Crosstalk XVI.....89.99
Multimate International
Multimate 3.3.....219.00
Multimate Advantage.....269.00
Norton Software
Norton Utilities 3.1.....49.99
Software Publishing Group
PFS:First Choice.....99.99
PFS:Professional Write.....129.00
PFS:Professional File.....159.00
Satellite Systems
Word Perfect 4.1.....219.00
The Software Group
Enable.....369.00

MONITORS.

Amdek
Video 310A Amber TTL.....$149.00
Color 600 RGB, IBM CGA.....399.00
Color 722 RGB, CGA/EGA.....499.00
Magnavox
8CM515 RGB Monitor-80.....289.00
7BM623 PC Monitor-80.....99.99
NEC
JB-1280 12" Green TTL.....129.00
JC-1401P3A Multi-Sync.....IN STOCK
Princeton Graphics
MAX-12 12" Amber TTL.....169.00
HX-12 12" Color RGB.....429.00
SR-12 12" Hi-Res RGB.....499.00
Taxan
640 12" Hi-Res RGB.....529.00
Teknika
MJ-22 13" RGB/Comp. Hi-Res..279.00

MODEMS.

Anchor
Expressi 1200 Half-Card.....$149.00
Everex
Evercom 920 1200 Baud Int.....139.00
Evercom 940 2400 Baud Int.....259.00
Hayes
Smartmodem 1200 External.....389.00
Smartmodem 2400B Internal.....539.00
Practical Peripherals
Practical Modem 1200 External.169.00

DRIVES.

CMS
Drive Plus 20MB Int. Card.....$399.00
T-120 20MB Tape-Backup.....469.00
T-160 60MB Tape-Backup.....699.00
Everex
Stream 60 60MB Tape-Backup..749.00
Iomega
A210H 10+10 Bernoulli Box...1899.00
A220H 20+20 Bernoulli Box...2499.00
Mountain
Drive Card 20MB Internal Card.689.00
Drive Card-30.....949.00
Priam
Priam ID-60AT Tape-Backup.....1349.00
Seagate
ST-225 20MB w/Controller.....399.00
ST-4038 30MB Hard Drive.....599.00

GET A TAILOR-MADE, 20 MEG, XT-COMPATIBLE FOR AS LITTLE AS $999.

Presenting PC TOO.™ Only from CMO.

When you think of tailor-made, you think expensive, right? Think again.

Now CMO can offer you a 20 Mb PC-compatible—one we assemble in our Pennsylvania lab just for you. To your specifications. With the attention to quality and performance you've come to expect from CMO. All for just $999.

Every tailor-made clone we make is backed with a full 90-day warranty on labor and parts, a 30 day money back guarantee and easy access to CMO technical support after the sale—the kind that keeps you up, running and satisfied.

For $999, you get: A 20 Mb, PC-XT compatible that runs thousands of programs, including Lotus 1-2-3™ ■ A 4.77 Mh chip speed ■ An XT chassis with 256K (expandable to 640K) ■ A 20 Mb hard drive ■ A 360K floppy drive ■ A floppy disk and hard drive controller ■ A 150 watt power supply (not just 130) ■ Open architecture with 8 expansion slots (not just 7) ■ And an 84-key, XT-style keyboard.

Need more power and more flexibility? Call us. Let's talk about your tailor-made PC TOO.

Your options are unlimited.

CMO. Policies and particulars.

Next day shipping on all in-stock items. • Free technical support from our own factory-trained staff. • Toll-free order inquiry. • No surcharge on VISA or MasterCard orders. • Credit cards will not be charged until the order is shipped. • No limit and no deposit on COD orders. • No sales tax on orders shipped outside PA. • No waiting period for cashier's checks.

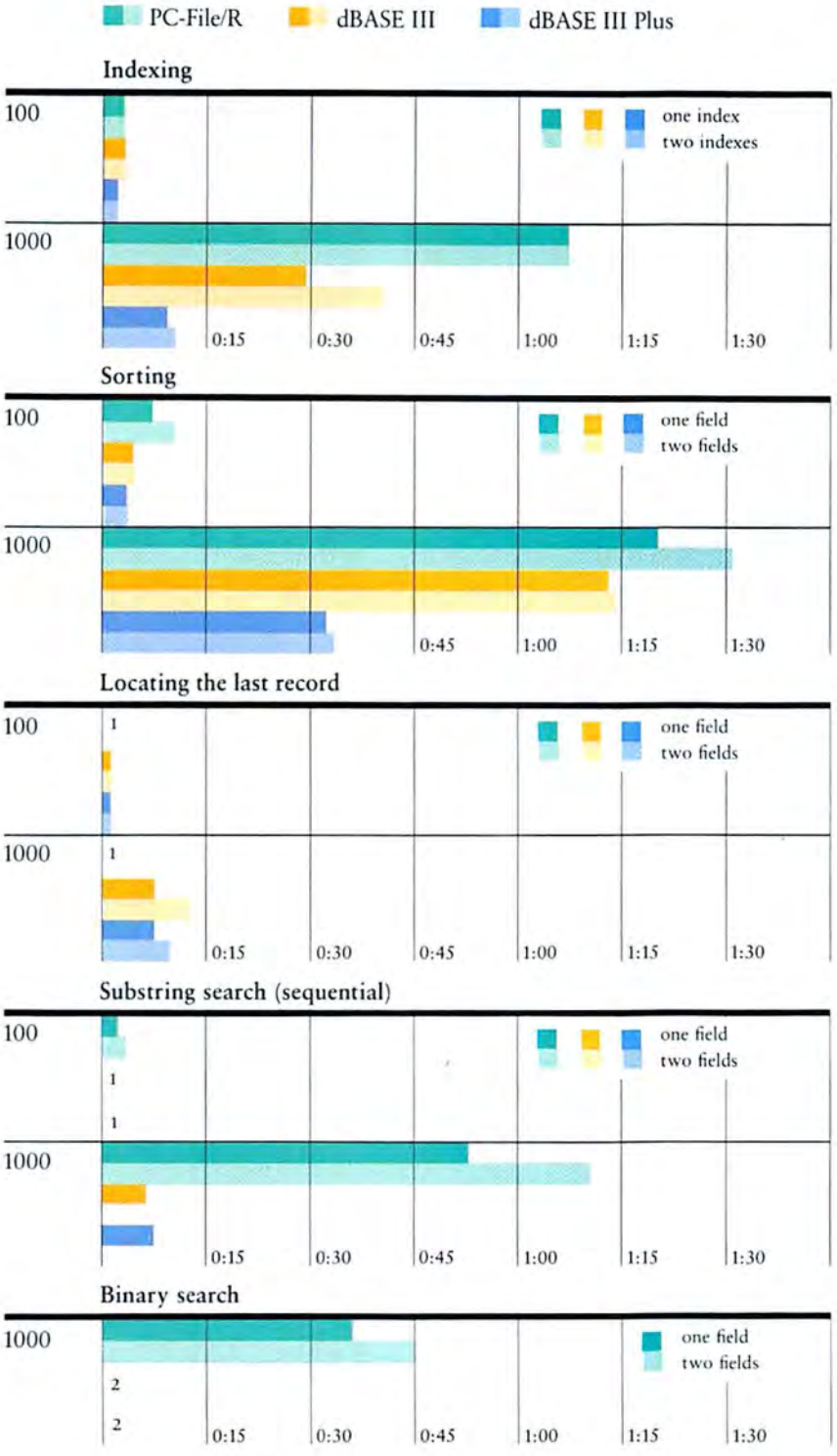
SHIPPING. Add 3% (minimum $7.00) shipping and handling on all orders. • Larger shipments may require additional charges. • Returned items may be subject to a restocking fee. • All items subject to availability and price changes.

EDUCATIONAL INSTITUTIONS: 1 800 221-4283

When you want to talk computers.
When you want to talk price.
Call toll-free: 1 800 233-8950.

Outside the U.S.A. 717 327-9575 Telex 5106017898
CMO. 477 East Third Street, Dept. B211, Williamsport, PA 17701
All major credit cards accepted

Figure 2: PC File/R side by side with dBASE III and dBASE III Plus (times shown in minutes:seconds)



[1]Less than .5 second
[2]dBASE III and dBASE III Plus cannot perform binary searches

(continues)

CopyWrite

Backs up IBM PC software

Hundreds of the most popular copy-protected business and educational programs are easily copied, to protect you against accidental loss of your software.

System requirements are an IBM PC, XT or AT, 128K or more of memory and at least 1 diskette drive.

Revisions to CopyWrite are published monthly to keep up with the latest in copy-protection and are available for $15.00 U.S.

"Quaid Software Ltd's CopyWrite is a copy program and nothing else, but it's probably the best"

"The progam is easy to use and does exactly what you expect"

Jared Taylor Jan 1986 PC Magazine.

Protect your software. Order CopyWrite today by calling (416) 961-8243 or return the coupon below. All orders shipped at our expense within a day.

CopyWrite $50.00 U.S.
☐ Check (Drawn on U.S. or Cdn. Bank)
☐ Money Order
☐ AMEX ☐ VISA ☐ MASTERCARD
Card No_____
Expiry Date _____
Name_____
Company _____
Address_____
City_____
State _____ Zip _____
Signature _____

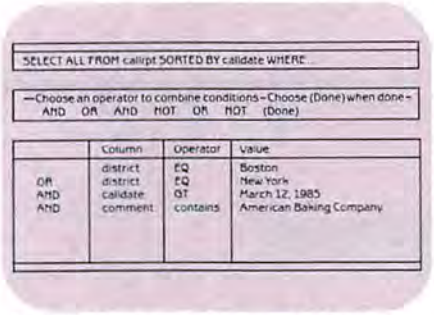
45 Charles Street East
Third Floor, Dept. 220
Toronto, Ontario M4Y 1S2
(416) 961-8243

Quaid Software Limited

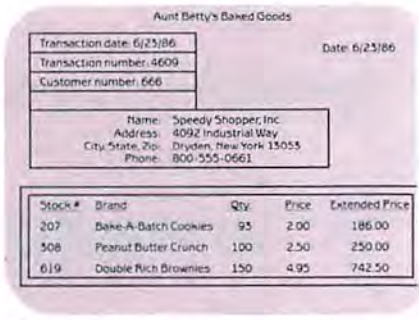
CopyWrite is not for use in producing software copies for sale or trade.
To run copy-protected software from your hard disk, ask about ZeroDisk.

NOW. POWERFUL WITHOUT POWE

A typical DBMS user's screen, after the 497th line of code.



An R:BASE System V Prompt-By-Example (PBE) screen. With PBE's query capabilities, you can retrieve just the information you need. Without programming.



A data entry screen designed without programming, using Forms EXPRESS.

With most database management software for the IBM PC family and compatibles, you're quickly confronted with a painful reality: the only way to make your package live up to its promise is to learn its programming language. Which can take months. Then you have to write the code, line after frustrating line.

But now, there's R:BASE™ System V. And for the first time, you can quickly create programs that automate your most important data management tasks. Without programming.

Of course, with R:BASE System V, you can enter, query, and report on data in a non-automated, ad hoc fashion. Without programming. And there's a high-level procedural language for programmers. But that's just the beginning.

R:BASE SYSTEM V. IT GIVES NON-PROGRAMMERS POWERFUL PROGRAMS.

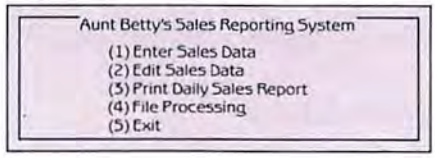
With the EXPRESS System in R:BASE System V, you can access powerful features, without programming, that other data management software can't touch.

With Definition EXPRESS, you can build a database structure with advanced features like computed columns, and *searchable* note fields. VIEWS that combine up to five tables in a single, powerful table. Data validation rules that check incoming data for errors. All without programming.

Then you can use Forms EXPRESS to create customized data entry forms. The forms you create can load data into five different tables, linked in One-To-Many relationships. You can also include scrolling regions, custom borders, and custom colors, all without programming.

And with Reports EXPRESS, you can design reports exactly the way you want. And see what they'll look like, right on the screen. To see how complex your reports can be, take a close look at the example at the end of this page.

Finally, you can tie it all together with Application EXPRESS. First, you design your own multi-level system of menus. Your first menu level might look like this:



For each menu choice, you assign an action. For example, to define menu choice #3, choose the actio "PRINT," select the report you just created in Reports EXPRESS and specify the appropriate data sorting and selection criteria. Then Application EXPRESS auto matically writes the program cod

Which means you've just created a very sophisticated program to deliver the full power of your DBMS. And you've done it a without learning how to program From this point on, every time yo want to run a report, all you do is choose item #3. With one simple keystroke, you've got it.

R:BASE SYSTEM V. IT GIVES PROGRAMMERS A POWERFUL ENVIRONMENT.

If you're an experienced pro grammer, you can use R:BASE System V to tackle the most demanding applications. You can use Application EXPRESS to create prototypes faster than wit any other microcomputer-based DBMS.

There's a high-level procedural language, and a full set of relational operators that can lever age up to 80 tables, all of which can be open at once. While you're racing along, a data dictionary

DBMS PROGRAMS RFUL DBMS PAIN.

keeps track of the action. Automatically.

For demanding analyses, there's a set of 70 math, statistical, financial, scientific, and string manipulation functions. You also get more capacity for your data. Comprehensive menu-driven import/export capabilities. Superior relational power. And much, much more.

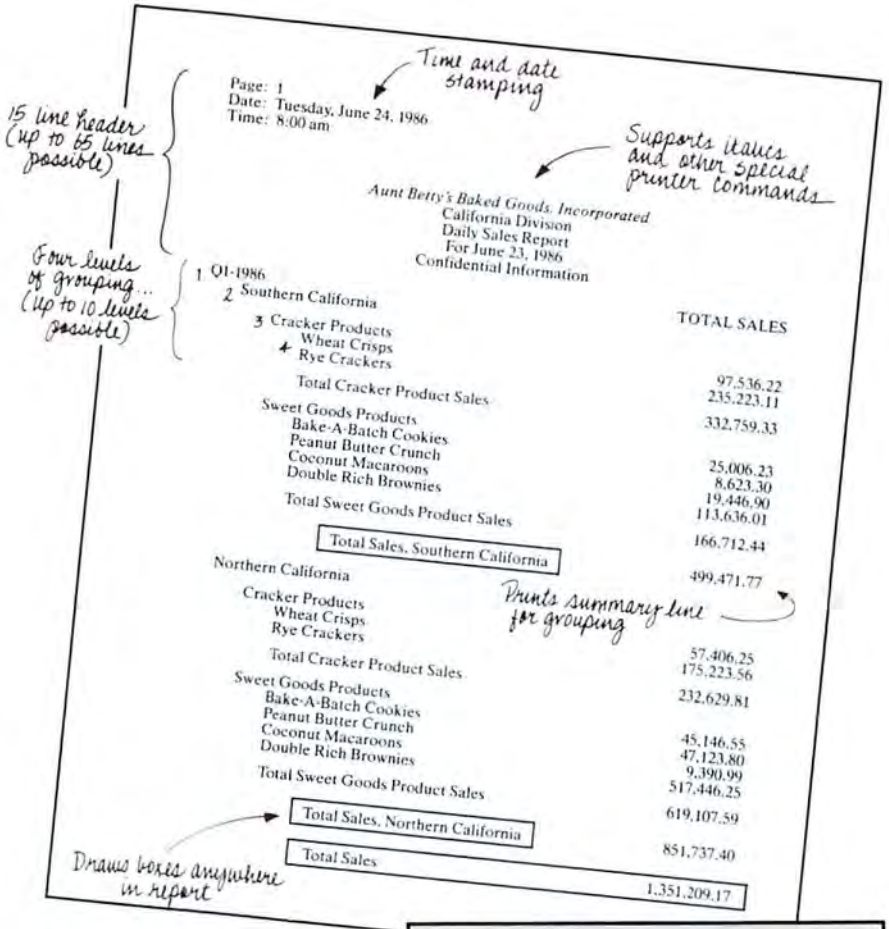
THE MOST POWERFUL DBMS FOR ONE USER OR A WHOLE NETWORK— ALL IN ONE PACKAGE.

In addition to its standalone personal computing power, R:BASE System V has all the features you need to share data on a local area network (LAN) built right in. When you're ready to network—now or later—this is the only DBMS package you'll ever need. And no matter how many users you add, you'll never have any growing pains. Because an unlimited number of users, attached to a LAN, can access R:BASE System V.

SEE FOR YOURSELF: $15.95.

We're confident you'll find R:BASE System V the shortest distance to your data management solution. Visit your computer dealer for a trial run. Or, if you prefer, we'll send you a Trial Pack for only $15.95, plus shipping. It's a fully functional, row-limited version of R:BASE System V. Just call 1-800-547-4000, Dept. 987 In Oregon or outside the U.S., call 1-503-684-3000, Dept. 987

What if you already own R:BASE 5000? If you bought your copy before June 30, 1986, you can trade it for the full power of R:BASE System V. For only $99. (Offer expires January 31, 1987.) Just give us a call at 1-800-248-2001. Outside the U.S., call 1-206-885-2000.



A program to print this report daily, with a one-keystroke menu pick, was developed without programming using R:BASE System V's EXPRESS Technology. Whether you know how to program or not, R:BASE System V is the shortest distance to your data management solution.

NEW R:BASE SYSTEM V FROM MICRORIM

ademarks/Owners: Microrim,
BASE/Microrim, Inc.; IBM/International
siness Machines, Inc. ©1986 Microrim, Inc.

each field by pressing <Enter> or the <Tab> key; <F10> confirms the entries. *PC-File/R* even provides a measure of data validation. With a few quick menu selections, you can limit a field to certain characters and formats (such as Social Security numbers), fill it with a set value or the sum of other fields, or designate it as a lookup field that draws data from another file.

Querying is equally stress-free. You can define searches based on exact matches, partial matches, or "Soundex"—words that are spelled differently but sound similar. Although the program typically searches through a file sequentially, you can specify that a field be found with a binary search, speeding the process by as much as 80 percent.

Generating reports is the bread and butter of any data manager, and ButtonWare has wisely provided *PC-File/R* with a capable yet simple report writer. The program gives you a choice of two report forms. The first confines each record to a line, while the second prints only one record per page, with the fields listed in order of creation from top to bottom. If you want something fancier, you can order the fields as desired and position them on the page by prefacing the field names with column numbers. Once you've created a custom report format, you can save it and use it later. You can't, however, apply it to a different data base unless the file structures match exactly.

PC-File/R's tautly written user manual skips conceptual treatments of data management and

(continues)

FAST • EASY • PRICED RIGHT

Widely acclaimed because it's FAST EASY and PRICED RIGHT (still only $65), TurboTax may be the best software purchase you ever make!

FAST TurboTax calculates a complete tax return in just three seconds. No kidding! This speed is just the ticket you need for finding the best way to file. "What-If" calculations are a snap at three seconds a pop!

EASY TurboTax is easy to use. Pop-up menus and windows abound, creating the most natural computer interface you're likely to see. Look at these features:

- **On-line help**
- **Pop-up menus**
- **Over 30 forms**
- **Pin-fed 1040s included**
- **Full depreciation support**
- **Automatic supporting schedules**
- **Pop-up calculator and notepad**
- **Full override capability**
- **1987 planning included FREE!**
- **IRS approved printouts on your personal printer**

PRICED RIGHT Simply put, TurboTax is the best tax preparation program available anywhere. And the price is so low, it makes the competition blush. To get yours, see your local dealer, or order direct. $65+$5 shipping. CA residents 6% sales tax. Visa/MC accepted. Integrated state returns available for most states—only $40 each. 30-day money-back guarantee. **$65**

CRITICS AND USERS AGREE

1986 PC WORLD WORLD CLASS AWARD

"World Class Winner"—PC World readership, October 1986. "TurboTax is fast to learn, fast to use, fast to print your return."—Jim Seymour, syndicated columnist, March 1986. "TurboTax takes the prize for most forms . . . our favorites for this review were TurboTax . . ."—InfoWorld, March 1986. "Flexible, Affordable and Complete"—PC Magazine, April 1986. "It makes doing your taxes almost fun."—Bill Alvernaz, PC Magazine, April 1985.

TURBOTAX FORMS LIBRARY
Form 1040, Schedules: A-B-C-D-E-F-G-K1-R-SE-W-ES, Forms: 2106, 2119, 2210, 2441, 3468, 3903, 4136, 4255, 4562,4684, 4797, 4952, 4972, 6251, 6252. Plus Worksheets: D, E, Depreciation & What-If.

TAX PREPARERS:
Our professional level software, TurboTax ProSeries/1040 has in-house tax return processing capability. Over 50 forms, four ways to print returns (incl LASER), client letter, time and billing, client file manager, batch printing and more. Integrated state packages for 26 states. We also have the best 1120, 1120S and 1065 packages you will find anywhere.

ChipSoft, Inc.
4901 Morena Blvd. #801 San Diego, CA 92117
(619) 581-2233.

Dealers circle 871 on reader service card
End users circle 60 on reader service card

In the world of high performance spreadsheets

SuperCalc 4 is #2. And coming up fast.

SuperCalc®4 has become the world's number two integrated spreadsheet, because businesses are discovering that we listen to their needs:

Flexible site licensing. Lotus 1-2-3* Release 1A and 2 compatibility. No copy protection. And a maintenance program that includes all future upgrades free.

And now SuperCalc4 delivers even more winning features, performance and compatibility. No wonder SuperCalc4 is the pick of more and more businesses. They know it goes the distance. Try SuperCalc4. Find out what it can do for your business.

Free trial offer:

Just call Terry Smith at
1-800-227-0112.
In California, call 1-800-228-1090.
In Canada, call 1-800-663-6904.

COMPUTER ASSOCIATES™
Software superior by design.™

The way is CA

Circle 823 on reader service card

© 1986 Computer Associates International, Inc. *Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

telemart

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

2222 East Indian School Road / Phoenix, Arizona 85016

ORDE
LINE

1-800-426-6659

Your Hardware and Software Source

$449

MiT SYSTEMS

Turbo PC/XT

256K Memory, One 360K Brand Name Floppy Drive, 135 Watt Power Supply, Slide Case, AT Style Keyboard, 8 MH$_z$ Clock Speed, (Keyboard Selectable) 8 Expansion Slots

FCC Approved Non-Infringing Bios Four Layer Mother Board
All First Quality Materials
1 Year Limited Warranty

FREE AIR EXPRESS SHIPPING
You Pay the Ground
We Pay the Air

IBM Compatible

Call For Pricing on Peripherals and other System Configurations

SOFTWARE

WORD PROCESSORS

Easy	$ 55
Leading Edge Word Processor	42
Leading Edge W/P with Spell & Merg	72
Turbo Lightening	55
Microsoft Word 3.0	249
Multimate 3.3	203
Multimate Advantage	269
PFS: Write w/Spell Checker	76
Volkswriter 3	136
Volkswriter Scientific	239
Word Perfect (Ver. 4.1)	199
Wordstar w/Tutor 3.31	162
Wordstar Pro Pack 3.31	233
Wordstar 2000 Plus 2.0	278

UTILITIES

1 DIR	$ 46
Copy II PC	19
Copywrite	39
Desqview	55
DR DOS	27
Fastback	86
Homebase 2.0	32
Gem Collection	109
Gem Desktop	27
Keyworks	49
Microsoft Windows	55
Norton Utilities 3.1	48
PC Tools	19
Printworks	36
Prokey 4.0	69
Sidekick	30
Sidekick/Superkey Bundle	85
Sidekick (Unprotected)	47
Sideways 3.1	34
Superkey	39
Turbo Editor Tool Box	38
XTree	27

GRAPHICS/MICE

Chartmaster	$199
Click Art Personal Publisher	99
Diagram Master	185
Enercharts	179
Energraphics 2.0	269
Gem Graph	137
Gem Word Chart	82
Harvard Presentation Graphics	215
In-A-Vision	249
Microsoft Buss Mouse	106
Microsoft Chart	164
Microsoft Serial Mouse	119
News Room	31
PC Buss Plus Mouse with Paint Plus	115
PC Draw	199
PC Mouse w/Dr. Halo II	99
PC Mouse w/Paint Plus	115
PFS: Graph	76
Printmaster	29
Print Shop	32
Signmaster	132
Turbo Graphix Tool Box	Call
Windows Draw!!	102

ACCOUNTING

Accounting Partner Plus w/Inventory	$599
BPI – G/L, A/R, A/P, Payroll	279 ea.
CYMA	Call
DAC Easy Accounting	39
DAC Easy Payroll	28
In-House Accountant	86
One Write Plus	143
Open Systems-G/L,A/R,A/P,Payroll 3.0	395 ea.
Peachtree – G/L, A/R, A/P, Payroll	249 ea.
Sorcim/IUS – G/L, A/R, A/P	299 ea.
State of the Art–G/L,A/R,A/P,Payroll	369 ea.

ACCESSORIES

Copy II Option Board	$ 75
Masterpiece	84
Masterpiece Plus	113
Summasketch 12x12 Tablet	339

LANGUAGES

Basic Compiler (Microsoft)	$219
C Compiler (Microsoft)	249
Cobol Compiler (Microsoft)	386
Fortran Compiler (Microsoft)	195
Lattice C Compiler	242
Macro Assembler (Microsoft)	84
Run C Interpreter	59
Pascal Compiler (Microsoft)	166
Quick Basic 2	55
Turbo Jumbo Pack	Call
Turbo Pascal w/8087 & BCD	59
Turbo DataBase Tool Box	Call
Turbo Prolog	54

TRAINING

Flight Simulator	$ 28
Mastertype	23
Mind Prober	25
PC Logo	75
Turbo Tutor	Call
Typing Instructor	28
Typing Tutor III	28

MONEY MANAGEMENT

Dollars & Sense w/Forcast	$ 94
Home Accountant Plus	76
Tobias Managing Your Money	Call

COMMUNICATIONS

CompuServe Starter Kit	Best Price
Crosstalk XVI	$ 92
Microsoft Access 1.01	139
PFS: Access	76
Remote	92
Smartcom II	83

DISKETTES

Maxell MD-2 (Qty. 100)	$125
Sony MD-2 (Qty. 100)	119

SPREADSHEETS

Lotus 1-2-3 Ver. 2.01	Call
Multiplan	$108
PFS: Plan	76
Spreadsheet Auditor 2.0	82
Supercalc 4	Call
Twin	52
VP Planner	49

DATA BASE MANAGEMENT

Clipper	$ 329
Clout 2	117
Cornerstone	67
dBase II	Call
dBase III Plus	Call
dBase III Lan	Call
Extended Report Writer	74
Knowledgeman II	249
Nutshell 2.0	Call
PFS: File	76
PFS: Report	67
Q & A	Call
Quickcode	138
QuickReport	138
Revelation	449
R:Base 5000 System V	Call
Reflex	82
Think Tank	91
VP Info	49

PROJECT MANAGEMENT

Harvard Total Project Manager	$262
Microsoft Project	219
Super Project Plus	239
Timeline 2.0	209

INTEGRATIVE SOFTWARE

Ability	$ 55
Enable 1.1	319
Framework II	Call
Smart Software System	379
Smart System Lan Pak	799
Symphony	Call

HARDWARE

PRINTERS

Brother Printers	Call
Citizen Printers	Call
Diablo D-25	509
Epson Printers	Call
Juki	
6100	429
6300	769
NEC	
P5,6,7 Series	Call
3550	735
8850	1049
Okidata Printers	Call
Panasonic Printers	Call
Star Micronics	Call
Toshiba	
321 Parallel & Serial	455
341 Parallel & Serial	635
351 Parallel & Serial	969

PLOTTERS

Epson HI-80 w/HPGL	$ 355

DISK DRIVES

Bernoulli Box	
10 Meg	$1195
20 Meg	1595
20 Meg Dual	1795
Segate 20 MG w/WD Controller	385

MODEMS

Anchor Modems	Call
Hayes	
Smartmodem 300	129
Smartmodem 1200	379
Smartmodem 1200B	315
Smartmodem 2400B	479
Prometheus 1200B w/Software	Call
US Robotics Password 1200	180
US Robotics Courier 2400	349

MONITORS

Amdek Monitors	Call
NEC Monitors	Call
Princeton Monitors	Call
Zenith Monitors	Call

BOARDS

AST	
Six Pack Plus	$ 155
Rampage	Call
Hercules	
Color Card	149
Graphics Card	179
Intel	
Above Board	Call
Orchid	
EGA	255
PC Turbo 186 w/256K	255
Tiny Turbo	415
Paradise 5 Pack	95
Quad EGA Plus	359
Quadlink	329
Tecmar Graphics Master	439
Tecmar Captain (No Memory)	109

KEYBOARDS

Keytronics 5151	$159

COMPUTERS

Compaq	Call
Panasonic	
Sr. Partner	$1165
Executive Partner	2129
Toshiba	
T-1100	1309
T-1100 Plus	Call
T-3100	Call
Zenith	Call

AMERICAN EXPRESS · MasterCard · VISA

• No Charge for VISA and Mastercard

- Ground Shipping & Handling $6.00
- Free Air applies ONLY to orders up to 10 lbs.
- Personal and Company Checks Will Delay Shipping 2 weeks
- Prices & Availability Subject to Change Without Notice
- Due to Copyright Laws No Returns on Software Purchases
- Add 3% for C.O.D. Orders
- **We Do Not Guarantee Machine Compatibility**

Mailing Address:
2222 East Indian School Road / Phoenix, Arizona 85016

- Order Line Hours: Mon-Fri 8:30-5:30 Saturday 9:00-1:00
- Order Processing: 602-224-9345 10:00 a.m. - 3:00 p.m. Monday - Friday

Circle 921 on reader service card

Can cut disk access time in half

Makes Your IBM PC LIGHTNING™ Fast!

$89.95 unprotected

$49.95, copy protected version with some limitations

Loads with the DOS — always ready as a background program (like Sidekick) to accelerate disk access. You do nothing — everything is automatic.

You are going to be so amazed when you start to work with ***LIGHTNING***™ installed. Most programs that frequently access the disk (hard disk or floppy) are made instantly faster — up to 2 to 4 times faster.

It is so easy to install and you never have to do anything again; it does it all for you — like lightning.

Disk instensive programs (like databases) can run 2 to 4 times faster.

LIGHTNING™ comes to you on a diskette. You simply load it onto your DOS diskette if you are using floppies, or if you have a hard disk, into the DOS area. Simple A-B-C instructions let you get it started the first time in five minutes. Then it is always ready, working automatically in the background any time you boot up. (The copy protected version is a "key diskette" and doesn't boot with the DOS.)

What's it like to use it? If you have ever worked with or seen a RAM Disk you know what a difference speed can make when working with any program that frequently accesses the disk. Well, ***LIGHTNING***™ enables those programs to approach the same rapid speed as a RAM Disk, but it does it without the disadvantages. With a RAM Disk there is a constant danger that you can lose your precious data if you forget to copy it back to the disk drive. With ***LIGHTNING***™ you just use your programs normally. You don't have to remember anything.

LIGHTNING™ has a fun feature that shows you just how fast you're operating. Any time you want, with a couple of keystrokes you can see a screen that keeps a record of how many times you've accessed the disk, and how much time ***LIGHTNING***™ has saved you. It's fun to check it out, and it's always astounding. Speed-up varies, depending on your application, frequency of disk access, and amount of RAM you can allocate. For example, best results occur with indexed databases.

When you work with a database program or most word processors, or any time you need to frequently load files into RAM or save them back, you are accessing your disk. It is such a pleasure to cut those times often in half and up to one-fourth.

Spreadsheets can speed up their loading and saving. Recalculation speed is not affected.

Another plus — ***LIGHTNING***™ fully exploits Above Board™ memory for PC's with that addition.

PCSG since early 1983 has dominated the lap portable market with ROM software such as Lucid spreadsheet and Write ROM that reviewers rated as excellent. We are proud to enter the IBM PC market with ***LIGHTNING***™. It's a great product that we not only enjoy offering, but enjoy using on our own PC's. It will support IBM PC, XT, and AT.

If you have an IBM PC or clone and don't have *LIGHTNING*™, we simply have done a poor job explaining it to you.

This is an exciting program. A typical comment from ***LIGHTNING***™ users is "I don't know how I ever did without it."

PCSG provides hotline support for the IBM PC.

(214) 351-0564

PERSONAL COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd., #206, Dallas, TX 75229

MC, Visa, American Express, Check, or C.O.D.

© PCSG

LIGHTNING™ PCSG 1985
Sidekick™ Borland Int.
Above Board™ Intel Corp.

Circle 236 on reader service card

Run Your Software 2 to 10 Times Faster!

No Additional Hardware (Cards or Chips) Required.

Introducing PolyBoost™
The Software Accelerator™

PolyBoost, a set of 3 memory-resident programs, speeds information flow to & from your computer's processor. 1, 2 or all 3 programs can be in loaded in memory. Operation is totally automatic & transparent. Only PolyBoost speeds up all three processor input/output (I/O) paths:

Requires DOS 2.0 or higher

Boost Disk Speed
A memory-buffer (disk cache) automatically speeds up hard or floppy disks by storing in RAM the data your software uses most often. You can set the cache size from 5K to 500K. Caches of up to 4 Megabytes each can reside in Expanded or Extended Memory. Unlike a RAM Disk, PolyBoost immediately writes all changed data to your physical disk to prevent data loss.

Boost Display Speed
Text scrolling & screen updates are FAST! You select the speed. Eliminates flicker in CGA cards. Also works with monochrome, EGA, & Hercules cards. (Uses only 4K RAM.)

Faster & Enhanced Keyboard
Adjust repeat rate for cursors & other keys. Increase size of type-ahead buffer. Optionally generate key clicks. Recall, edit & execute DOS commands. (Uses only 3K RAM.)

60 Day Money Back Guarantee

$79.95 + $5.00 S/H

VISA/MC ORDERS 1-800-654-5301 In CA (213) 493-2471 ext. 201
POLYTRON Corp. 1815 NW 169th Pl., Suite 2110 Beaverton, OR 97006 (Sales Agent CSSI)

For the IBM PC, XT, AT & Compatibles

Circle 804 on reader service card

UNLOCK™ Removes Copy Protection

Produces Unprotected Backup Copies

RUNS YOUR SOFTWARE ON ANY HARD DISK

UNlock "copying" disk allows you to make "unprotected" DOS copies of popular original program disks. **Unprotected backup copies** perform perfectly, as do copies of these copies. UNlock copies **run on any hard disk,** including Bernoulli Boxes. No original required in drive "A." **Run on a RAM disk** simply and conveniently. **Also, copy DOS 5¼" programs to 3½" diskettes.** For IBM® PC, XT, AT, compatibles, 256K or more, DOS 2.1 or higher. Choice of the critics!

Guaranteed to work only with programs below:

SPECIAL OFFER "Best of UNLOCK" ALBUM "D" PLUS **$74.95** (Plus $4 ship handling. Foreign orders $10)

- dBASE III & dBASE III PLUS™
- FRAMEWORK I & II™
- CLIPPER™
- FASTBACK™ (5.3)
- CHARTMASTER™ (6.1)
- SIGNMASTER™ (5.1)
- DOLLARS & SENSE™ (2.0)
- LOTUS 1-2-3™ (1A-2.0)
- SYMPHONY™ (1.1)
- LOTUS 1-2-3 REPORT WRITER™ (1.0)
- DOUBLEDOS™
- HARVARD TOTAL PROJECT MGR.™ (1.10)
- MANAGING YOUR MONEY™ (1.5, 1.51, 2.0)
- THINKTANK™ (2.0, 2.1)
- MICROSOFT WORD™ (1.15, 2.0, 2.01)

UNLOCK™ FLIGHT/JET #202 **$29.95**
• FLIGHT SIMULATOR™ • JET™ • SCENERY DISKS (Plus $4 ship handling. Foreign orders $10)

Recommended by the editors of: PERSONAL COMPUTING "The Best Software Utilities For Under $100"

TRANSEC UNLOCK™

ORDER TODAY TOLL FREE:
1-800-423-0772
IN FLORIDA: 1-305-474-7548

TranSec Systems, Inc., 220 Congress Park Drive, Delray Beach, FL 33445

Trademarks are the sole property of their respective owners. UNlock is for use only to improve the useability of legally acquired and operated software.

dives right into the specifics of getting a job done. Sample applications are provided, although the manual could expand on these and provide more coherent commentary. ButtonWare's technical support hot line isn't toll-free and is available only 4 hours a day during the week, but the staff is friendly and their advice reasonably helpful. For knottier issues, you can post questions on the company's electronic bulletin board system and later retrieve the answers.

With all the goodies *PC-File/R* has to offer, it may seem as if you're using a high-powered data manager. Keep firmly in mind that for all its merits, *PC-File/R* is no *dBASE*. It lacks a command language, and its relational capabilities are rudimentary at best, limiting the program's reporting and query features. ButtonWare also advertises features that the program's intended audience can't use. For example, company literature maintains that *PC-File/R* can exchange data with a number of programs, notably *dBASE*. Unfortunately, the program can't directly ingest a .DBF file in the manner of *Paradox*. You must first convert the *dBASE* file to ASCII, then import the result into a *PC-File/R* file that duplicates the *dBASE* file structure down to the last field. User-friendly this isn't.

But on the whole, *PC-File/R* is an excellent choice for the experienced PC user with occasional data management tasks or the novice who needs a fair amount of sophistication wrapped in *pfs:file*-like simplicity. What the program does—list processing, boilerplate letters,

(continues)

Powerful MS™-DOS Software.

For the IBM®-PC, XT, AT & others with generic MS-DOS/PC-DOS 2.0 or higher.

Not copy protected!

Only **$39.95** Each!

UTAH COBOL™

Whether student, teacher or professional programmer, this is the one you've heard so much about.

- ☐ It's easy to use. Compiles 5000 statements on a 128K machine.
- ☐ 170 clear error messages, i.e. DATA-NAME IS MISSING OR MISSPELLED.
- ☐ Distribute your object code programs royalty free.
- ☐ Small object code programs conserve disk space.
- ☐ Fast compile times to increase programmer productivity. Over 25 times faster than one compiler costing $995!
- ☐ You get a diskette and 213-page manual with lots of examples and 16 complete COBOL source code programs. **$39.95.**

Also available: COBOL Application Packages, Book 1 **$9.95.**

UTAH PASCAL™

- ☐ 14-digit precision, BCD math, no round-off errors with decimal arithmetic for business and floating point +63 −64 for scientific.
- ☐ A very nice TRACE style debugging.
- ☐ Arrays up to 8 dimensions and 64K strings.
- ☐ External procedures and functions with dynamic auto-loading.
- ☐ One-step compile, no assembly or link required.
- ☐ You get a 132-page manual and diskette. **$39.95**

UTAH PILOT™

- ☐ Perfect for industrial training, office training, drill and testing, virtually all programmed instruction, word puzzle games, and data entry facilitated by prompts.
- ☐ John Starkweather, Ph.D., the inventor of the PILOT language, has added a built-in full-screen text editor, and much more.
- ☐ Meets all PILOT-73 standards for full compatibility with older versions.
- ☐ You get a diskette, 125-page manual and ten useful sample programs. **$39.95.**

Also still available for 8-bit machines with CP/M® is our world famous Nevada Software Series used by 50,000 customers in 40 countries. These include Nevada COBOL, Nevada FORTRAN, Nevada PASCAL, Nevada PILOT, Nevada BASIC and Nevada EDIT. **$39.95** each.

Satisfaction guaranteed. If for any reason you're not completely satisfied, just return the package within 15 days in good condition, and we'll refund your money.

IBM is a registered trademark of International Business Machines Corp. CP/M is a registered trademark of Digital Research. MS is a trademark of Microsoft Corp. © 1985 Ellis Computing, Inc.

UTAH FORTRAN™

- ☐ FORTRAN IV based upon ANSI-66 standards.
- ☐ Very fast compile times and easy to use.
- ☐ IF . . THEN . . ELSE constructs.
- ☐ Chaining with blank and named common.
- ☐ Copy statement.
- ☐ ENCODE and DECODE.
- ☐ Free-format input and output.
- ☐ A very nice TRACE style debugging.
- ☐ 150 English language error messages.
- ☐ You get a diskette, and 223-page manual. **$39.95**

UTAH EDIT™

- ☐ A character-oriented full-screen video display text editor designed specifically to create COBOL, FORTRAN and PASCAL programs.
- ☐ Only requires 15K disk space so it can fit on the same disk as your compilers.
- ☐ Completely customizable tab stops, default file type, keyboard control key layout and CRT by menu selection.
- ☐ Diskette comes with easy to read 58-page manual. **$39.95.**

UTAH BASIC™

- ☐ This interpreter has a built-in full-screen editor.
- ☐ Single- and Multi-line user definable functions.
- ☐ BCD Math- no round-off errors.
- ☐ Full Matrix operations.
- ☐ You get 220-page manual and diskette. **$39.95.**

Handling/Shipping: No shipping charge within US. Overseas add $10 for first package, $5 each additional. Checks must be in US Dollars, drawn on a US bank.

Utah Software requires 128K RAM and PC-DOS or MS-DOS 2.0 or higher.

HOW TO ORDER. Send check or money order to Ellis Computing, Inc. with VISA or MASTERCARD order by phone. Sorry no COD's.

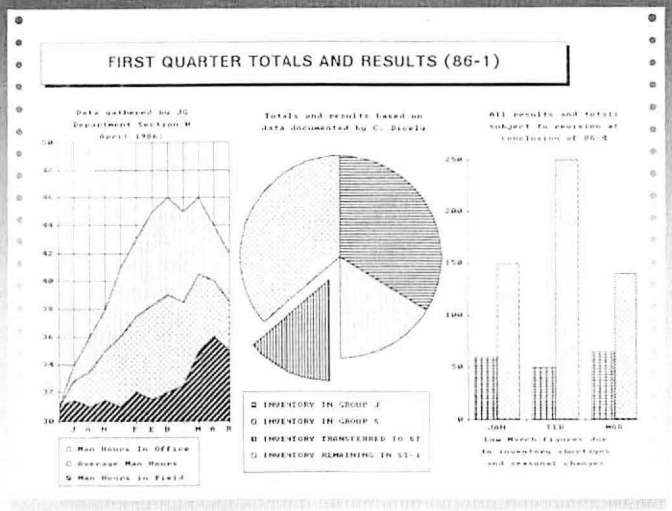
Ellis Computing, Inc.
5655 Riggins Court, Suite 10
Reno, Nevada 89502
Phone (702) 827-3030

SINCE 1977

ELLIS COMPUTING™

Circle 424 on reader service card

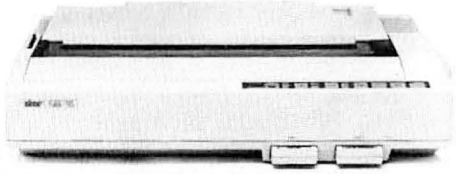
Quality



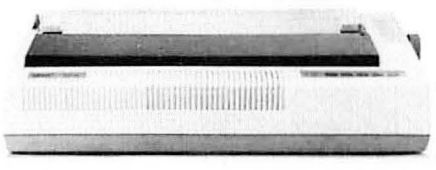
Quality in Star's line of advanced printers begins with the exceptional appearance of their letter quality printouts. They're crisp. Professional. The images sharp. And true letter quality is fast and quiet. But whether it's a spreadsheet, graphics, or a letter, all our printers give you Star quality output, because of Star's quality input.

We design our printers. We make our own precision parts. In fact, we even make the machines that make the parts.

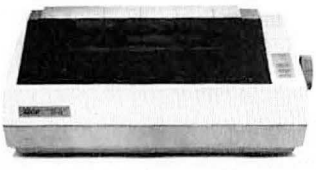
But what good is quality without control?



NB-15 *The top of the line 24-wire business printer. 300 cps draft 100 cps true letter quality.*

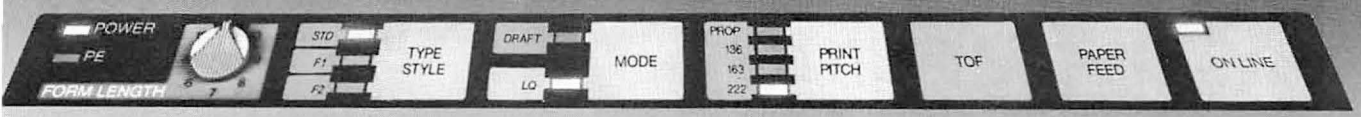


SR-10/SR-15 *The high speed printers for home or office. 200 cps draft 50 cps near letter quality.*



SD-10/SD-15 *The no-nonsense printers that are flexible and affordable. 160 cps draft 40 cps near letter quality.*

Control

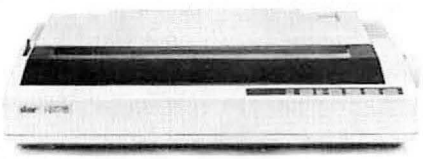


Control begins with the convenient front panel. With advanced features at your fingertips you'll find touch control throughout the entire line of Star printers.

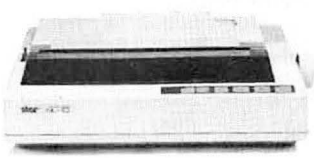
Our premiere printer, the 24-wire NB-15,™ lets you select draft or letter quality at a touch. Choose type style—either standard, or any two of five optional fonts. Print pitch—pica, elite, standard or proportional. And you can also feed in single sheets of paper automatically.

Star's line of printers also has standard memories ranging up to a 16K buffer that can expand to 32K. Draft speeds as fast as 300 characters per second (cps). True letter quality as fast as 100 cps. And of course, there's compatibility with all major personal and business computers.

Discover the quality and control of Star's entire printer line at participating ComputerLand and other computer products retailers.



NX-10/NX-15 *The economical printers that combine speed and convenience. 120 cps draft 30 cps near letter quality.*



NL-10 *The versatile printer with interchangeable interface cartridges. 120 cps draft 30 cps near letter quality.*

Circle 319 on reader service card

star®
micronics

200 Park Avenue
New York, NY 10166

Regional Offices:
Atlanta, GA (404) 441-3126
Chicago, IL (312) 773-3717
Irvine, CA (714) 768-7203

and simple reporting—it does well. But whether *PC-File/R* will leave its imprint on an already stratified data management market remains to be seen. *—Jeff Angus*

PC-File/R version 1.0
ButtonWare, Inc.
P.O. Box 5786
Bellevue, WA 98006
206/746-4296
List price: $149.95
Requirements: 256K, one disk drive, DOS 2.00 or later version
Not copy protected

Webster's New World On-Line Thesaurus

Just when you thought your PC's memory was on the verge of splitting its seams, along comes another "must have" memory-resident program. I refer, of course, to *Webster's New World On-Line Thesaurus,* required booting for anyone who writes with a PC. The program packs a finely honed selection of 120,000 synonyms and, more important, 20,000 root words that are automatically called upon when a lightning-bug of a word isn't immediately recognized. And therein lies the program's ultimate advantage over snazzier, better-heeled competitors.

Summoning a synonym is a matter of placing the cursor on a word and pressing the program's changeable <Alt>-T hot key. If *Webster's* doesn't find the exact word in its

(continues)

CANNED

Once you've tried FIRST AVENUE, You'll put the others to rest.

First Avenue™
Productivity for Office and Home.

Try FIRST AVENUE and you'll see the clear superiority of this very friendly yet powerful program. Imagine a program with *four times* the functions found in Sidekick™! As a new generation productivity tool, FIRST AVENUE helps you maximize your valuable time and improve your efficiency. It works the way you work. Speaks your language. Puts you in control of your office, and home, like no other program on the market.

- Organizes up to 100 of your applications programs for easy, instant and visual access. Start any program, or execute DOS commands, with a single keystroke.
- FIRST AVENUE's powerful communications feature links you to your secretary or staff and lets you send and receive electronic mail, files, and telephone messages . . . even while you're working on a program like Wordstar.™
- You can jump back and forth between FIRST AVENUE and programs like Lotus 1-2-3™ and dBASE II/III™ with just one keystroke. Juggle assignments and deal confidently with several projects at the same time.
- Organize your time, appointments, work-flow and other home and office details that put you in control. FIRST AVENUE's full-featured desk-top organizer includes: Weekly calendar. Daily and repetitive appointments files. Auto-dial with address and phone book. Tickler file with built-in clock. Memo and letter writer. Memo in/out box. Calculator. Index card filing system. Security password. And more.

$69.00 (Copy Protected, makes two copies) or $99.00 (Not Copy Protected). Shipping to U.S. cities included. Money back guarantee if not satisfied.

Computer Requirements: IBM PC, AT, XT or 100% Compatibles with 256K and Up. DOS 2.10 and up. Hard-disk recommended. Hayes compatible modem for communications.

VISA **TO ORDER CALL 1-800-843-6757** MasterCard
(In California call 213-804-1379, residents add 6½% tax.)
Send Check or M.O. to:
CANAL SYSTEMS
5230 Clark Avenue, Suite 33 • Lakewood, CA 90712
Dealer inquiries welcomed. Site Licensing available

Circle 863 on reader service card

© Eastman Kodak Company, 1986

It used to take up to $15,000 and a video technician to project real-time PC images. Now anybody can do it in five minutes for $1270.*

1.
Plug the unit into your PC.
2.
Place it on your overhead projector.
3.
Begin your real-time presentation.

New KODAK DATASHOW System

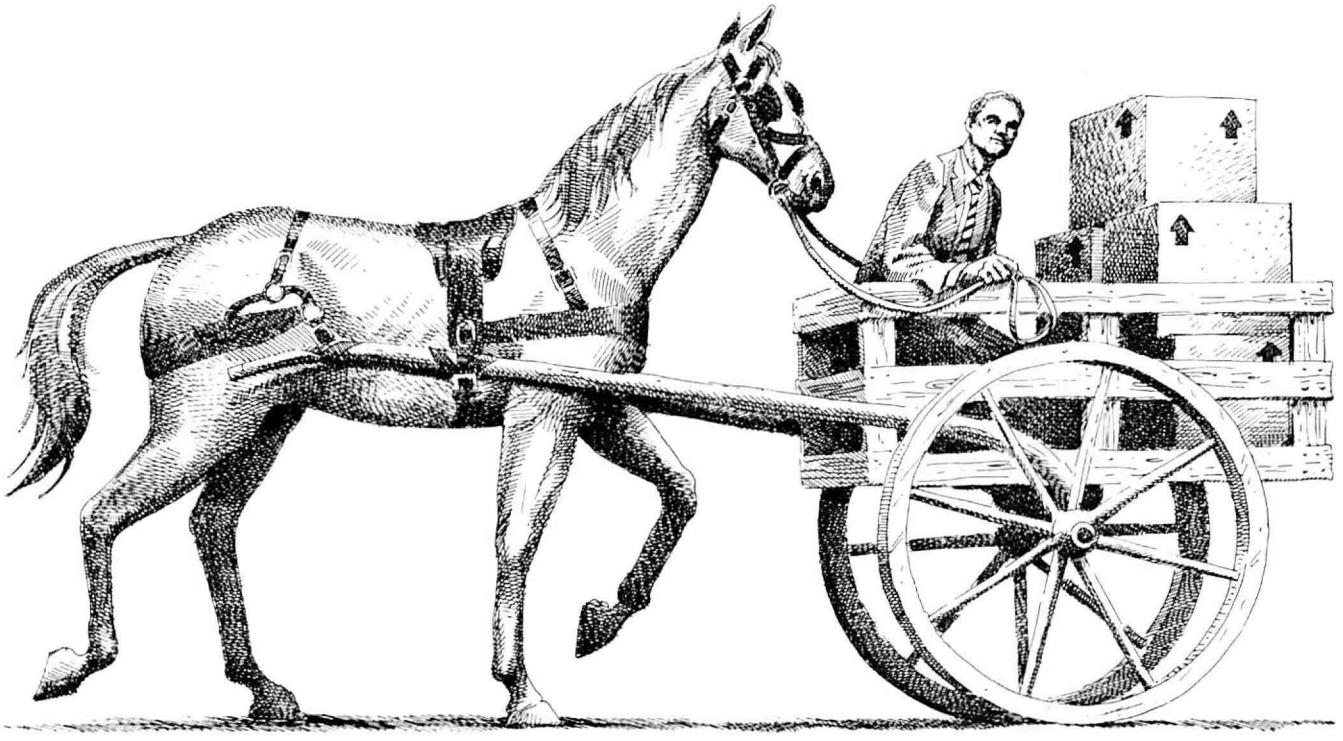
Just think of all the applications.
Call for details:

1 800 44KODAK, Ext 865
(1 800 445-6325, Ext 865)

The DATASHOW System is used with an IBM PC or 100% compatible computer.
*Price shown is Kodak's suggested price only. Actual selling price is determined by dealer.

Kodak
Eastman Kodak Company
Motion Picture and
Audiovisual Products Division

Circle 292 on reader service card



Any business that buys a computer without Pick faces one slight problem.

They're putting the cart before the horse.

Because without first considering the Pick Operating System, you'll probably get stuck with a system that won't expand with your needs.

Pick is the one operating environment that grows with you. For example, you can start with a single PC-AT and later connect up to nine dumb terminals. You'll have a complete 10-user system for about 1/3 the cost of networking.

But there's more. As your business continues to grow, you won't have to redo your application software if you expand to a Pick-based mini or mainframe.

The reason? Pick is machine independent. Its data and applications are transportable from one Pick-based system to another.

Pick is made for business.

It's not an engineering system that was adapted to business applications.

That's the reason you don't have to adapt your business to the computer. Instead, Pick adapts to you.

You access all data in a way that's natural to business. And because the system is so simple, you can complete most jobs with a lot less keystrokes.

600,000 users can't be wrong.

Pick is used by thousands of small and large companies worldwide. The system runs on hardware from 22 manufacturers. And over 2,000 software applications packages are available.

If you want your computer to be able to expand with your business, don't put the cart before the horse. Call 1-800-FOR-PICK. In California, (714) 261-7425.

PICK®
SYSTEMS
The system you grow into, not out of.

Circle 777 on reader service card

10 MHZ 286

NOT A CLONE. AN IMPROVEMENT.

Made in the U.S.A. 100% Functional Test and Burn-in.

10 MHz 80286 motherboard: $995.00

Includes built in multifunction card (1 serial port, 1 parallel port, clock/calendar), 512K memory, switch selectable 10, 8 or 6 MHz operation, uses only full spec 80286 components, 6 expansion slots. Phoenix Technologies ROM BIOS provides full compatibility with the IBM PC/AT.™ High reliability gate array design and CAD generated PCB layout. Designed and built in the U.S.A. in a highly automated production facility.

Dealer O.E.M. discounts available. Private label inquiries welcome.

* *Personal Computer AT™ is a registered trademark of IBM Corporation*

Basic System: $1795.00

- ☐ 6, 8, 10 MHz 80286 microprocessor
- ☐ 512K byte high speed memory (expandable to 640K or 1M on motherboard)
- ☐ Phoenix Technologies ROM BIOS
- ☐ Fully compatible with the IBM Personal Computer AT™
- ☐ 1.2M byte floppy disk drive
- ☐ High performance floppy/hard disk controller
- ☐ Tactile touch keyboard
- ☐ Serial port
- ☐ Parallel port
- ☐ Clock/calendar with battery backup
- ☐ 192 watt power supply
- ☐ Optional math co-processor

Basic System with 30M byte Fast access hard disk: $2695.00

Basic System with 40M byte Fast access hard disk: $3195.00

Basic System with 70M byte Fast access hard disk: $3795.00

Red River Technology, Inc.
4001 West Airport Frwy., Suite 270
Bedford, Texas 76021
Telephone: 817/571-5714
Telex: 510601 6264 RED RIVER TECH

Circle 838 on reader service card

DVORAK SAYS: "I advise you to **run (don't walk)** to the phone or Post Office and order a copy of the **Mace Utilities** for the IBM PC."

InfoWorld, 3-24-86

MACE + UTILITIES™

Eliminate Hard Disk Risks!

UnFORMAT recovers from an accidental FORMAT of your hard disk. Magic? It just seems like it.

UnDELETE gets back deleted files with four keystrokes.

REMEDY automatically finds and cures bad spots on the disk. Moves endangered files to safety.

Optimize Hard Disk Performance!

CONDENSE unfragments any disk, from 160K to 32 megabytes at a rate of 1–2 minutes per megabyte.
☞Just as fast on a full disk.
☞*Doubles* the speed at which programs load, find and store data by placing files in one physical piece on the disk, reorganizing directories, data and free space into separate blocks.

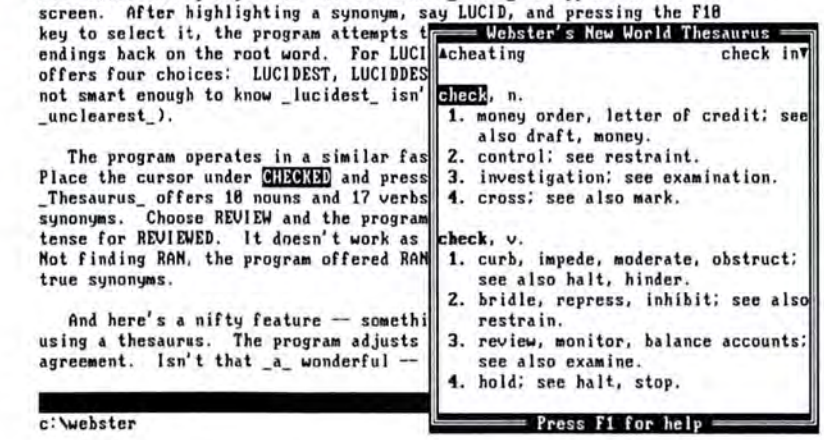
SQUEEZE/SORT sorts directories on any field.
☞Speeds up the path by squeezing deleted references from your directories.

Paul Mace Software
206 Alicia Ave.
Ashland, OR 97520
(503) 488–0224

$69.95 Visa,MC,Check

Order Toll Free
1-800-523-0258

Circle 614 on reader service card



Screen 2: If you've used an on-line spelling checker, you'll find Webster's On-Line Thesaurus equally simple. Highlight the not-so-right word, and Webster's offers a panoply of possibilities.

dictionary, it strips the word of its prefix and suffix, looks up the root, and in seconds displays the possibilities in a window at the top of the screen. You can even look up synonyms of synonyms until lightning strikes.

Once you've found a suitable replacement, highlight the word in the list and press <F10> to insert it into the underlying application. Like most contemporary electronic thesauri and dictionaries, *Webster's* matches the original word's capitalization and inserts or deletes the correct number of spaces for proper fit. As icing on the cake, *Webster's* adjusts preceding articles, changing *a* to *an* and vice versa.

Webster's will even match prefixes, suffixes, and the tense of the original word. For example, if you toss the program *clearest*, it digs up synonyms for the root *clear*. Pick a synonym such as *lucid* and press <F10>, and *Webster's* offers four choices: *lucidest, luciddest, most lucid*, and *lucid*. It's up to you to distinguish the words from the non-words—an absurd demand for any reference work to make.

If you highlight a regular verb such as *checked*, the program proposes 10 nouns and 17 verbs, including *review* (see Screen 2). Select *review* and *Webster's* automatically matches the tense and inserts *reviewed*. Irregular verbs, however, can throw the program a curve. *Ran* elicited *ranch*, but *run* generated 29 true synonyms. It's clear that *Webster's* isn't perfect, and it's too bad, because except for those serious flaws it's a great improvement over the thesauri featured by *Turbo Lightning* and *Reference Set*.

(continues)

DOING IT RIGHT!

A SIMPLE FORMULA FOR SUCCESS FROM THE IBM OF THE MAIL ORDER BUSINESS

FLIGHT SIMULATOR
$27.00*

HAYES MACH III JOYSTICK
$30.25*

EPSON FX-85
$355.00*

MICROSOFT MOUSE
$107.00*

ANY TITLE ABOVE
$20.00*

When we founded PC Network, **our goal was to create the IBM of our Industry.**

In three short years, **we have grown to an annual sales volume of over $75,000,000 employing over 200 people! We have served over 200,000 members. We ship over 7,000 orders per week.**

We have become the world's largest PC Mail Order Firm.

We are often asked how we did it **by the Editors of Computer and Business Magazines, Newspapers, Computer Manufacturers and Fledgling Entrepreneurs.**

Our answer is our philosophy.

Price computer products at what they're worth, not the most you can get. **For us that became our wholesale +8% pricing applied to over 30,000 products, not just the "Grabbers".**

The customer is the most important person in the universe!! **Treat him or her well and your business will grow and prosper.**

10 Day hardware returns, software rentals, a 24 hour bulletin board **with over 20,000 FREE software programs yours for the picking, and numerous other benefits are only the tip of the iceberg in translating this philosophy into practice.**

These commitments all cost money. A lot of money. **But we firmly believe that for every dollar we spend on YOU our customer, we will receive many in return.**

We are told we should be proud **of our accomplishments, and we are. But we realize that they all come from working for you, giving you exceptional value and good service.**

That means at PC Network, the Customer will always come first!

William R. Stankiewicz
Warehouse Manager

Richard A. Koril
Vice President

Stephen A. Dukker
President

PC Network
(800) 621-SAVE

Simply put: THE™ highest quality and best value in computer products anywhere.

THE™ commitment to our customers is compatibility, quality, value, service and support

THE™ backs every product with a

45 DAY MONEY BACK GUARANTEE

and a

FULL 1 YEAR PARTS AND LABOR WARRANTY

THE™ MULTI 384

This multi-function card features 0-384K memory, a parallel printer port, a serial port for communications, a clock/calendar with battery backup, and a software bonus that includes RAMdisk and other utilities. Retail $90.00

$67.00* Special Wholesale Price

THE™ H720 MONO

This monochrome graphics card with printer port features 100% IBM™ and Hercules™ compatibility, at a fraction of their prices. Retail Price $91.25

$69.00* Special Wholesale Price

THE™ MODEMS

100% Hayes compatible

THE™ 1200 COM EXTERNAL

This self-testing 1200 BPS modem comes with auto answer, auto dial, auto redial and a built-in speaker. Retail Price $161.25*

Special Wholesale Price **$119.00***

THE™ 1200 COM INTERNAL

Features auto answer, dial and redial, with a built-in speaker, RS 232-C serial port and PC Talk III. Retail Price $148.75

Special Wholesale Price **$109.00***

THE™ 2400 COM EXTERNAL

Eight times the speed of a 300 BPS unit makes this 2400 Baud modem truly affordable, and we've made it truly compatible. With auto answer, auto dial, auto redial, and a built-in speaker with volume control. Retail Price $346.25

Special Wholesale Price **$259.00***

THE™ 2400 COM INTERNAL

Features auto answer, auto dial, auto re-dial a built-in speaker and Free PC Talk III. Retail Price $332.00

$197.00*

THE™ COLOR CARD

100% compatible with the IBM™ color card with display modes of 320x200 graphic and 80x25 alphanumeric, w/printer port.
Retail Price $75.00

$60.00*

THE™ 2MB EMS RAM

Intel™/Lotus/Microsoft specs. Features up tp 2MB of RAM Retail Price $172

$99.00*

A $120.00 VALUE!

ADAM OSBORN'S PAPERBACK SOFTWARE

- Paperback Writer
- Paperback Speller
- Numberworks Spreadsheet

All three for only...

$32.00* *With the purchase of a PC+*

THE™ 20MB HARD DISK KIT

Featuring a half-height IBM™ PC compatible internal 20MB disk drive, controller card, connecting cables and installation manual. Retail $458.75

Special Wholesale Price **$357.00***

THE™ MULTI I/O

Feature for feature, **THE™** matches the AST™ I/O + and comes up a winner, with serial/parallel and game ports standard, (a second serial port optional), a clock/calendar, RAMdisk and print spooler. Retail Price $75.00

$60.00* Special Wholesale Price

THE™ EGA PLUS

With 256K standard this 100% IBM™ EGA and Hercules Graphics compatible card is ideal for high resolution graphics display of Microsoft™ Windows, Lotus™ and AutoCAD,™ w/printer port.

Retail Price $300.67

Special Wholesale Price **$220.00***

Thompson, Harriman and Edwards Computer

THE™

Thompson, Harriman and Edwards Computer Products Company Ltd.

HE™ PC + COMPUTER

HE™ PC + is compatible with all siness, professional and personal ftware written for the IBM™ PC. It will so enhance your productivity with its ility to switch to an 8 megahertz clock te, enabling you to run your software rice as fast as the IBM™ PC. **THE**™ PC + so comes standard with an "AT" style yboard, correcting the inefficiencies und by IBM™ on their regular PC yboard. 256K standard (640K optional) the mother board will allow you to run emory intensive programs such as tus 1-2-3, DBase III and Framework thout adding extra memory cards. Plenty power, with a 135 Watt source and ts of room for expansion ith 8 card slots is also andard. Base unit cludes: 256K RAM, mputer with ne 360K 5¼" Floppy ive, Dual Turbo Clock peed, 8 Expansion ots, 135 Watt Power upply, "AT" Style eyboard, Full Year Warranty nd 45 Day oney Back uarantee!

ail Price $586.25*

ecial olesale ce

444.00*

Monitor Not Included)

ll **THE** roducts n this pecial ale re ffered hru

THE MOST INCREDIBLE LIMITED TIME OFFER IN COMPUTER HISTORY, FROM THE™ and PC NETWORK...

THE™ PC+

256K RAM, IBM™ PC compatible, 360K 5.25" Disk Drive, Turbo Speed, "AT" Style Keyboard

Special Wholesale Price

$444.00*

$469.00* for 640K System

PC Network

All prices in this ad are wholesale—PC Network Members pay wholesale + 8% and shipping.

CALL TOLL FREE W2NZ

(800) 621-SAVE

In Illinois (312) 280-0002

Products Company Ltd.

Dealer Inquiries Call **THE**™ at (312) 642-9626
319 West Ontario Street, Chicago, Illinois 60610

PC NETWORK

BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%, AND GET 14-30 DAY SOFTWARE RENTALS†...

Every few months, *The NETWORK* saves its members more than $24,000,000 and processes over 100,000 orders.

Listed below are just a few of the over 30,000 products available at our EVERYDAY LOW PRICES!

Starting Nov. 1 Mon.-Fri. 7 am-9 pm CST

CALL TOLL FREE 1-800-621-S-A-V-E

(Orders—Membership and Advice!)
In Illinois call (312) 280-0002
Your Membership Validation Number W2Z6

You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD or AMERICAN EXPRESS.
Our knowledgeable sales consultants are on duty Mon.-Fri. 8:00 AM to 7:00 PM, Sat. 9:00 AM to 5:00 PM CST.

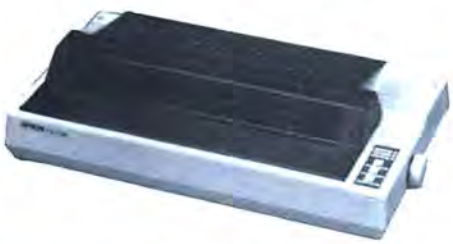
PERSONAL COMPUTER NETWORK
320 West Ohio Street
Chicago, Illinois 60610

Call now...Join the PC NETWORK and start saving today!
Customer Service and Order Status (312) 280-1567
8:30 AM to 4:30 PM, Mon.-Fri. CST

EPSON FX-286 PRINTER

132CPS/200CPS Letter Quality

$440.00*



Epson FX-85 *160CPS 10" Par*	**$355.00***
Epson FX-286 *200CPS/40CPS NLQ*	**440.00***
Epson LX-86 *120CPS/8.5 Friction Feed Parallel w/NLQ Switch*	**219.00***
Epson LQ-800 *180COL/46CPS Par*	**519.00***
Epson LQ-1000 *180CPS/60CPS NLQ*	**699.00***
Epson LQ-2500 *180CPS/132COL Par/Ser*	**995.00***
Epson EX-800 *NEW! 80COL/Par/Matrix*	**445.00***
Epson EX-1000 *132COL/Par/Matrix*	**629.00***

GAMES & EDUCATIONAL SOFTWARE

(Please add $1 shipping and handling for each title ordered from below.)

	Wholesale
Bluechip *Millionaire, Oil Baron or Tycoon*	$28.99*
Broderbund *Ancient Art of War*	22.75*
Broderbund *Lode Runner*	17.25*
Comprehensive *Intro to Personal Computing*	32.00*
Davidson *Math Blaster, Word Attack!*	21.50*
Epyx *Temple Apshai Triology*	20.00*
Hayden *Sargon III*	26.00*
Individual *The Instructor*	24.50*
▶ **Infocom** *Zork I, Witness, or Trinity*	20.00*
▶ **Infocom** *Deadline or Suspended*	24.00*
Microprose *F-15 Strike Eagle, Silent Service*	18.50*
Microsoft *Flight Simulator*	27.00*
Mindscape *The Mist, First Blood Pt. 2/or View to a Kill*	21.00*
Mouse Systems *PC Paint-Turn your PC into a Color Macintosh!*	$59.95*
Pinpoint Publishing *Micro Cookbook*	21.00*
Scarborough *MasterType*	19.75*
Sierra On-Line *King's Quest II*	24.75*
Spectrum Holobyte *GATO*	18.00*
▶ **Spinnaker** *Alphabet Zoo, Kinder Comp Story Machine, Face Maker, Hey Diddle Diddle, Rhymes & Riddles*	15.97*
▶ **Spinnaker** *Delta Drawing or Most Amazing Thing*	20.75*
Sublogic *Night Mission Pinball*	20.00*
Sublogic *Jet*	27.50*
Timeworks *Evelyn Wood Dynamic Reader*	41.00*

BUSINESS SOFTWARE

(Please add $2.50 shipping and handling for each title ordered from below.)

ANSA *Paradox*	$445.00*
▶ **Ashton-Tate** *DBase III+*	365.00*
▶ **Ashton-Tate** *Framework II*	365.00*
Borland *Reflex*	54.00*
Borland *SideKick (Protected)*	26.00*
Borland *Turbo Pascal*	35.00*
Borland *Turbo Pascal 8087*	53.00*
Borland *SuperKey*	34.50*
Breakthrough Software *Time Line 2.0*	203.00*
Central Point *Copy II PC*	16.25*
Computer Associates *Supercalc IV*	239.95*
Computer Associates *Super Project Plus*	239.95*
DAC *Easy Accounting*	39.80*
Enertronics *Energraphics*	145.00*
FGS *Fastback*	85.00*
Funk Software *Sideways*	32.00*
Harvard *Harvard Total Project Manager*	245.00*
Hayes *Smartcom II—New VT 100 Emulator*	68.00*
Human Edge *The Management Edge*	45.00*
▶ **Human Edge** *The Sales Edge or Mind Prober*	24.00*
Lifetree *Volkswriter III*	126.00*
Living Videotext *Think Tank*	87.00*
Lotus *Lotus 1-2-3*	285.00*
MicroPro *Wordstar 2000*	209.00*
MicroPro *Wordstar 2000+*	$259.00*
MicroRim *R Base 5000*	215.00*
MicroRim *R Base System V*	339.00*
Microsoft *C Compiler*	215.00*
▶ **Microsoft** *Word—Latest Version 3.0*	229.00*
Microsoft *Multiplan*	98.00*
Microsoft *Quick Basic*	54.00*
Monogram *Dollars & Sense*	85.00*
▶ **Multimate** *Multimate (Latest Version)*	180.00*
Multimate *Multimate Advantage*	270.00*
▶ **Meca** *Managing Your Money*	92.00*
Nantucket *Clipper DBase III Compiler*	350.00*
Norton *Commander*	36.00*
Norton *Norton Utilities 3.1*	43.00*
Open Systems *A/R INV G/L A/P Ver.3.X*	ea.395.00*
Power Base *Power Base*	200.00*
Rosesoft *ProKey Version 4*	65.00*
Satellite Software *Word Perfect*	185.00*
Software Group *Enable*	293.00*
Software Publishing *PFS: File, Write, Graph*	68.00*
Software Publishing *PFS: Professional File*	132.00*
Software Publishing *PFS: Professional Write*	105.00*
Software Publishing *PFS: Report*	64.00*

HARDWARE

(Please add shipping and handling charges found in italics next to price.)

COMPLETE SYSTEMS

Apple *Macintosh/Apple IIc/IIe*	CALL	
AT&T *6300 PC CPU2 640K:2 Floppy:1 Serial/1 Parallel/Mono Monitor*	$1,775.00*	(38.34)
COMPAQ *Hard Disk20MB Portable/1 Floppy w/256K*	1,800.00*	(38.88)
COMPAQ *DeskPro Hard Disk 20MB w/256K/ 1 Floppy*	1,775.00*	(38.34)
▶ **IBM** *PC Base System 2 DS/DD FDC w/256K*	1,025.00*	(22.14)
▶ **IBM** *PC Professional 20MB Hard Disk*	1,337.00*	(28.88)
IBM *PC/AT All Configs*	CALL	
IBM *PC/AT Base Unit 1.2MB Floppy w/256K*	2,875.00*	(60.37)

DISK DRIVES & CONTROLLERS

IOmega *Bernoulli Box/Dual MB Drives*	$1,710.00*	(36.94)
▶ **PC Network** *10MB Internal 1/2 Height Autoboot Drive: by Seagate or Shugart*	299.00*	(6.46)
PC Network *10MB Tape Backup Same Unit used in Compaq's DeskPro*	340.00*	(9.48)
PC Network *20MB Tape Backup Half Height w/controller*	495.00*	(10.69)
▶ **PC Network** *Half Height DS/DD Drive*	75.00*	(1.68)
Tandon *20MB Hard Card*	435.00*	(9.40)
▶ **THE "20 + 20** *Storage System w/20MB Tape Backup - Combo Kit*	629.00*	(13.58)
▶ **THE "20MB** *20MB Internal 1/2 Height Autoboot Drives: by Seagate or Microscience*	357.00*	(7.93)

MEMORY CHIPS

All chips guaranteed for life

▶ **64K Memory Upgrade Kits** *(9 chips)*	$7.75*	(1.00)
▶ **64K Dynamic Ram Chips** *(Each)*	1.00*	(1.00)
▶ **256K Dynamic Ram Chips** *(Each)*	2.90*	(1.00)
▶ **128K AT Mother Board Chips** *(Each)*	3.90*	(1.00)
▶ **Intel** *8087 Co-Processor*	99.50*	(2.15)

MODEMS

▶ **Hayes** *Smartmodem 2400*	$525.00*	(5.00)
Hayes *Smartmodem 1200B with new Smartcom II VT 100 Emulator*	315.00*	(2.50)
Hayes *Smartmodem 1200*	340.00*	(5.00)
U.S. Robotics *Courier 2400BPS Modem*	345.00*	(5.00)
U.S. Robotics *Password*	172.00*	(2.50)

ALL THE "MODEMS ARE 100% HAYES COMPATIBLE

▶ **THE "1200 Com External**	119.00*	(2.58)
▶ **THE "2400 Com External**	259.00*	(5.54)
▶ **THE "1200 Com Internal** *w/Free PC Talk III*	109.00*	(2.50)
THE "2400 Com Internal	197.00*	(2.50)

MONITORS

Amdek *Video 310A Amber TTL Monitor*	$130.00*	(3.00)
Amdek *Color 600 High Res RGB Monitor*	365.00*	(7.88)
Amdek *Color 722 NEW! Enhanced*	424.00*	(9.16)
Magnavox *Amber IBM Type TTL Monitor*	79.00*	(5.00)
Magnavox *14"RGB Color Monitor 640 x 240*	250.00*	(5.00)
NEC *JC-1401 Multisync RGB ColorMonitor*	530.00*	(11.45)
Princeton *HX-12 RGB Monitor*	369.50*	(7.98)
Princeton *HX-12E RGA or EGA Monitor*	430.00*	(9.29)
Princeton *MAX-12E Supports Either Mono or RGB Cards*	138.00*	(5.00)
Taxan *630 High Res RGB Monitor*	383.00*	(8.27)
Taxan *640 Highest Res (720x400) Currently Available—Works with Persyst BOB Card*	439.00*	(8.27)

MULTIFUNCTION CARDS

AST *SixPakPremium "w/0K*	$315.00*	(2.50)
▶ **AST** *SixPakPlus "with 64K*	139.00*	(2.50)
AST *I/O Plus II "*	129.50*	(2.50)
▶ **AST** *Advantage for AT*	325.00*	(2.50)
Orchid *Conquest*	220.00*	(2.50)
Orchid *Tiny Turbo 286*	399.00*	(2.50)
Tecmar *Captain Multifunction Card 0/K*	109.00*	(2.50)
▶ **THE "2MB RAMCard** *Intel "spec card w/0K*	99.00*	(2.50)
▶ **THE "Multi 384** *A functional clone of AST's "SixPakPlus " Includes up to 384K of expansion memory, 1 serial, 1 parallel, 1 game port a clock calendar and 3 software standard*	67.00*	(1.62)
▶ **THE "Multi I/O** *I/O Plus Clone Ser/Par/Game/Clock Standard*	60.00*	(2.50)

PRINTERS

Citizen *MSP-10 NEW! 160CPS/80COL/Fric + Trac*	$259.00*	(4.86)
Citizen *MSP-15 NEW! 160CPS/132COL/Fric + Trac*	340.00*	(7.34)
Citizen *MSP-25 NEW! 200CPS/132COL/Fric + Trac*	435.00*	(9.40)
Citizen *Premiere 35 NEW! 35CPS Daisywheel/132COL/Fric + Trac*	420.00*	(9.07)
Citizen *120-D 120/25CPS 10" w/Tractor*	169.00*	(3.65)
Epson *FX-85 160CPS 10" Par.*	355.00*	(7.45)
▶ **Epson** *FX-286 NEW! 200CPS/40CPS NLQ*	440.00*	(10.91)
▶ **Epson** *LQ-1000 NEW! 180CPS 60CPS NLQ*	699.00*	(15.10)
▶ **Epson** *LX-86 120CPS 8.5 Friction Feed Parallel w/NLQ Switch*	219.00*	(4.35)
▶ **Epson** *LQ-800 180COL 60CPS Parallel*	519.00*	(10.99)
▶ **Epson** *LQ-2500 108CPS 132COL Par/Ser*	995.00*	(19.90)
▶ **Epson** *EX-800 80COL Parallel Matrix*	445.00	(9.10)
▶ **Epson** *EX-1000 132COL Parallel Matrix*	629.00*	(12.58)
NEC *2050 20CPS Letter Quality Printer*	570.00*	(11.88)
NEC *3550 33CPS Letter Quality Printer*	690.00*	(14.90)
NEC *8850 55CPS Printer*	949.00*	(20.50)
NEC *Pin Writer P-6 216/180/65CPS 10"*	415.00*	(8.96)
NEC *Pin Writer P-7 180/65CPS/132COL*	535.00*	(11.56)
Panasonic *KX-P1091 120/75/22CPS*	220.00*	(4.75)
Panasonic *KX-P1092 180/CPS w/Tractor*	329.00*	(7.11)
Panasonic *KX-P1592 180/CPS 15" w/Trac*	406.00*	(8.77)
Toshiba *NEW! P341 210CPS/132COL*	699.00*	(15.01)
Toshiba *351 Par/Ser 288CPS/132COL*	959.00*	(20.71)

VIDEO CARDS

Hercules *Color Card w/Parallel Port*	$126.00*	(2.50)
Hercules *Monochrome Graphics Cards*	162.00*	(2.50)
Paradise *Autoswitch EGA*	336.00*	(2.50)
Orchid *Turbo EGA Card*	569.00*	(2.50)
Quadram *Quad EGA +*	323.00*	(2.50)
▶ **THE "EGA Plus** *w 256K and printer port*	220.00*	(2.50)
▶ **THE "H720** *Mono Graphics w parallel port 100% Hercules Compatible!*	69.00*	(2.50)
▶ **THE "Color Card** *100% IBM Compatible*	60.00*	(2.50)

ACCESSORIES AND SUPPLIES

▶ **Brand Name DS/DD Diskettes (Box of 10)** *Guaranteed for Life! Not Generic*	$7.95*	(1.00)
▶ **DS/DD Bulk Pack Special** *Packaged in 50 with sleeves and labels Guaranteed for Life!*	ea. .44*	
▶ **PC Network** *Replacement 130 Watt IBM-PC Power Supply—Gives you PC (Old or New) the same capacity as an XT. Good for add-in tape drives (without need for a piggyback unit) and large capacity disk drives*	70.00*	(2.70)
SMA *PCDocumate Keyboard Templates for Lotus/DBase/Multimate and others*	ea. 9.99*	(1.00)
Sony *DS/DD Diskettes*	15.95*	(1.00)
WP Printer Paper *2600 Sheets Microfine Perfs (invisible when torn)*	17.00*	(10.00)

***PC NETWORK Members pay just 8% above the wholesale price, plus shipping.** All prices reflect a 3% cash discount. Minimum shipping $2.50 per order. International orders call for shipping & handling charges. Money Orders, personal and company checks please allow 10 working days to clear. All prices subject to change.

†RENT BEFORE YOU BUY—Members are eligible to join the NETWORK'S Business and Game Software Rental Libraries to evaluate products for a full 14 (Regular) or 30 (V.I.P.) days to see if they meet your needs. And the NETWORK'S rental charges are far less than other software rental services—JUST 20% OF THE MEMBER WHOLESALE PRICE. **We feature over 1,000 available titles in IBM/Apple/Mac and CP/M.**

COMPLETE SYSTEMS
(Optional local warranty service available in most major metro areas)

IBM PC BASE SYSTEM
IBM PC w/256K
Floppy Drive Controller
2 Double Sided Double Density Disk Drives
Mix and Match with your Favorite Monitor and Printer!

$1,025.00*

CUSTOM CONFIGURATIONS WELCOME

IBM PC HARD DISK SYSTEM
IBM PC w/256K
Floppy Drive Controller
1 Double Sided Double Density Disk Drive
Half Height Hard Disk

w/20MB
$1,337.00*

CALL FOR LATEST IBM ANNOUNCEMENTS

PORTABLE HARD DISK SYSTEM
256K/1Floppy/20MB Hard Disk

$1,800.00*

DESKPRO SYSTEM
256K CPU/1 Floppy/Hard Disk

COMPAQ™

$1,999.00* w/30MB

$1,775.00* w/20MB

64K IBM PC EXPANSION KIT
Lifetime Guarantee!
Set of 9
150/200ns

$7.75*

256K	Set of 9	$26.10*
128K	For the AT	35.10*

INTEL™ Math Co-Processors

8087	5Mhz	$99.50*
8087	8Mhz	161.00*
80287	5Mhz/8Mhz	197.00*

HERCULES GRAPHICS CARDS
Monochrome w/Parallel Port **$162.00*** Color **$126.00***

New from THE™

THE™ 20MB HARD DISK CARD
$375.00*

1/2 Height 360K DS/DD Floppy Disk Drive
$75.00*

THE™ 20 + 20 20MB Hard Disk 20MB Tape Backup
$629.00*

THE™ 20MB Hard Disk Kit
$357.00*

*Members pay 8% above this wholesale price plus shipping.

CALL TOLL FREE **1-800-621-S A V E** (orders and memberships)

In Illinois call (312) 280-0002 Validation Code: W2Z6

Customer Service and Order Status (312) 280-1567

TM & R—Registered Trademarks of IBM/COMPAQ/APPLE/AST Research/Lotus/Multimate/Omega/Hayes/Hercules

SEE WHY OVER 200,000 HAVE JOINED MAKING US THE NATION'S #1 SOURCE FOR EVERYTHING IN COMPUTING

- **Our 600 Page Wholesale Catalog**
  Over 30,000 products priced at Wholesale + 8%. Anything you will ever need at a Consistent low price...
- **Quarterly Catalog Updates**
  Your Catalog is never obsolete! Keep on top of the newest products and latest price changes.
- **The Printout**
  Our newsletter gives you fantastic specials along with unbiased analysis of new products and industry trends.
- **10 Day Returns on Hardware!!**
  If you don't like any hardware product—for any reason —return it for a refund.
- **1000 + Title Rental Library**
  14 to 30 day rentals on over 1000 different titles. Try before you buy!!
- **Size, Strength and Stability**
  The Network has over 200 employees, 55,000 square feet of office and warehouse space, inventory valued in excess of $25,000,000 and is ranked the largest computer product supplier in the nation! Our commitment is to serve our customers and our 90% repeat business rate is proof!!
- **OnLine™ Bulletin Board**
  Download "Freeware" from the nation's largest single concentration of Public Domain software available! Get tied into the nation's largest technical information network! Place orders, get tech support or contact customer service from the Network's OnLine,™ not just a bulletin board but a complete customer information network.

MAGNAVOX COLOR RGB 12" MONITOR

$250.00*

Amdek	*Video 310A Amber*	$130.00*
Amdek	*Color 722 NEW! Enhanced*	424.00*
Magnavox	*Amber IBM Type TTL*	79.00*
Princeton	*HX-12 RGB*	369.50*
Princeton	*Max-12E*	138.00*
Princeton	*HX-12E RGA or EGA*	430.00*
Taxan	*630 High Res RGB*	383.00*
Taxan	*Highest Res 720x400*	439.00*

NEC JC-1401 MULTISYNC RGB COLOR
$530.00*

FULL HOUSE

BUY THE WORLD'S #1 PRINTER FROM THE WORLD'S #1 SOURCE

It's an unbeatable combination. We're the nation's largest mail order source for everything in computing. Epsons are the nation's best-selling family of printers...and for good reason. Epsons are unmatched in speed, versatility, choice of fonts, letter and correspondence quality, and are backed by the strongest local service network in the nation. So we stock them in tremendous volume, ready for immediate shipment...at the kind of prices that helped make us #1. Epson printers, as well as 30,000 other products are priced at Wholesale + 8%. Also, when you join the Network you get our catalog, our own periodical newsletter, a vast software rental library, free phone consultation, our 10 day money-back guarantee and more! Watch your benefits stack up.

Introducing the EX-800 and EX-1000, for highspeed throughput, at 300 COL draft mode, 60 CPS Near Letter Quality mode.

PC NETWORK (800) 621-SAVE

In Illinois Call (312) 280-0002

Webster's also earns high marks for ease of installation and general amiability. The simple setup routine includes an option for customizing *Webster's* if your word processor isn't one of the 30 programs already supported. The program is blessedly well behaved and works uncomplainingly with *SideKick, ProKey, FlickerFree,* and a host of other memory-resident utilities. A single help screen is available at the touch of a key and the user manual is thorough and well organized—though I doubt if you'll need either. In a word, *Webster's* is number one.
—Donald B. Trivette

Webster's New World On-Line Thesaurus
Simon & Schuster Software
1 Gulf + Western Plaza
New York, NY 10023
800/624-0023, 800/624-0024
New Jersey
List price: $69.95
Requirements: 44K, one disk drive, DOS 2.00 or later version
Not copy protected

Resident

In its most popular usage, *resident* is the name 98 percent of the United States population is known by. In the world of PCs, it applies to a similarly massive population of software—few of which get along.

A recent immigrant to these teeming shores is a memory-resident utility called, aptly enough, *Resident.* While the address it occupies could never be mistaken for one along a shady street called Elm, *Resident* establishes a new rule of computer demographics: Anything can be a resident if it wants to be.

Resident, as you may have surmised, allows almost any application from *1-2-3* to *WordStar* to work like a memory-resident utility. You can't display two or more programs at once, but why invest in

(continues)

Introducing The New, Low Cost Epson Alternatives.

DM2010 & DM2015. Fast, heavy duty performers that do the job right.

Fast ... 200 cps in draft and 50 cps in NLQ; built-in 7K buffer.
Reliable ... averages many years of solid use.
Compatible ... emulates Epson and IBM Dot Matrix Printers.
Versatile ... with downloadable fonts; plug-in font cards.

Convenient ... built-in tractor; uses Epson ribbons.
And backed by Dynax, since 1980.
See your authorized Dynax/Fortis dealers for more details.

FORTIS®
FORTIS means STRENGTH. Dynax, Inc.

Epson is a registered trademark of Epson America Inc.
IBM is a registered trademark of International Business Machines Corp.

6070 Rickenbacker Road, Commerce, CA 90040 • (213) 727-1227

Dealers Circle 706 on reader service card
End users Circle 708 on reader service card

See Us at COMDEX Booth #902

REMOTE™ software lets you run almost any program, from any location, as if you were the

REMOTE is the software that turns your personal computer into a host computer. You or anyone you choose can dial it up from almost any terminal in almost any location, and run most popular application programs such as word processing, spreadsheets, and data base managers.

You'll see the program on your dial in terminal screen as if you were seated at the host PC.

While REMOTE software itself becomes transparent in use, it offers some very tangible benefits:

- You don't need a second PC to do the job of two. Almost any terminal or terminal emulator will do. The only software you need is the software in your host PC.
- Each of several different users can call in from anywhere in the world and use the host PC and software. REMOTE software includes a sophisticated electronic mail system with encrypted messages and individual password protection.
- You can transfer files to and from the host computer, using the CROSSTALK® or XMODEM protocol.
- Programmers and software vendors can use REMOTE software to debug a client's software by phone, without leaving their own offices.

Imagine the potential REMOTE software has in extending th power of your own PC. Ask your dealer, or write:

CROSSTALK and MICROSTUF are registered trademarks of Microstuf, Inc.
REMOTE is a trademark of Microstuf, Inc.

REMOTE™

MICROSTU

1000 Holcomb Woods Parkw
Roswell, Georgia 300

Circle 275 on reader service ca

Indian Ridge Software Gets Rave Reviews!!

"Loaded with features and provides excellent value for the money."

— 80 MICRO MAGAZINE, July 1986

$49.95 each

THE Best Because:

- ALL PACKAGES CAN BE RUN STANDALONE OR IN ANY COMBINATION
- ADD PACKAGES AS YOU NEED THEM
- PACKAGES INTEGRATE AS YOU ADD THEM
- DATA ENTRY REQUIRES NO KNOWLEDGE OF ACCOUNTING PROCEDURES
- EASY TO EDIT DATA ENTRY SCREENS
- AUTOMATIC INSTALLATION WITH DEFAULTS. NO FILE SIZE DEFINITIONS OR TRANSACTION NUMBERS REQUIRED
- ENTER DATA ONLY ONCE
- SMART SYSTEMS FIGURE OUT THE NEXT LOGICAL STEP AND TELL YOU WHAT TO DO

THE General Ledger:

- Verifies all data input
- Totals entries to check balances
- Supports multiple departments or profit centers
- Proofs input data onto paper for auditing
- Lets you specify recurring journal entries
- On-line inquiry for account status
- Reports include: Income Statement, Balance Sheet, Chart of Accounts, General Ledger Report, Accounts Distribution Report, Trial Balance
- Account numbering automatically formats financials.

THE Accounts Payable:

- 5 transaction types: Release, Hold, Void, Prepaid and Credit Memos
- Access invoices for payment or inquiry
- Priority status or projected payment date available for each voucher
- Maintains numeric control over checks
- Complete payment information on check stubs
- Computes discounts
- Writes automatic payables schedule
- Automatic vouchers for recurring items
- Allows partial payments
- Reports include: Aged Trial Balance, Two Pre-check Reports, Aged Cash Requirements, Vendor History Report, Check Register, Checks, Summary of Accounts Distribution Vendor List, Account List

THE Accounts Receivable:

- Balance forward or open item billing
- Automatically computes late charges or interest
- Handle cash, C.O.D. or credit customers
- Specify any 3 invoice aging periods
- Print statements at any interval
- THE A/R posts cash receipts or invoices to customer accounts, types customer statements and reminder notices, and prints management information reports
- Automatically records recurring charges
- Reports Include: Aged Trial Balance, On-Line Inquiry, Batch Proof, Accounts Distribution Report, Customer Statements, Customer Lists, Invoice & Cash Batch Proof, General Ledger Update
- Optional dunning letters

THE Order Entry:

- Processes invoices singly or in batches
- Unshipped items are marked on the Order Report
- Each invoice depletes THE Inventory automatically
- Sends accounting transactions to THE Accounts Receivable
- Assign separate line item amounts to independent sales and receivables accounts
- Checks stock quantities in THE Inventory and notifies you when back orders are required

THE Inventory:

- Suited for both retail and wholesale environments
- 30 character description field
- 13 digit, user-definable alphanumeric part number.
- Fast/simple additions and depletions entry.
- Complete current statistics on each inventory item
- Activity statistics for current or to-date period
- Instant on-line inquiries
- Optional hard copy record of all transactions
- Reports include: Activity Report, Valuation Report, Auditability Proof, Reorder Report, Item List, and Item File Print

THE Payroll:

- Handles any combination of weekly, biweekly, semimonthly & monthly pay schedules
- Define up to 20 earning or deduction categories
- Assign any 8 categories for each employee
- Accountants can perform after-the-fact payroll
- Prints information for government reports
- Salary expenses can be distributed to different departments, branches or profit centers
- Reports Include: Company History, Pay Transaction Proof, Calculations Proof, Employee History, Employee Master List, Check Register, Payroll Journal, Vacation Report, 940 & 941 Reports, W2 Forms, & Prints Checks
- Of course, THE Payroll calculates payroll including Federal & State taxes, prints checks, allows hand written checks, lets user maintain tax tables and keeps an extensive employee payroll history

THE Spreadsheet:

- On-line tutorial and help
- Cut & paste multiple spreadsheets
- Format: Global, Column, Row, Entry
- Arrays: Copy, Replicate, Move, Insert, Delete, Blank
- Labels: centered, right or left justified
- Variable cell width
- 2 Windows to view separate areas of worksheet
- 20 special math functions
- Manual or automatic recalculation
- Complete glossary of spreadsheet terms
- Maximum size: 255 Rows x 64 Columns
- Variable print formatting options
- Simple editing functions
- Status on contents of any cell
- Set hold on any row or column to prevent scrolling

THE Wordprocessor:

- On-line help
- Powerful editing: Erase, Copy or Cut & Paste characters, words, sentences, lines, paragraphs, pages, or user-defined blocks of text
- Automatic word wrap-around (may be turned off)
- User-defined page breaks, soft hyphen, tab, indent and margin settings
- Proportional & justified printing
- Global Search & Replace, Automatic & Examine
- Optional command character viewing
- Superscript and subscript
- Phrase files for boilerplate
- Print bold, centered, underline
- Generate and edit ASCII files
- Right or left justification, and hyphenation

THE Name & Address System:

- Up to 6 labels across and 99 labels per name
- Reads A/R customer and A/P vendor files
- Create name & address files
- Print mailing labels
- Sort files by up to 4 items
- Search or sort by match or range
- Print a report of a NAD file
- Merge files
- 80 character open reference field
- Sort by any character in reference field
- 10 number zip code

THE Mailmerge:

- Integrates THE Wordprocessor & THE Name & Address System
- Mass mailings
- Specialized mailings to select groups in your Name & Address System.
- Can read A/R customer file, A/P vendor file and payroll employee file so you may send customized Wordprocessor letters

WindowMaster:

WindowMaster lets you run up to seven programs simultaneously. Run THE Payroll and print checks while you are using THE Wordprocessor. Or enter orders with THE Order Entry while THE Spreadsheet performs a lengthy calculation and THE Mailmerge prints letters for mass mailing. The simple inter-window transfer feature allows you to pass data from one application to another. The powerful keyboard enhancer lets you program keys on your keyboard to perform special functions which would otherwise require many keystrokes. You can also redefine keys. WindowMaster integrates both IRE and other programs and enhances your computer system.

"I test drove Indian Ridge's software in my own business and then installed it in my clients' businesses. It's great software." — Rex L. Ashley, CPA

"The programs are everything programs costing many times more wish they were."— John Smolke, Comptroller, Region Oil Company

"These packages clearly outperform DAC."

— A. Ronald Sincaco, Data Processing, Management Consultant

"We were going to buy Ashton Tates's software, but we bought Indian Ridge software instead. I love it!"

— Anthony Paradise, President, Paradon Wholesale Meat Packers

TO ORDER
RETURN COUPON TODAY
OR CALL TOLL FREE:
1-800-992-9255
Ask For Extension PC
In California:
800-992-9245, Ext. PC
FOR MORE INFORMATION CALL:
(415) 268-1435

30-day money back guarantee. Indian Ridge offers an unconditional guarantee on all IRE products (less shipping charges). There is a $15 restocking charge if the disk envelope is open or the manual damaged. This guarantee is valid for all software products bought directly from Indian Ridge Enterprises, Inc.

All software runs on the IBM PC, XT, AT, PC Jr. and true compatibles. The accounting packages and WindowMaster require 2 floppy disk drives or a floppy disk and a hard disk drive.

Indian Ridge Enterprises, Incorporated

508 Second St., Oakland, CA 94607 Dept. PC

$49.95 each. Please include Shipping & Handling charges listed below. Credit Card orders by phone OR send check OR money order with Coupon. Sorry, No COD's or Purchase Orders.

☐ THE General Ledger ☐ THE Order Entry ☐ THE NAD System ☐ THE Mailmerge
☐ THE Accounts Payable ☐ THE Inventory ☐ THE Spreadsheet ☐ WindowMaster
☐ THE Accounts Receivable ☐ THE Payroll ☐ THE Wordprocessor

☐ Check ☐ Money Order ☐ VISA ☐ MasterCard

Account No. _____ Expiration Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Signature _____

1 or 2 Packages—Add $7.50 Shipping & Handling; 3 to 5 Packages—Add $10.00 Shipping & Handling; 5 to 11 Packages—Add $15.00 Shipping & Handling. California Residents add 6½% Sales Tax. Outside US add $15.00 and payment must be made by bank draft payable in US by US Dollars.

a notepad program when you can just as easily pop your copy of *WordPerfect* onto the screen?

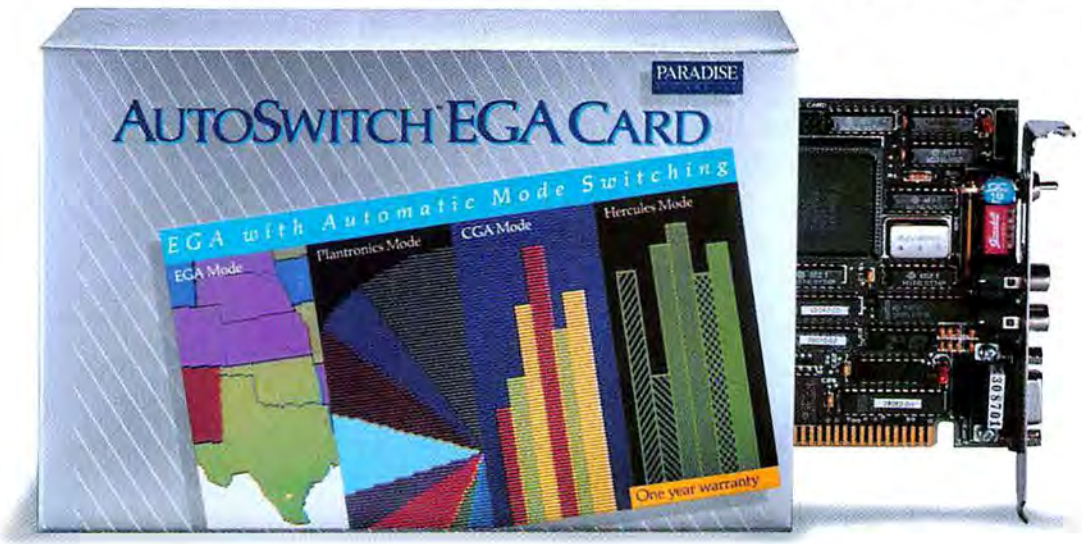
Using *Resident* is simple stuff. To run *1-2-3* in memory-resident mode, you would type *Resident S,150 C:*\Lotus\123 at the DOS prompt or enter the equivalent commands in an AUTOEXEC.BAT file. S is the key assigned (in combination with the unchangeable <Alt>-<Shift> hot keys) to summon *1-2-3;* 150 is the amount of memory (in kilobytes) required, and C:\Lotus\123 is the drive, subdirectory, and file name where *1-2-3* can be found. To call *1-2-3* while hip-deep in another application, press <Alt>-<Shift>-S. Press <Alt>-<Shift>, and *Resident* saves your place in *1-2-3* and returns control to the original application.

Resident can juggle as many as 26 different programs at once, memory permitting. I used it with *WordStar, Crosstalk,* and a favorite spelling checker and found myself leaping like Baryshnikov from one application to the next. Whenever I forgot which key combination I'd assigned to a program, I pressed <Alt>-<Shift>-<Space> to display a *Resident* status window listing the programs in memory and their key assignments. *Resident* also features a rather crude clipboard that enables you to cut and paste about 4K of data from one application to another.

Although *Resident* works unfailingly with a wide range of programs, it refused outright to cooperate with *Microsoft Word,* ignoring program commands and pointing my mouse's little feet skyward. *Resident* will sometimes reenact this nasty scenario when shifting from a memory-resident program back to DOS. According to the user manual, this occurs when your computer is "busy with some of its internal functions."

Here's What You Ought To Do
To Switch Video Modes Instantly.

You AutoSwitch.™



Frankly, I think it's a bug, as control can be restored by pressing <Enter>. The company is cognizant that some programs won't work with *Resident* and offers a 30-day money-back guarantee—a practice other software vendors might well heed.

Other problems are mostly annoying. If you use a program that switches the screen to graphics mode, *Resident* will not restore the screen to text mode when you leave the program. You must exit to DOS and type in the appropriate MODE parameters. (A new release of the program reportedly makes this change automatically.) *Resident*'s Remove command, which clears memory of the last memory-resident program, nevertheless fails to give the bum's rush to PRINT-.COM and other DOS utilities normally appended to commercial applications. The only solution is restarting the system.

My major reservation rests on *Resident*'s inability to support EMS boards. When you consider that *Word* and *1-2-3* together require at least 400K, this is a significant limitation. (The company claims that a soon-to-be-released version of *Resident* will take advantage of expanded memory.) Note too that *Resident* stores only a program's executable file in memory and thus must have ready access to supporting files (such as overlays) on disk. On a dual floppy system, this likewise severely limits the number of applications you can use in memory-resident fashion.

Resident is relatively simple to learn and use, despite a poorly written, haphazardly organized manual. But the lack of EMS support and the amateurish design give me pause—relatively inexpensive programs such as *Microsoft Windows* offer far more elegant and comprehensive solutions to the

(continues)

Only The Paradise AutoSwitch™ EGA Card Switches Video Modes Automatically.

EGA standard video gives you the best quality color graphics and text you can get on a PC. Crisp, colorful charts and graphs. Sharp, easy-to-read text.

All EGA cards are not created equal. IBM's, and most other EGA cards, won't work with some popular software programs, like Lotus 1-2-3 (version 1.0), that were designed to run in IBM's original color graphics (CGA) or Hercules monochrome graphics modes.

A few EGA cards can run this software. But, they require you to switch video modes manually by flipping switches or by loading a special "configuration" program when you want to switch modes. Major aggravations.

A smarter EGA Card. Computers should *do* work for you rather than *make* work for you. That's why we designed the Paradise AutoSwitch™ EGA Card to work with all popular PC video modes, including CGA, Hercules and MDA. It's the *only* graphics card smart enough to switch to the right video mode, automatically, every time you change programs. So, when you upgrade to AutoSwitch EGA, you can continue to use your existing software, as well as new programs written for EGA. With no mode switching hassles.

Short is beautiful. The AutoSwitch EGA Card fits into a short PC, XT or AT slot. Our user's manual, called by *InfoWorld* "...the best we've seen for such cards...," is also short.

A full year warranty. Plus, the AutoSwitch EGA Card is made by Paradise Systems, the company that makes more PC video controllers than anyone except IBM. For a demonstration, visit your PC dealer. And see how the most advanced EGA card you can buy is also the easiest to use.

For dealer name, or more information, call toll-free: (800) 527-7977, Ext. ___

In California, (800) 822-2020, Ext. ___

PARADISE

SYSTEMS, INC

The Video Technology Company

Trademarks: Paradise, AutoSwitch EGA Card - Paradise Systems, Inc.; Lotus Development Corporation; registered trademark IBM - International Business Machines Corporation

LaserTEN™

A great deal. Easier.

No other laser printer makes the power of laser printing as affordable or as easy to use as the Qume® LaserTEN™. You get professional looking printing, crisp graphics, multiple type fonts with unprecedented ease of system interfacing, operation and maintenance.

For the Multi-user office or the single-user PC.

With its ability to print out 10 pages a minute of high-resolution (300 x 300 dpi), solid characters, and detailed graphics, the Qume LaserTEN can easily handle the production and quality demands of your clustered workstations and local area networks. At the same time, it's priced low enough to justify its dedication to a single PC workstation.

A new ease of interfacing.

If you're using any of today's popular computers or printers you'll discover that the Qume LaserTEN and LaserTEN PLUS with enhanced graphics emulate all of the most popular laser, daisywheel, and dot-matrix printers *with the software you already have;* and, making the match is as fast—and as easy—as snapping in a new interface module.

The LaserTEN also puts you into a new world of printing sophistication. ITT Qume offers over 100 type styles in fast-loading, snap-in cartridges. Every typeface can be styled for the exact type look you want. Use up to 20 typefaces per page.

Simply sophisticated to make it simply reliable.

The LaserTEN gives you the most durable printing drum made, an advanced processor controller for faster operation, and extra-strength parts throughout. It will run for months with virtually no service and a minimum of supplies. And to make buying or

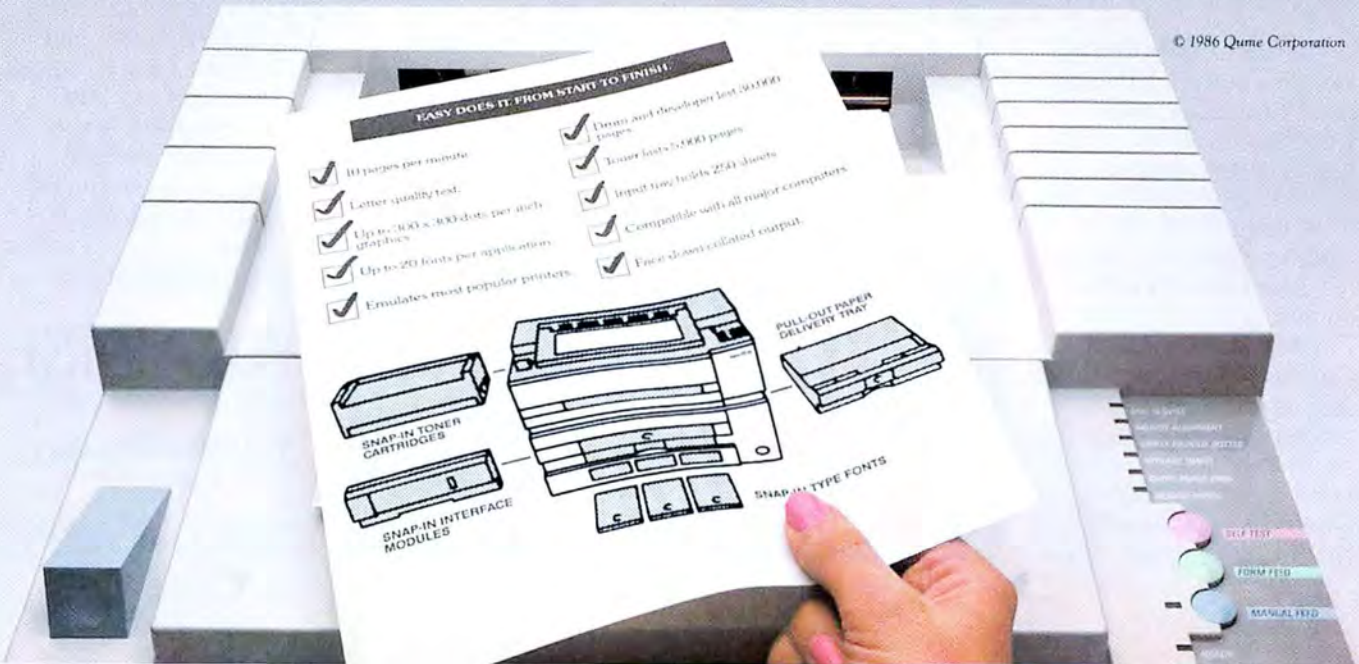
leasing easy there's ITT financing; and for your ongoing service needs, the ITT SERVCOM™ Network.

Make a great deal easier. Call: ITT Qume, (800) 223-2479; TELEX 40970122; TWX 910-338-0232. Or, contact your nearest authorized ITT Qume dealer.

ITT QUME

Circle 797 on reader service card

© 1986 Qume Corporation



BUSINESS COMPUTERS
OF PETERBOROUGH Gollan Co., Inc.
Upper Union St. P.O. Box 94
W. Peterborough, NH 03468-0094

Absolutely NO Additional Charges *

"One price, free freight, in stock, and that's my promise."

William F. Gollan
President

Member Better Business Bureau

"We'll support, service, and warranty everything we sell and stand behind it 100%."

COMPUTERS

Compac	
All Products	CALL
IBM	
All Products	CALL
Quadram Dataview	
Superfwist w/2 3.5" drives	1699.95
Sharp	
PC 7000 Portable	1199.95
Televideo	
Telecat 286 w/20mB	2259.95
Toshiba	
T-1100 +	1789.95
T-3100 AT	CALL
Wyse	
PC 286 w/Key B. w/40mb	2899.95
PC w/Key w/10mb	1379.95

MODEMS

BCP/USA	
PG1200 (1yr war)	179.95
PG1200 B½ w/sw (2yr war)	159.95
JG2400 (1yr war)	329.95
JG2400 B½ w/sw (2yr war)	CALL
D.C. Hayes	
Smartmodem 1200	384.95
Smartmodem 1200B½ sw	354.95
Smartmodem 2400	569.95
Smartmodem 2400B sw	519.95
Transet 1000 w/128k	289.95
Transet 1000 w/512k	389.95
Prometheus	
Pro 1200	279.95
Pro 1200B sw	239.95
Pro 2400	379.95
Pro 2400B ½ w/sw	CALL
US Robotics	
Courier 2400	409.95
MicroLink 1200B½ sw	269.95
MicroLink 2400B sw	409.95
Password 1200	219.95
Ventel	
1200 +	369.95
1200 ½ Card w/Crosstalk	369.95
2400 ½ Card w/Crosstalk	469.95
2400 +	469.95

PERIPHERALS

AMDEK	
310 Amber	164.95
Color 600 RGB	409.95
Color 722/725 EGA (ea)	519.95
Color 730	689.95
1280 CAD/Desktop Pub.	CALL
AST	
Adv. Prem. w/DV w/512k	399.95
Adv. Prem. w/DV w/2mb	569.95
AST 5251/11 +	609.95
AST 5251/12	509.95
Preview	249.95
Rampage AT w/512k	459.95
Rampage AT w/2mB	629.95
Rampage PC w/256k	264.95
Rampage PC w/2mB	459.95
Ramvantage AT w/128k	249.95
Ramvantage AT w/3mB	539.95
6 Pac Prem. w/DV w/512k	369.95
6 Pac Prem. w/DV w/1mB	469.95
6 Pac Prem. w/DV w/2mB	699.95
6 Pac w/5k w/64k	179.95
6 Pac w/5k w/384k	229.95
EGA 3G+ w/64k	289.95
EGA 3G+ w/256k	349.95
Curtis Mfg.	
Emerald	39.95
Ruby	59.95
Static Mat	29.95
System Stand AT	38.95
System Stand PC/XT	19.95
Uni I System Stand	24.95
Uni I Printer Stand	18.95
DCA/IRMA	
IRMA 3278/3279 730	784.95
Disk Drive	
Toshiba PC 360KB ½HT	109.95
Toshiba AT 360KB ½HT	119.95
Hercules	
Color	164.95
Graphic's +	199.95
Intel	
Above Brd. AT w/128k	389.95
Above Brd. AT w/2mB	579.95
Above Brd. AT w/4mB	959.95
Above Brd. ATPS w/128k	429.95
Above Brd. ATPS w/1.5mB	569.95
Above Brd. ATPS w/3.5mB	949.95
Above Brd. PC w/64K	269.95
Above Brd. PC w/2mB	469.95
Above Brd. PS w/64K	309.95
Above Brd. PS w/1.5mB	469.95
8087 (PC/XT)	124.95
8087-2 (for 8MHZ CPU's)	169.95
80287-8	269.95
80287 (AT)	209.95
Iomega	
Bernoulli 10+10	1859.95
Bernoulli 20+20	2459.95
Bernoulli 20+20 & 80mB	3699.95
Bernoulli 10mb (3 pac)	189.95
Bernoulli 20mb (3 pac)	239.95
Joysticks	
Kraft & Hayes M's (ea)	39.95
Kensington	
Master Piece +	124.95
Master Piece	99.95
Keytronics	
KB 5151	176.95
KB 5153	276.95
Maynard	
All Products	CALL
Memory	
64k & 256K (9)	CALL
Microsoft	
Mach10 w/IP,Wind.,Mouse	389.95
Mouse Bus. w/PC Paint	129.95
Mouse RS232C w/PC Paint	139.95
Mountain	
Drive Card 20mB	659.95
Drive Card 30mB	999.95
Race Card-286	399.95
Mouse Systems	
PC Mouse w/PC Paint +	139.95
PC Mousew/Ready & PC P+	152.95
PC Mouse w/DR Hallo II	129.95
PC Mouse Bus w/PC+	CALL
NEC	
Multisync 1401	559.95
Orchid	
PC Net Turbo	CALL
PC Net Starter	749.95
PC Turbo 286E w/1mb	749.95
Tiny Turbo 286	459.95
PGA Turbo	1039.95
EGA Turbo w/256k	589.95
EGA	359.95
Paradise	
Color/Mono	149.95
EGA Autoswitch	364.95
Hi Res Graphics	259.95
Modular Graphics	269.95
Multi Display	189.95
Persyst	
Bob 16	474.95
Plus Development	
Hard Card 10mb	539.95
Hard Card 20mb	689.95
Priam Internals	
ID 40 AT	909.95
ID 60 AT	1199.95

PERIPHERALS

Princeton	
HX 12	454.95
HX 12 E	539.95
Max 12 E	184.95
SR 12	574.95
Quadram	
EGA Monitor	519.95
EGA +	369.95
Liberty PC w/2mb	459.95
Liberty PC w/0k	249.95
Liberty AT w/2mb	509.95
Liberty AT w/128k	299.95
Microfazer II w/512k	359.95
Microfazer II w/2.5mB	879.95
Microfazer w/128k	169.95
Quad Board AT w/128k	379.95
Quad Board AT w/1.5mB	569.95
Quad EMS+ w/IO w/256k	339.95
Quad EMS+ w/IO w/2mB	519.95
Seagate	
20 mB w/Cont. ½ ht	439.95
30 mB w/Cont. ½ ht	539.95
Sigma	
Color 400	464.95
EGA	374.95
STB	
Chauffer HT	239.95
EGA +	299.95
Tall Tree	
Jram II PC w/0k	159.95
Jram II PC w/2mB	399.95
Jram III PC w/0k	219.95
Jram III PC w/2mB	439.95
Jram II AT w/0k	219.95
Jram II AT w/2mB	439.95
Jram III AT w/0k	249.95
Jram III AT W/2mB	489.95
Video-7	
Vega EGA	369.95

PRINTERS

AST Turbo Laser	CALL
Canon A1p Laser	1979.95
Canon A2 Laser	2649.95
Citizen MSP 10	309.95
Citizen MSP 15	399.95
Citizen MSP 20	349.95
Citizen MSP 25	499.95
Citizen Premier 35	499.95
Cordata Lp300 Laser	2229.95
Epson EX 800	CALL
Epson EX 1000	CALL
Epson LQ 800	619.95
Epson LQ 1000	829.95
Epson LX 80 F/T	339.95
Epson FX 85	439.95
Epson FX 286	619.95
Fujitsu DX 2100	369.95
Fujitsu DX 2200	469.95
Fujitsu DL 2400	729.95
NEC P560	959.95
NEC P660	459.95
NEC P760	629.95
NEC 3550	779.95
NEC 8850	1079.95
NEC 560 XL Color	1109.95
NEC LC800 Laser	CALL
Okidata 192+	364.95
Okidata 193+	529.95
Okidata 292	499.95
Okidata 293	639.95
Okidata 294	959.95
Quadram Laser	2849.95
Qume Laser 10	2159.95
Qume Laser 10+	2599.95
Silver Reed Exp 550	309.95
Silver Reed Exp 800	669.95
Star LV 1210	219.95
Star NB 15	939.95
Star NX 10	274.95
Toshiba 321	489.95
Toshiba 351	999.95
Toshiba 351 C	1139.95
Toshiba PageLaser 12	CALL

BUSINESS SOFTWARE

Ashton-Tate	
dBase III +	CALL
Framework II	CALL
BPI	
AR/GL/AP/PR (ea)	303.95
Compuserve	
Subscription Kit	24.95
Great American	
AR/AP/PR	140.95
One Write +	160.95
Graphics Communication	
Freelance	201.95
Graphwriter Combo	299.95
Infocom	
Cornerstone	69.95
Innovative	
SmartSystem	429.95
Spell Checker	79.95
Lifetree	
Volkswriter Deluxe 3.0	149.95
Volkswriter Scientific	264.95
Living Videotext	
Ready	50.95
Think Tank	105.95
Lotus	
1-2-3 V2.01	CALL
Symphony	CALL
Meca	
Mng. Your $ V-2.0	109.95
Mng. the Market	89.95
Microrim	
R Base 5000	249.95
R Base System V	369.95
Microsoft	
Access	139.95
Chart 2.0	184.95

MONTHLY SPECIAL

Laptop's In Stock Today!

Toshiba		Sharp	
T-1100 +	1789.95	PC 7000 Portable	1199.95
T-1100 + Drive 5.25"	399.95	PC 7000 Expansion Chassis	349.95
T-1100 + Modem 1200	319.95	PC 7000 Modem 1200B	279.95
T-1100 + PC Link	189.95	PC 7000 Carry Case	89.95
T-3100 AT	CALL		

BUSINESS SOFTWARE

Project 2.0	241.95
Multiplan 2.0	121.95
Windows	69.95
Word V 3.0	249.95
Migent	
Ability	66.95
Monogram	
$ & Cents V 2.0	105.95
Micropro	
Wordstar Pro	244.95
Wordstar 2000	244.95
Wordstar 2000 + V 2.0	289.95
Multimate Int'l.	
Advantage	264.95
Multimate 3.31	219.95
Paper Back	
VP Planner	59.95
VP Info	59.95
Power Base Systems	
Power Base V 2.2	190.95
Satellite Software	
Wordperfect 4.1	229.95
Word Perfect Library	64.95
Simon Schuster	
Websters Speller	44.95
Websters Writer	CALL
Software Group	
Enable	329.95
Software Publishing	
Harvard Total PM	288.95
Harvard Pres. Graphics	248.95
PFS:PL, FL, GR, RP (ea)	84.95
PFS:Write w/Spell	84.95
PFS:Pro File	154.95
PFS:Pro Write	134.95
Sorcim/IUS	
AR/GL/AP/PR/IC (ea.)	299.95
SuperCalc III V 2.1	199.95
SuperCalc 4	281.95
SuperProject +	270.95
Symantec	
Q & A	264.95
United	
In House Acct.	109.95

UTILITIES & LANGUAGES

Aldus	
Pagemaker	CALL
Borland	
Reflex Bundle	129.95
Reflex DBMS	89.95
Reflex Workshop	43.95
Sidekick CP	39.95
Sidekick NCP	53.95
Superkey	43.95
Traveling Sidekick	44.95
Traveling Sidekick w/sk	79.95
Turbo Lightning	61.95
Turbo Lightning w/WW	89.95
Turbo Pascal V3.0	60.95
Turbo Prolog	61.95
Turbo Tool Box DB.	44.95
Turbo Tool Box Editor	44.95
Turbo Tutor V 2.0	29.95
Turbo Game Wks.	44.95
Turbo Graphics	44.95
Word Wizard	44.95
Broderbund	
Graphic LIB. #1,#2 (ea)	27.95
Print Shop	39.95
Central Point	
Copy II PC	27.95
Option Board	84.95
PC Tools	27.95
Data Transforms	
Fontrix	99.95
Font Packs (ea.)	19.95
Printrix	84.95
Decision Resources	
Chartmaster	238.95
Diagram Master	204.95
Map Master	247.95
Signmaster	158.95
Digital Research	
Gem Collection	124.95
Gem Desktop	34.95
Gem Draw	144.95
Gem Graph	154.95
Entertronics	
Chart	199.95
Entergraphics V 2.0	289.95
Merge	114.95
Plotter	59.95
Fifth Generation	
Fast Back	102.95
Fox & Geller	
dGraph III	139.95
dUtility III +	84.95
Quick Code III	139.95
Quick Index	84.95
Quick MAC	64.95
Quick Report III	154.95
Funk	
Sideways V 3.1	42.95
Lattice	
C Compiler	269.95
Curses Screen Mng.	69.95
dbc III Interface	139.95
Panel Screen Ed.	159.95
Seafood Smorg.	84.95
Sprite Debug	99.95
Topview	139.95
Meridan	
Carbon Copy	134.95
Microsoft	
Basic Compiler	239.95
Basic Inter.	229.95
C Compiler	289.95
Cobol 2.0	419.95
Fortran Compiler	208.95
Macro Assem.	109.95
Pascal	179.95
Quick Basic	69.95
Microstuff	
Crosstalk V3.6	99.95
Remote V 1.3	99.95
Transporter	149.95
Nantucket	
Clipper	354.95
Norton Lambert	
Close-Up	CALL
Norton Utilities	
Norton Commander	40.95
Norton Util. v 3.1	60.95
Personics	
Smart Notes	54.95
Rosesoft	
Prokey v 4.0	79.95
Quarterdeck	
Deskview	69.95
Graham	
scLaser +	CALL
Soft Logic	
Cubit	39.95
Disk Optimizer	39.95
Double DOS	39.95
Software Carousel	39.95
Spectrum	
Art Studio	34.95
Executive Pic. Show	134.95
Springboard	
Certificate Maker	CALL
Clip Art V1	21.95
Clip Art V2	26.95
Newsroom	39.95
Summit	
Better Basic V 2.0	129.95
Btrieve Interface	69.95
C Link Interface	69.95
Math Module 8087/80287	69.95
Run Time	164.95
T Maker	
Clickart Publisher	119.95
Laser Option	89.95
True Basic	
True Basic	112.95
True Basic Fireworks	162.95

- **FREE** CREDIT CARD USE
- **FREE** SHIPPING
- **FREE** HANDLING

Customer Service (603) 924-9406

* Our Terms and Conditions
* Shipping UPS Ground FREE (Lower 48 only)
* Handling FREE
* Credit Card Surcharge 0%
* Purchase Orders FOB NH, Handling
* APO/FPO FOB NH & Handling
* Prices & Availability Subject to Change

Circle 235 on reader service card

VISA

CALL TODAY—ORDERS ONLY 1-800-845-3003

MasterCard

NEW!
For Your IBM PC or Compatible
RightWriter® Version 2.0

THE Intelligent
Grammar and Style Checker

RightWriter is a new tool to help you produce lean, powerful BUSINESS WRITING. RightWriter uses advanced artificial intelligence technology to flag errors in GRAMMAR, STYLE, USAGE, and PUNCTUATION. RightWriter is the first office automation package aimed at producing better writing, not more writing.

- **Messages are Inserted** directly into text to point out possible errors and problem areas.
- **Easy to Use** — only one command to learn, your word processor does the rest.
- **Works with Leading Word Processors** — including WordStar®, Volkswriter®, PFS:write®, MultiMate®, and others.
- **Readability Index** — measures the reading grade level of the document using the D.O.D. standard Flesch-Kincaid formula.
- **Uncommon Word List** — lists misspelled, slang, and uncommon words.
- **Recommends** — never decides. RightWriter is a writing aid. The final decision is always left to you.

"...RightWriter is an idea whose time is long overdue."
Phil Wiswell — PC Magazine

"RightWriter is an excellent, low-cost, eye-opening software package..."
Inside Word Management

"The documentation is among the best I have seen."
Jim Pile, Soft Sector

Price $95.00

Available from your local dealer or:
DECISIONWARE, INC./RightSoft Division
2033 Wood St. • Suite 218
Sarasota, FL 33577
Phone Orders Call: (813) 952-9211
Add $4 for shipping and handling.
VISA & MASTERCARD accepted
30 Day Money Back Guarantee

RightWriter is a trademark of DecisionWare, Inc. WordStar is a trademark of MicroPro International Corporation. MultiMate is a trademark of MultiMate International. PFS:write is a trademark of Software Publishing Corporation. Volkswriter is a trademark of Lifetree Software, Inc.

Circle 365 on reader service card

Get In on the PC Market Action

Your *PC World* Action Ad takes you to the heart of the IBM PC marketplace. These ⅓-page gems provide a cost-effective way to reach over 275,000 *PC World* readers. Place your ad with Carol Watson at 800/435-7766 (800/435-7760 in California).

problems *Resident* only partially addresses. *Resident* has its merits, but slip it into your disk drive with kid gloves. *–Judy Getts*

Resident version 1.1
Information Software, Inc.
2639 Walnut Hill Ln. #135
Dallas, TX 75229
214/353-2966
List price: $89.95
Requirements: 128K (640K recommended), one disk drive (hard disk recommended), DOS 2.00 or later version
Not copy protected

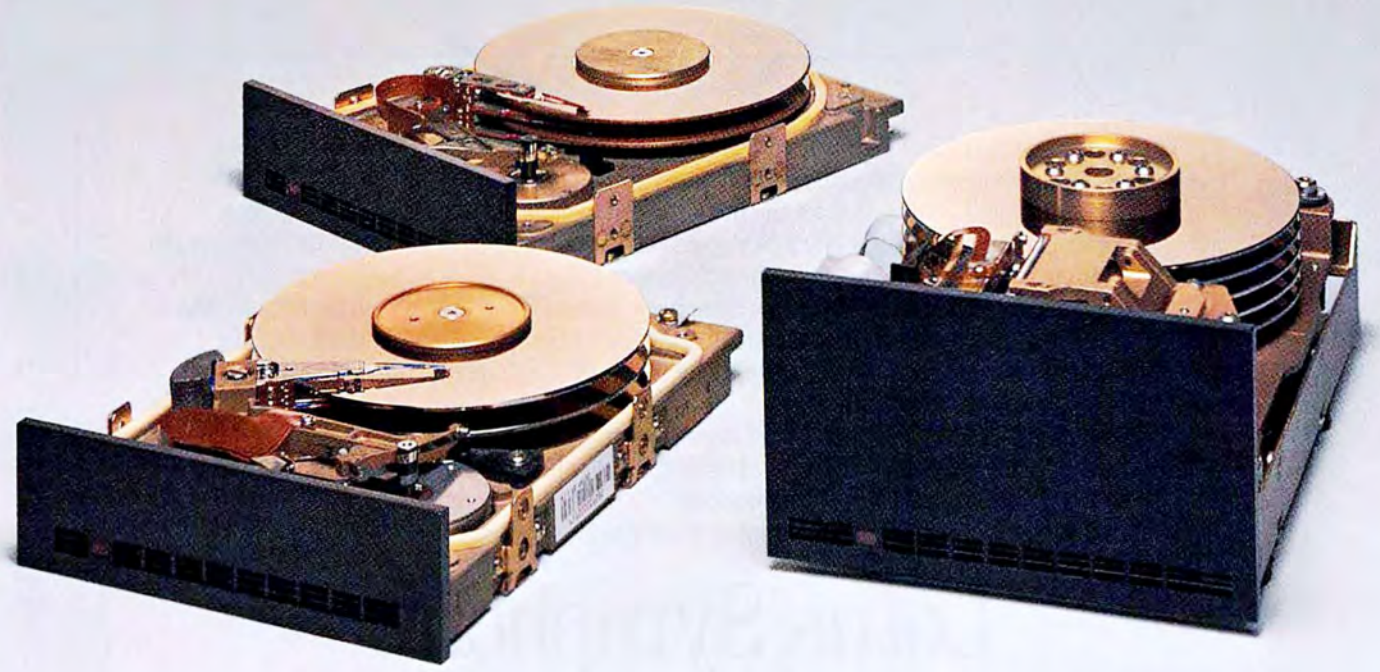
Vestor

Apparently it's easier to make money in the stock market than it used to be. Why else would there be securities analysis programs for every man, woman, and child? But I'll leave this burning question for free-market philosophers to settle. As they say on Wall Street, don't fight the trend.

Despite the great number of programs being introduced, most fit into one of two categories. The first is the Crunchers—they download raw data from on-line commercial data bases such as Dow Jones, massage it inside the Big Beige Box this magazine is named after, and spit out ratios and recommendations on demand. The second group is the Callers. These specialized telecommunications packages connect with some company's mainframe and capture previously massaged, company-specific information. In their

(continues)

Unforgettable.



Disc drives should never forget one thing: your important information.

At Seagate, we build our drives to protect your data against all mishaps. And we put each drive through a series of grueling tests to make sure it doesn't forget.

That's why quality-conscious customers have bought more than 3 million of our 5¼" hard disc drives.

So the next time you're looking for a new computer, disc memory upgrade or add-on, ask for Seagate by name.

It's all you need to remember.

Seagate Technology, 920 Disc Drive, Scotts Valley, CA 95066. 800-468-DISC. In California, 800-468-DISK.

Seagate

Circle 425 on reader service card

CONSTANT COMMITMENT

Complete management tool

There are enough copies of Symphony® software in use today to make Symphony, by itself, the fourth largest independent microcomputer software company in the world. Now let's discuss why.

It's a truly complete workstation for the modern manager...incorporating 1-2-3's® powerful spreadsheet capability with Symphony's own word processing, graphics, database and communications. All of them working together, all in one program.

As your computer knowledge grows, so Symphony grows. The more you use Symphony, the more you find you can do with it. And with a growing line of Symphony add-in products from Lotus® (Text Outliner, Spelling Checker, Symphony Link™ etc.), Symphony offers steady and seemingly endless potential for expansion.

A workstation. Thoroughly integrated. Geared for growth.

That's why Symphony is one of the world's most successful business software programs for IBM® personal computers and compatible products.

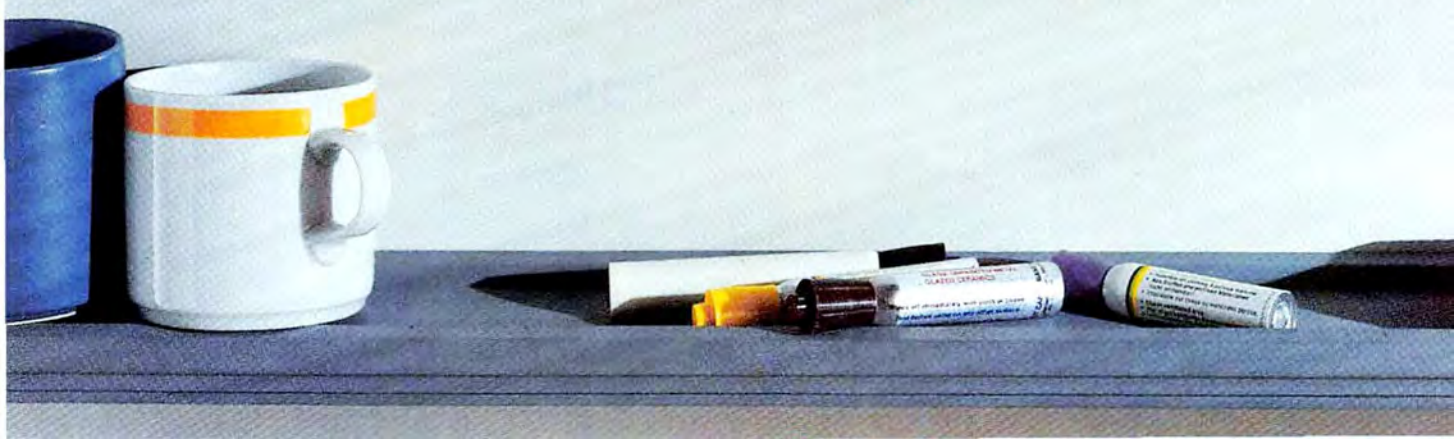
And that's why you ought to get a complete demonstration.

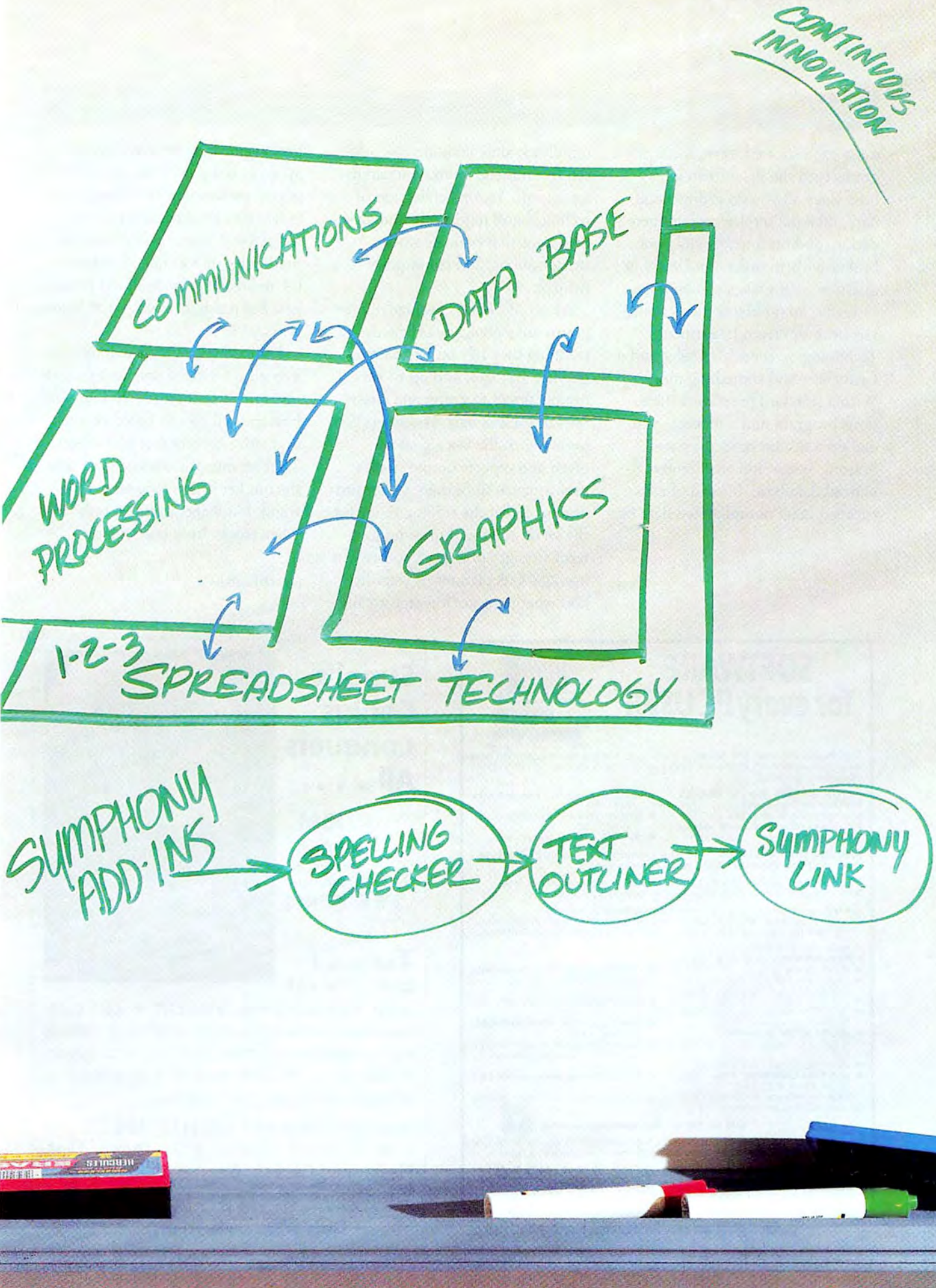
Lotus Symphony

A complete general-purpose software tool built around the world's leading spreadsheet technology.

© 1986 Lotus Development Corporation. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. Symphony Link is a trademark of Lotus Development Corporation. IBM is a registered trademark of International Business Machines Corporation.

you can't out grow it




CONTINUOUS INNOVATION
COMMUNICATIONS
DATA BASE
WORD PROCESSING
GRAPHICS
1-2-3 SPREADSHEET TECHNOLOGY
SYMPHONY ADD-INS
SPELLING CHECKER
TEXT OUTLINER
SYMPHONY LINK

most sophisticated form, these programs turn the PC into an idiot box, since all you do is download data, take the service's recommendation, and presumably call your broker with an order. And without question, that makes you an idiot.

Vestor, an on-line securities analysis program from Investment Technologies, is both a Caller and a Cruncher—and something more. With a standard telecommunications program and a modem, you dial up a distant minicomputer housing *Vestor* and an extensive financial data base. Instead of capturing a mass of undigested data or mindlessly downloading buy-and-sell recommendations, you can interact with *Vestor*'s collection of technical and fundamental analysis programs that evaluate stocks, stock options, and commodity futures.

Many of *Vestor*'s evaluative programs are technically oriented, meaning they rely on trend lines, moving averages, and up-to-the-minute prices to graph and chart buy-and-sell signals. *Vestor* lets you know when the last signal was given and reports on the stock's performance since then. Other programs predict the trading range for the week and the short- and long-term strength of a given security or average. Calculations of volatility and whether a stock is statistically undervalued are only keystrokes away, as is a prediction of the expected performance of a stock in a bull versus a bear market. If you feel passive, *Vestor* will search the market for its top-rated fundamental and technically analyzed favorites. But passivity is not what *Vestor* is about.

For example, *Vestor* will retrieve historical financial data and provide investment ratings, predictions, and buy-and-sell signals based on the evaluative criteria that you select. Thus an investor who believes that the market is in a long-term uptrend, but wants to invest only when stocks look particularly

(continues)

SOFTWARE for every PC USER

The Public Domain SW library offers over 4000 User-Supported and fully documented software programs that run on MS/PC DOS operating systems.

***Our DISKS have MANY MANY programs!**
5-60 programs per disk.
PC-Catalog on two disks
(with search & sort capability)

- Catalog A with 0-240 different disks $8
- Catalog B with 241 and counting up $6
- **SAVE & buy two** $11

Special Introduction — 1 FREE catalog disk plus 4 pre-selected disks and the second catalog disk all for only $35

$1 - includes games, printspooler, music, communications, etc.
$2 - includes datebooks, debugging, games, graphics, etc.

SAVE more when you become a **MEMBER!** Only $5
Membership includes: 1) lower prices 2) Newsletter with what's new, computer tips, etc. and 3) annual update on catalog, membership

A few selected disks:
EDUCATION: (any two $11)

- Math tutor grades 1-6 #241
- 3-D algebraic functions, chemistry, spelling, etc. #231
- History tutorial, etc #169
- Word Processor for children & finance programs #263
- **BULLETIN BOARD** SYSTEM: 2 disks #261, #262, $11
- Recover LOST FILES: #255
- **CATALOGING:** Keep files organized #257 $7
- **UNPROTECT POPULAR SOFTWARE:** and 30 more useful programs #111 $7
- **WORDPROCESSOR:** PC Write #251-252 $11
- **DATEBASE PROGRAM:** PC File #171 $7
- **GAMES:** Baseball simulation, etc. #233. Football simulation, etc. #236
- **SAVE! Any two disks $11**

FREE Notebook (DOS size) with order of 5 or more disks from library (S1 and S2 not included)

50¢ in 10 qt. for members only

For Traceable Shipments: Canada & Overseas $15. CA Res. add 7% tax. Include $4 for shipping and handling. Single disks orders $7 each.

PUBLIC DOMAIN SW
3080 Olcott St. B 130
Santa Clara, CA 95054

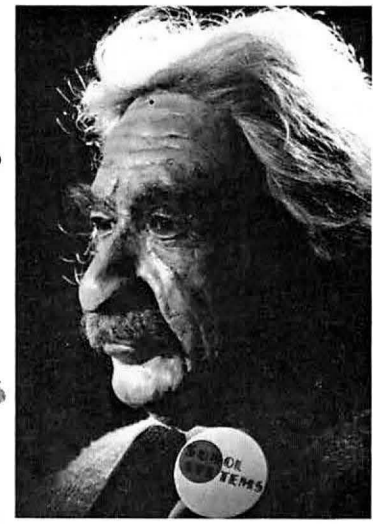
408-988-0230
MC/VISA

Circle 511 on reader service card

Sunol's Genius Conquers All . . .

IBM +Mac

SUNOL SYSTEMS



The Sunol DATA STORAGE AND NETWORKING SYSTEM • can communicate between multiple operating systems • is compatible with over 30 different computers • with up to 366 MB capacity • Tape back-up is available for all O.S. systems.

Want to know more? Call (415) 484-3322 or write to Sunol Systems, 1177 Quarry Lane, Pleasanton, CA 94566.

IBM is a registered trademark of International Business Machines.
Mac is a registered trademark of Apple Computer.

Circle 857 on reader service card

LOGIMOUSE HOLIDAY GRAPHICS PACKAGE

$99

LOGIMOUSE C7

$219

NEW LOGIPAINT-&-DRAW

To place a credit card order call our special toll-free number:

800-231-7717

Call toll-free in California:

800-552-8885

Just for the holidays we've wrapped up LOGIMOUSE and its Plus Software with Generic CADD and PC Paintbrush into the graphics package of the year. LOGIPAINT-&-DRAW is the complete graphics toolkit for combining freehand and technical drawing.

Use LOGIPAINT-&-DRAW to design your holiday greeting, enhance your spreadsheets, graphs and memos, or create and personalize a map or mechanical. Just create your CADD drawing, import it into PC Paintbrush, and embellish it with paint sketches and fancy fonts.

At a saving of almost $50 off our usual low prices, LOGIPAINT-&-DRAW is a holiday package you can't afford to pass up.

LOGIPAINT-&-DRAW includes:

LOGIMOUSE C7 with Plus Software

LOGIMOUSE is the high resolution (200-dot-per-inch) mouse that is ideal for CADD and paint. It connects directly to the serial port of any IBM PC/XT/AT or compatible, with no pad or external power supply required. The Plus Package is our top-of-the-line mouse software featuring a pop-up menu system, an automatic mouse configurator, a unique mouse interface for Lotus 1-2-3, and a mouse based text editor.

LOGICADD—Generic CADD 2.0 and Dot Plot

Generic CADD is the sensational, new CADD package that offers the features and performance of high-priced at an unbelievably low price. The package also includes DotPlot, the add-on utility that turns your dot matrix printer into a plotter.

LOGIPAINT—PC Paintbrush

PC Paintbrush is the most advanced paint set available for the PC. It's the preferred choice of professional users, but with its icon menus for both graphics and text it's easy and fun for beginners as well. It offers complete graphic capabilities as well as 11 type fonts and a palette of 16 colors.

LOGIMOUSE $199 with Borland's Reflex

Reflex, Borland's amazing database management program, flies with LOGIMOUSE! We offer Reflex with LOGIMOUSE and the Plus Package Software at a very special price!

YES I want to add the power of LOGIMOUSE to my holidays!

☐ LOGIPAINT-&-DRAW	$219
☐ LOGIMOUSE w/Driver 3.0	$99
☐ LOGIMOUSE w/Plus Software	$119
☐ LOGICADD w/Logimouse & Plus Software	$189
☐ LOGIPAINT w/Logimouse & Plus Software	$169
☐ REFLEX w/Logimouse & Plus Software	$199

For my computer model: _____

30-Day Money-Back Guarantee

☐ VISA ☐ MasterCard ☐ Check Enclosed

Add $6.50 for shipping and handling. Calif. residents add applicable sales tax. Prices valid in U.S. only.

Card Number _____ Expiration Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

DEALER INQUIRIES WELCOME

LOGITECH

Logitech, Inc.
805 Veterans Blvd.
Redwood City, CA 94063
Tel: 415-365-9852

In Europe:
Logitech SA, Switzerland
Tel: 41-21-879656

In Italy: Tel: 39-2-215-5622

LOGIMOUSE is a registered trademark of LOGITECH. Lotus and 1-2-3 are trademarks of Lotus Development Corp. Reflex is a trademark of Borland-Analytica. Generic CADD is a trademark of Generic Software, Inc. PC Paintbrush is a registered trademark of ZSoft Corp.

POWER LUNCH.

Introducing the new power in AT-class personal computers. The NEC Advanced Personal Computer IV.

You're very serious about personal computers. You'd rather work through lunch than sit in some lazy cafe.

You're a Power User. And the NEC APC IV™ is the one machine that won't leave you power hungry.

It's built for compatibility and speed, with your choice of 6 MHz or 8MHz processing speeds at the flick of a switch.

It's built for looks, with an incredible 800 x 560 screen resolution.

C&C Computers and Communications

And it's built for power, with 5 versatile internal storage slots to accommodate two 1.2 MB floppies, two 40 MB hard disks, and a tape back up allowing you the flexibility to tailor the APC IV to your storage requirements.

Plus, the APC IV has the power of NEC behind it. The $10 billion leader in computers and communications. So you never have to worry about support.

The new NEC APC IV. Because sooner or later, you're going to have to take it to the limit. For more information, call NEC at 1-800-343-4419 (in MA 617-264-8635). NEC Information Systems, Inc., Dept. 1610, 1414 Massachusetts Avenue, Boxborough, MA 01719.

Take it to the limit.

NEC

Circle 737 on reader service card

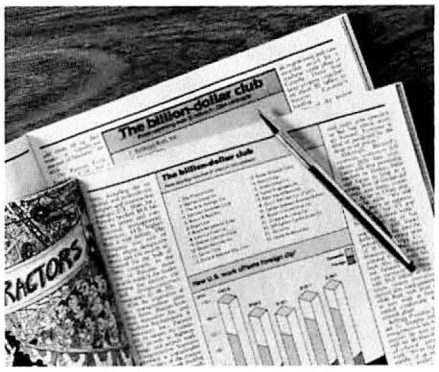
good, can instruct *Vestor* to recommend stocks that had positive ratings in several important derived values. *Vestor* will consider whether the stock was in an uptrend or technically undervalued, and weigh such factors as fundamental and long- and short-term strength. You can keep adding conditions until *Vestor*'s recommendations meet your requirements.

Vestor's user manual provides both an excellent system overview and the necessary details, but the on-line Instruct program will teach you how to operate the entire gizmo if you get confused. *Vestor* will even keep track of your monthly charges on the service and allow you to log on to other on-line services.

Although *Vestor* puts powerful, wide-ranging analysis only a modem away, it does not perform "qualitative" analysis. For example, the program can't measure the quality of a company's management, predict the possibility of a takeover, or foresee the introduction of a new product. And it's not for those who simply dabble in the market. A subscription to *Vestor* can be a wonderful thing—but this is serious stuff for serious players. If you know your alpha from your beta and don't think Elliott Wave theory is an advanced surfing technique, *Vestor* is worth consideration. *—Stephen A. Blumenthal*

Vestor
Investment Technologies, Inc.
510 Thornall St.
Edison, NJ 08837-2212
800/524-0831, 201/494-1200
List price: one-time sign-up fee

(continues)



23 out of 24. Again.

The Billion Dollar Club. An elite group, that handles the world's biggest projects, as reported by *Engineering News-Record.*

Last year, only 24 companies made the list. 23 of them use Primavera Project Planner.

This year, the list again numbered 24 companies. And once more, 23 of them use Primavera.

Coincidence? Ask some of the project managers. They'll tell you that Primavera consistently delivers more:

The *capability* to handle projects with up to 10,000 activities. And the *flexibility* provided by features like 20 activity codes per project, choice of I-J or precedence formats, interactive and batch modes for data entry, resource leveling, direct interface to Lotus® or dBASE,® even on-screen bar charts and histograms. Plus exceptional report-generating control.

Send for our $35 demo and see for yourself.

We're helping the world's top companies manage their projects more effectively. Isn't it time we do the same for you?

Project management software
that works as hard as you do.

PRIMAVERA SYSTEMS, INC.

Two Bala Plaza • Bala Cynwyd, PA 19004 • (215) 667-8600 • Telex: 910 997 0484

Primavera project management software:
Primavera Project Planner • Finest Hour (hourly scheduling and multiple calendars)
• Primavision (optional plotter graphics) • Available for MS-DOS and VAX environments

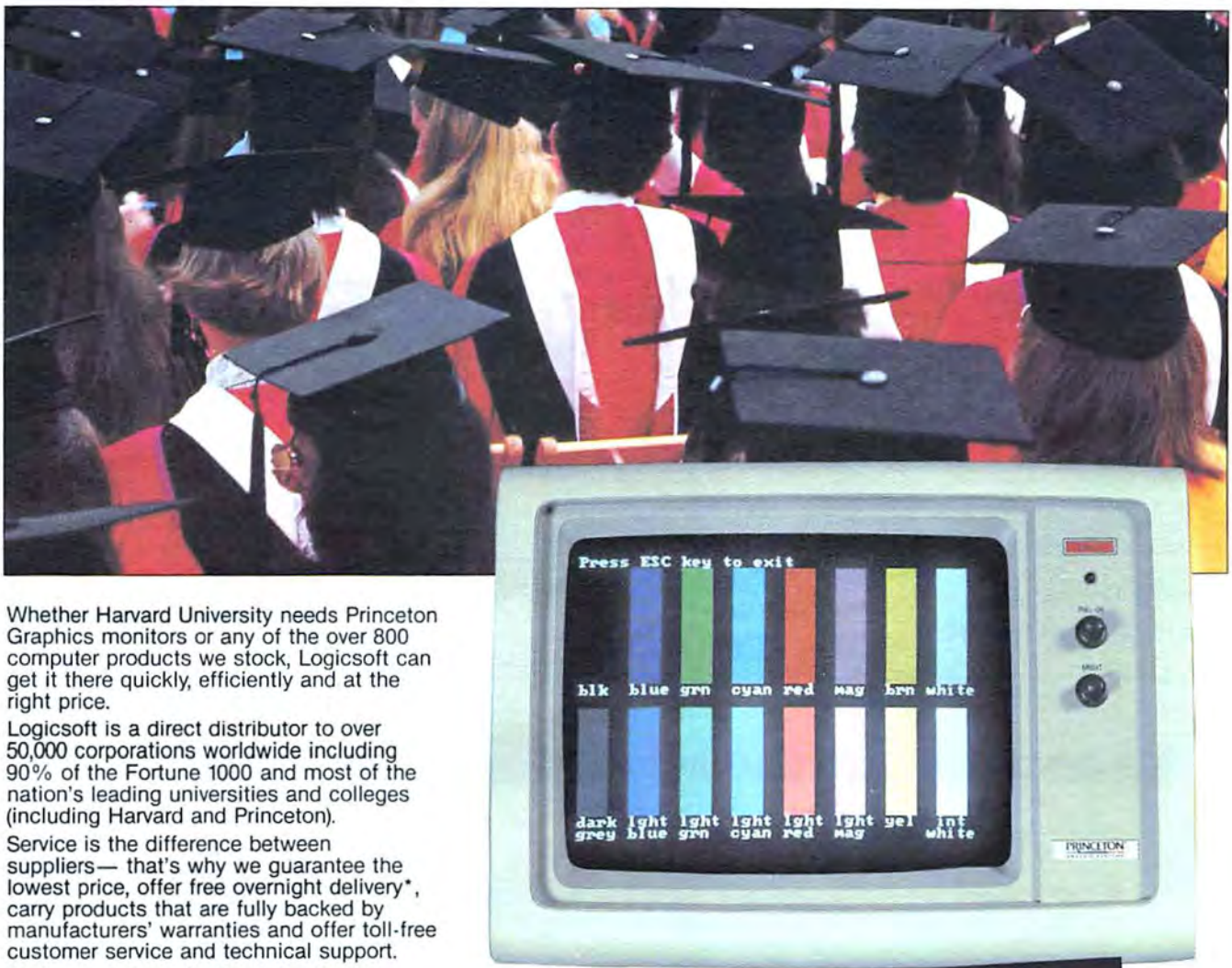
Source: ENR Construction Economics Dept., *Engineering News-Record.* Issue dates: April 18, 1985 and April 17, 1986.

Circle 148 on reader service card

Get In on the PC Market Action

Your *PC World* Action Ad takes you to the heart of the IBM PC marketplace. These ⅓-page gems provide a cost-effective way to reach over 275,000 *PC World* readers. Place your ad with Carol Watson at 800/435-7766 (800/435-7760 in California).

When Harvard needs Princeton they should call Logicsoft



Whether Harvard University needs Princeton Graphics monitors or any of the over 800 computer products we stock, Logicsoft can get it there quickly, efficiently and at the right price.

Logicsoft is a direct distributor to over 50,000 corporations worldwide including 90% of the Fortune 1000 and most of the nation's leading universities and colleges (including Harvard and Princeton).

Service is the difference between suppliers— that's why we guarantee the lowest price, offer free overnight delivery*, carry products that are fully backed by manufacturers' warranties and offer toll-free customer service and technical support.

And we are the only direct distributor to offer national on-site installation and service on systems through our 96 authorized service centers.

It's easy to do business with Logicsoft. We offer terms to qualified institutions; accept all major cards; and now our newest service...leasing.

Therefore, when Princeton needs Harvard (Total Project Manager) they should call us too!

LOGICSOFT SPECIAL OF THE MONTH
Princeton Graphics HX-12 color monitor. High resolution, 16 superb colors, .31mm dot pitch.
CALL FOR OUR SPECIAL LOW PRICE!

THE NATION'S LARGEST DIRECT DISTRIBUTOR OF COMPUTER PRODUCTS

LOGICSOFT®

110 Bi-County Blvd., Dept. 5432
Farmingdale, NY 11735
CANADA: 800-433-6235
Domestic/Int'l Telex
286905 SoftUR

To order or receive technical assistance, call our National Hotline:

1-800-645-3491

NY STATE: 1-800-235-6442 (516) 249-8440
Customer Service: 1-800-431-9037 NYS: 516-249-8440
FAX #516-249-5289

EUROPE: 020-83 48 64
Telex: 10759 Logic NL
Mail orders to:
LOGICSOFT EUROPE BV
Baarsjesweg 224
Amsterdam, Holland

• No surcharge for MasterCard, VISA, American Express, C.O.D., money order, check or PO's (please call for price verification) • No sales tax on orders shipped outside N.Y. State • Please add 2% for insurance and handling ($3.00 minimum) (int'l orders add'l) • We do not bill until we ship. All products covered by mfg's warranty. Defective merchandise may be returned for repair or exchange only. We do not guarantee compatibility. Any goods returned for credit are subject to a 15% restocking charge. All prices and policies subject to change without notice.

***FREE OVERNIGHT DELIVERY**—available on orders totaling over $100. Shipped UPS, FREE, if under $100 (within Cont. U.S.). Due to weight restrictions, printers and monitors & some misc. bulk items are also shipped UPS, FREE.
LOWEST PRICE GUARANTEE—If you find a lower price (bonafide advertisement or quote) we'll beat it by $10. On items under $100, American Express or terms orders we will meet any lower price. We reserve the right to request a current written price quote.

Free on-site insta

Enhanced Leading Edge Model D

• 512K RAM Memory • 1200B Internal Modem • Two 360K Half/Height Floppy Drives • Four Expansion Slots • Keyboard • Text Display Card • Monochrome Monitor• One Serial and Parallel Port • Software Bundle • Color Monitor Option Available.
• **Purchase Price: $1,375**

Lease For **$59** per month

New IBM XT 286—20 Mb

• 6 MHz • 80286 Based CPU • Zero Wait States • 640K • 1.2 Mb Half/Height Floppy • 20 Mb Half/Height Hard Drive • Serial/Parallel Adapter • Eight Expansion Slots- (5) 16-Bit, (3) 8-Bit • IBM PC Enhanced Keyboard • Free 90-Day, On-Site Contract • Color or Monochrome Monitor Available as Option.
• **Purchase Price: $3,199**

Lease For **$126** per month

New IBM AT-30 Mb

• 8 MHz • 512K • 30 Mb IBM Hard Drive (Full Height, w/controller) • 1.2 Mb Half/Height Floppy • Eight Expansion Slots • IBM Enhanced PC Keyboard • Serial/Parallel Adapter • Free 90-day, On-Site Service Contract • Color or Monochrome Monitor Available as Option.
• **Purchase Price: $4,179**

Lease For **$165** per month

New Compaq Portable II 20 Mb

• 640K RAM Memory • 8 MHz • 80286 Based CPU • One 20Mb Hal Height Hard Drive (w/controller) • 360K one/third Height Floppy Drive Two Expansion Slots • Compaq II Keyboard • Text/Graphics Display • 9" Text/Graphics Monochrome Monitor • One Serial and Parallel Po Free 90-Day, On-Site Service Contr
• **Purchase Price: $3,879**

Lease For **$153** per month

Lease or purchase systems from Logicsoft

A Logiclease of any system entiltles you to free installation and 90-day service contract at your place of business! Outstanding flexibility plus possible tax benefits. We'll process your lease application in 24 hours!

A purchase of any system entitles you to installation for only $99, and free service for 90 days at your place of business.

ON-SITE SERVICE

Trained technicians are ready to respond to your needs within an average of 4 hours from any of our 96 authorized service centers, located in most major metropolitan areas throughout the United States.

Logic AT

FCC Class B Approved.
• 8 MHz • 512K RAM Memory • 80286 Based CPU ☐ ROM BIOS 32 (Includes auto system test when pov is turned on • 1.2 Mb High Density Floppy Drive • Eight Expansion Slots Enhanced Keyboard • (1) Serial Port (1) Parallel • Clock/calendar • Graphics Card • Programmable Spea • Automatic Lock/Unlock Mechanis Monochrome or Color Monitor Availat as Option. Hard Drive Options Availat
• **Purchase Price: $1,485**

Lease For **$58** per month

100% Burn-In and Testing.

All systems undergo a 48-hour configuration, testing and burn-in period. We configure system boards, set DIP switches, format hard drives perform memory diagnostics and ch system with monitor.

The Nation's lo
and fr

5 YEAR WARRANTY

Look for the items printed in blue to identify our line of LogicWare computer hardware products. They are fully compatible with, but priced well below, the major manufacturers. You save—not by our use of inexpensive labor and parts—but through state-of-the-art technology.
Each product carries our 5 year unconditional replace or repair warranty.

SPECIALS

Canon LBP8A1 Laser Printer

LEASE PRICE **$85** PER MONTH
Purchase price $1985

• 8 Pages Per Minute • 128K Built-In Memory • Super Quiet • Has Four Built-In Fonts plus the ability to accept fonts downloaded from a computer and various plug-in font cartridges • As many as 16 different fonts can be mixed on a single page. Great for Word Processing, Spreadsheets & Business Graphics.

CANON LBP8A2 LASER PRINTER
Lease for **$122** per month
Purchase price $3089

CANON LBP8A ½ TONER CARTRIDGE—$95

DESKTOP PUBLISHING SOFTWARE

ScLASER plus	$329
Softype	795
Spellbinder Desktop Publisher	429

PRINTERS*

CANON

Bubble Jet BJ-80	$449

EPSON

LQ 800	569
LQ 1000	749
FX-85	389

FX-286	579

JUKI

6100	429
6300	699

NEC

Pinwriter P-5 Series	Low Price Call!
Pinwriter P-6	489
Pinwriter P-7	679

OKIDATA

182 Plug & Play	223
192 Plus (IBM)	349
193 Plus (IBM)	558
2410 P Plug & Play	1729

PANASONIC

KX 1091	245
KX 1595	619

TOSHIBA

P/S 321 (IBM)	489
P 341	799
P/S 351	999

CITIZEN

MSP 10	299
MSP 15	399
MSP 20	329
MSP 25	499
Premier 35	489

LASER PRINTERS*

CANON

Laser Printer LBP8A1	$1985
Laser Printer LBP8A2	3089

HEWLETT PACKARD

Laser Printer	2489
Laser Printer Plus	3199
Laser Jet 500 (+)	4299

OASYS

Laser Pro Express	1699

PLOTTERS*

CAL COMP

1043	$7899

FACIT

4550 (6 Pen Plotter)	395

HEWLETT PACKARD

7475A	1629
7550	3349

HOUSTON INSTRUMENTS

DMP 40	899
DMP 41	2549
DMP 42	2549
DMP 51	3849
DMP 52	3849
DMP 52 MP	4889

PRINTER BUFFERS

QUADRAM

Microfazer Series	Low Price Call!

MONITORS*

AMDEK

Color 600	$ 389
Color 722	499
Color 725	Low Price Call!
12" Amber 310A	149

IBM

Color Monitor	545
Monochrome Monitor	225
Enhanced Color Display	679

NEC

JC—1401P 3A Multi-sync color w/swivel base	559

PRINCETON GRAPHICS

RGB HX-12	419
RGB HX-12E	535
RGB SR-12	559
RGB SR-12P	625
Amber Max 12	159

QUADRAM

Amberchrome 12"	145
Enhanced Graphics Monitor w/swivel	549

TAXAN

121/122	145
620	415
640	515

MULTI-FUNCTION BOARDS

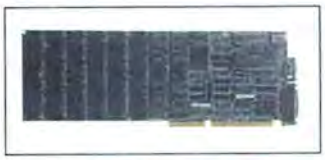
AST RESEARCH

Six Pack Premium	$379
Six Pack Plus (384K)	229
Rampage w/256K	249
Rampage (AT) w/512K	449
Advantage (128K)	359
I/O Mini Half Card	119
I/O Plus II	125

LOGICWARE

Logic Above Board (Lotus/Intel/Microsoft Expanded memory specification) .. 189

Logic (AST Compatible) Multifunction Board w/384K 159



Logic (AST Compatible) AT Multifunction Board w/128K (Expandable to 2.0 Mb 219
Logic (AST Compatible) 576K Ram Board ½ Card

Circle #400 on reader service card.

Free overnight delivery on software for all your IBM PC applications!

30 DAY MONEY BACK GUARANTEE ON LOGICWARE...THE LOGICSOFT LOW COST ALTERNATIVE

WORDSTAR CLONE
Processing your words now becomes more affordable through this amazing clone!

only **$79.95**

dB III CLONE
A clone that gives you the same capabilities at a very capable cost!

only **$79.95**

1-2-3 CLONE
Now, a 1-2-3 clone; we've cloned the software, but we didn't clone the price!

only **$79.95**

You may return LogicWare software for any reason within 30 days of purchase. Please call for return authorization number.

WORD PROCESSING

DisplayWrite III	$349
Easy Writer II	195
Microsoft Word 3	269
Multimate	235
Multimate Advantage	277
New Word 3	269
Office Writer	245
Volkswriter 3	147
Word Perfect	219
Wordstar	169
Wordstar Pro Pak	239
Wordstar 2000	245
Wordstar 2000 Plus	295
XY Write III	219

WORD PROCESSING ADD-ONS

Fancy Font	$145
Punctuation & Style	75
Reference Set	Low Price Call!
Turbo Lightning	59
Word Finder	55

DATABASE MGMT.

Cornerstone	$ 75
d Base III Plus	429
d Base III Lan Pak	629
Knowledgeman/2	309
Paradox	495
Powerbase	209
Q & A	249
R: Base 5000	265
R: Base System V	369
Reflex	75
Revelation	519

DATABASE MGMT. ADD-ONS

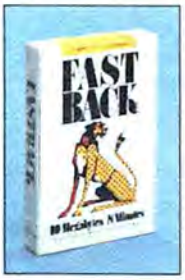
Clipper	$349
Clout 2	139
DB III Compiler (Wordtech)	459
dGraph III	149
Ext Report Writer	85
Genifer	289
Quickcode III	145
Quick Report	139

SPREADSHEET/ INTEGRATED

Ability	$ 69
Enable	339
First Choice	Low Price Call!
Framework II	415
Lotus 1-2-3	317
Microsoft Multiplan	119
Smart Integrated	439
Supercalc IV (NEW)	285
Symphony	443

SPREADSHEET ADD-ONS

Cambridge Spreadsheet Analyst	$ 75
Lotus Report Writer	109
Quickcode for 1-2-3	85
Sideways	45
Smart Notes	Low Price Call!
Spreadsheet Auditor	99
SQZ	65



FASTBACK
A low cost alternative to tape backup hardware. Back up 10 Mb in less than 8 minutes using 5¼" diskettes.

only **$93**

LOTUS REPORT WRITER
The next step for the Power User! Format your own reports, forms and mailings using 1-2-3 files.

only **$109**

SIDEWAYS
Now you can create extra wide printouts of your spreadsheets without the mess of staples, glue or tape.

only **$45**

DESKTOP PUBLISHING

Click Art Personal Publisher	$119
ScLaser Plus	329
Spellbinder Desktop Publisher	429

GRAPHICS

Chartmaster	$209
Diagram Master	195
Energraphics (New)	289
Freelance	199
Graphwriter	219
Harvard Presentation	289
Map Master	229
Microsoft Chart	179
Sign Master	149

CAD/CAM

Auto CAD 2.5	$2249
Auto CAD Basic	247
Drafix 1	239
Generic CAD	119
Pro Design II	229

LANGUAGES

BASIC Compiler (MS)	$245
C Compiler (MS)	265
COBOL Compiler (MS)	425
FORTRAN Compiler (MS)	217
Lattice C Compiler	259
Macro Assembler (MS)	97
Pascal Compiler (MS)	183
Quick Basic (MS)	67
True Basic	119
Turbo Pascal (plus BCD & 8087)	65

PROJECT MANAGEMENT

Harvard Total	$285
Microsoft Project	237
Super Project Plus	285
Timeline	235

FINANCIAL

Managing Your Money	$109
Dollars N' Sense	107

ACCOUNTING

BPI Entry	$299
Computer Associates (formerly IUS)	317
Great Plains	447
Open Systems (3.0)	417

MISC/UTILITIES

ASC II Pro	Low Price Call!
Carbon Copy	$139
Concurrent PC DOS	179
Copy II PC	35
Crosstalk XVI	99
Fast Back	93
Microsoft Windows	67
Norton Commander	49
Norton Utilities	55
PC DOS 3.2	85
Prokey 4.0	77
Remote	99
Sidekick	47
Superkey	45
Traveling Sidekick	55
XTREE	39

2 NEW FREE CATALOGS. CALL TODAY! 1-800-645-3491

• Brand new **Programmer's Language and Utilities Guide** • A convenient and valuable listing of timesaving tools for the programming professional • Complete with product description.

• Brand new **Productivity Guide** • Full line catalog of software enhancements for the business professional • Full descriptions of templates, memory management, menu management, backup software, training, and much more.

Circle #400 on reader service card.

ation and service

ew Compaq eskpro 286—30 Mb

12K RAM Memory • 80286 Based J • One 30 Mb Hard Drive (controller) • One 1.2 Mb /Height Floppy Drive • Seven ansion Slots • Compaq Keyboard • phics Card • One Parallel Port • e 90-Day, On-Site Service Contract olor or Monochrome Available as ion.

urchase Price: $3,859

ase For **$152** per month

AT&T 6300

• 640K RAM Memory • One 360K Floppy Drive • Seven Expansion Slots • AT&T Keyboard • High-Resolution Monochrome Graphics Card • High-Resolution Monochrome Graphics Monitor • Serial & Parallel Ports • GW Basic and MS. DOS. Free 90-Day, On-Site Service Contract. Color Monitor Optional.

• **Purchase Price: $1,799**

Lease For **$76** per month

ITT XTRA (Dual Floppy)

• 256K RAM Memory • Two 360K Half/Height Floppy Drives • 4.77 MHz 8088 Based CPU • 5 Expansion Slots • ITT Keyboard • Text Display Card • ITT Monochrome Monitor (Amber or Green.) One Parallel and Serial Port • Color Option Available.

• **Purchase Price: $1339**

Lease For **$58** per month

ITT XTRA XP W/20 Mb

IBM XT Compatible with speed of an AT • 512K of RAM Memory (Expandable to 640K on Mother Board) • 80286 Based CPU running at 6 MHz • One 20 MB Hard Drive • One 360K Floppy Drive • 5 Expansion Slots • ITT Keyboard • One Serial Port □ One Parallel Port • Color or Monochrome Monitor Available as Option.

• **Purchase Price: $2,049**

Lease For **$88** per month

gic Turbo XT

C Class B Approved. MHz • 640K RAM Memory • tem ROM 8K BIOS • 360K Half/ ght Floppy Drive • Eight Expansion ts • Enhanced Keyboard • (1)Serial arallel Port • Clock Calendar • phics Card • Monochrome Monitor • r Option Available • 30-Day Money k Satisfaction Guarantee • 1 Year rranty. Hard Drive Options Available.

urchase Price: $795

TOSHIBA Lap-Top T-1100 Plus

(DUAL FLOPPY)

• 640K RAM Memory • CMOS 80C86 Running at 7.1 MHz • Two 720K 3.5" Floppy Drives • One Expansion Slot • TOSHIBA Keyboard • LCD Display • Color Graphics/Monochrome Composite Card • One Parallel and Serial Port • Clock Calendar • External Floppy Drives Optional.

• **Purchase Price: $1,799**

Lease For **$76** per month

IBM AT TOTAL BUSINESS SYSTEM

We'll configure a system to your needs, including peripherals and software and make the price affordable through low monthly Logiclease payments. Here's an example of what you can do!

• 512K RAM Memory • 6 MHz • One 30 Mb Hard Drive • One 1.2 Mb High Density Floppy • Eight Expansion Slots • IBM AT Keyboard • Serial/Parallel Port • IBM Color Monitor • Color Graphics Card • Tobshiba 351 P/S Printer & Cable • Software Bundle (Lotus 1-2-3, dBase III, Wordperfect, IBM DOS 3.2). Free 90-Day On Site Service Contract

• **Purchase Price: $5,499**

Lease For **$208** per month

THE NATION'S LARGEST DIRECT DISTRIBUTOR OF COMPUTER PRODUCTS

LOGICSOFT®

110 Bi-County Blvd., Dept. 5432
Farmingdale, NY 11735

CANADA: 800-433-6235
Domestic/Int'l Telex
286905 SoftUR

To order or receive technical assistance, call our National Hotline:

1-800-645-3491

NY STATE: 1-800-235-6442 (516) 249-8440
Customer Service: 1-800-431-9037 NYS: 516-249-8440
FAX #516-249-5289

EUROPE: 020-83 48 64
Telex: 10759 Logic NL
Mail orders to:
LOGICSOFT EUROPE BV
Baarsjesweg 224 Amsterdam,
Holland

irgest selection of peripherals
ee overnight delivery!

w/0K 59
w/384K 129
w/576K 138

EVEREX
Magic Card II w/384K 199
Logic (AST Comp.) I/O Mini Half Card 99

TECMAR
Captain (384K) 199

QUADRAM
Quadboard (384K) 199
Silverboard 209
Ems w/256K 349
Liberty (AT) w/128K 315

INTEL
Above Board (PS/AT) w/128K $399
Above Board (PC) w/64K . . . 275
Above Board (AT) w/128K . . 419
Above Board (PS) 64K 309
Above Board (PS) 256K 389
80387-2 Math Co-Processor . 139
80387-3 Math Co-Processor . 179
80287 Math Co-Processor . 199

GRAPHICS BOARDS

AST
Preview $239

EVEREX
The Edge 239
Evergraphics . . . **Low Price Call!**

HERCULES
Monochrome Graphics Card 199
Color Card 155
Graphics Card Plus 209

LOGICWARE
Logic (Hercules Comp.) Color Graphics Board . . . 99

Logic (IBM Comp.) Enhanced Graphics Adapter (EGA) 239

Logic (Hercules Comp.) Monographics Board . . . 109

PARADISE SYSTEMS
Auto Switch EGA Card 359
Modular Graphics Card 249
Color/Mono 159

QUADRAM
EGA Plus Graphics 369

SIGMA
EGA Board 369
Color 400 (Princeton) 479

STB
Chauffeur 209
EGA Plus 309

TECMAR
Graphics Master 399

COMMUNICATIONS BOARDS

AST
5251-11 Plus $685
5251-11 629

DCA
IRMA Board 779

MODEMS

AST
Reach 1200 Half Card $299

EVEREX
Evercom II 149

HAYES
Smartmodem 1200 389
Smartmodem 1200B w/Smartcom II 359

Smartmodem 2400 599
Smartmodem 2400B w/Smartcom II 549

LOGICWARE
Logic (Hayes Comp.) 1200 Baud External Modems . 199
Logic (Hayes Comp.) 2400 Baud External Modem . . 309

Logic (Hayes Comp.) 1200B Internal Modem with Mirror (Crosstalk Clone) Software 149
Logic 2400B Internal Modem 2400B w/Software 299

PROMETHEUS
Pro-modem 1200 279
Pro-modem 1200B w/software 239

QUADRAM
Quadmodem Series . . . . . **Low Price Call!**

VEN-TEL
PC Modem 1200 Half Card . 359
1200 Plus 329
PC Modem 2400 Half Card . 469

MOUSE INPUT DEVICES

MOUSE SYSTEMS
PC Mouse w/DR Halo 2 . . . . $129

MICROSOFT
Microsoft Mouse (Serial) . . 135
Microsoft Mouse (Buss) . . . 125

SURGE PROTECTORS

KENSINGTON MICROWARE

Masterpiece Plus $119

CURTIS
Diamond 39
Emerald 45
Ruby 59

KEYBOARDS

KEYTRONIC
5151 (Deluxe) $169
5153 (w/touch Pad) 289
3270 PC 245
5151 (AT&T) 189
Keytronic Jr. 5151 169

MEMORY STORAGE

IOMEGA
Bernoulli Box (10 + 10) . . . $1999

Bernoulli Box (20 Mb) 1899
Bernoulli Box (20 + 20) . . . 2750
Bernoulli Box Plus 4199

HARD DISK DRIVES

MOUNTAIN COMPUTER
Hard Drive Card (20 Mb) . . . $869
Hard Drive Card (30 Mb) . . . 1199

PRIAM CORP
60 Mb Internal Hard Drive 1449
Innerspace ID 40 Mb 1349

PLUS +
Hard Card 10 Mb 629

Hard Card 20 Mb 699

SEAGATE
10 Mb ½ Ht Int 465
20 Mb ½ Ht Int . . . . .
30 Mb ½ Ht Int . . . . .
20 Mb Full Ht (AT) . . . . .
30 Mb Full Ht (AT) . . . . .
40 Mb Full Ht (AT) . . . . .
80 Mb Full Ht (AT) 1

CORE
20 Mb Int (AT) 1
30 Mb Int (AT) 1
40 Mb Int (AT) 1
72 Mb Int (AT) 2

CARTRIDGE TAPE BACK-U

EVEREX
Excel Stream 20 Mb Int . . . . $
Excel Stream 60 Mb Int . . . .
Excel Stream 60 Mb Ext . . .

IRWIN
Irwin 110 10 Mb Int . . . . .
20 Mb Int . . . . .
20 MB 325 (AT) Ext. D . . . . .

LOGICWARE

Logic 60 Mb Internal Cartridge Tape Backup Kit . . . . .
Logic 20 Mb Internal Cartridge Tape Backup Kit . . . . .

SYSGEN
Image Tape Backup 10 Mb Int . . . . .
Image Tape Backup 20 Mb Int 5
Image Tape Backup 20 Mb Ext 6

TECMAR
QIC 60 AT 12
QIC 60 Ext Tape Backup . . . 15

CORE
60 Mb Ext 15

FLOPPY DISK DRIVES

Panasonic 360 K ½ Ht. . . . . $
Tandon TM-100 360 K F/Ht. .
Tandon TM-100 360 K ½ Ht.
Toshiba 360 K ½ Ht. . . . .

BACK UP POWER SUPPLIE

DATA SHIELD
200 Wt (PC) $2
300 Wt (XT) 3

500 Wt (AT) 5
800 Wt (AT) 6

Due to weight restrictions, Printers and Monitors and some misc. bulk items are shipped UPS—free. All prices and policies subject to change without notice.

$295, $24 monthly
Requirements:
telecommunications program,
300- or 1200-bps modem

Alice

Alice may be the most advanced programming environment currently available for the PC. It combines a Pascal interpreter and a powerful debugger with a syntax-directed editor that lets you write a program by filling in the blanks. Applications developed with Alice can be compiled by Turbo Pascal with little modification. Alice runs on an IBM PC with 256K of RAM; a 320K system can accommodate a large-memory version that permits bigger programs.

Because it is an interpreter, Alice brings back the conveniences that most programmers gave up when they switched from BASIC to Pascal, such as the ability to run statements in the immediate mode. If you want to know the values of A, B, and C, for example, you can go to Alice's command line, type writeln(A,B,C), and see the result. Thus you can execute a procedure or function without running an entire program—and quickly check that it works with a particular set of parameters. In Alice's TRON-like trace mode, one window displays program output, while another displays the relevant source code, the cursor leaping from statement to statement to show the path of execution. Program execution can also be stepped one line at a time.

(continues)

AccountMate™

Integrated Accounting Software

Easy, fast and flexible dBASE III, multi-user dBASE III plus, and Clipper-compiled dBASE III versions available.

Recommended for Professionals, by Professionals!

Multi-User Now Available!

"One of the best dBASE™ accounting packages available. The program is so well organized and well designed that it is almost possible to run the system without documentation."
Data Based Advisor

"The General Ledger system may be the best choice for the knowledgeable user, since it has much more power than other bookkeeping software systems."
Business Software

"This is a very powerful program. I was impressed by the ease of set up and the on-screen help file."
PCM Magazine

"Professional accountants should love AccountMate."
Online Today

Nationwide 800-228-8896 California 800-762-7788

Demo Programs only $25.00 Each
Free Source Code provided.

Integrated Accounting Modules	Single-user	Multi-User
General Ledger	395.	595.
Consolidated Ledger	195.	395.
Sales Order/Inventory	195.	395.
Purchase Order/Inventory	195.	395.
Accounts Receivable/Inventory	295.	495.
Accounts Payable	295.	495.
Payroll	395.	595.
State Tax Program	100.	200.
Time & Billing	395.	595.
Fund Accounting	395.	595.
Manufacturing Inventory Control	995.	1,195.
Working Demo	25.	—

Prices, U.S. Currency Only.

SourceMate™
INFORMATION SYSTEMS, INC.

For the dealer nearest you call (415) 381-1011
20 Sunnyside Ave., Mill Valley, CA 94941

Canadian Distributor:
Synapse Datagroup, Inc.
Montreal: (514) 383-1515
Toronto: (416) 299-0838
Winnipeg: (204) 942-7449

dBASE III and dBASE III Plus are registered trademarks of Ashton-Tate, Inc. UNIX is a registered trademark of AT&T. Data Based Advisor is a trademark of Data Based Solutions. AccountMate, AccountMate II, AccountMate III Plus are trademarks of SourceMate Information Systems, Inc. Clipper is a trademark of Nantucket.

Circle 449 on reader service card

But Alice's most powerful feature is its syntax-directed editor. As you start typing in part of a statement, Alice finishes the job and inserts placeholders for items that you need to fill in. Program syntax is therefore always correct, and you never have unmatched Begins and Ends or missing semicolons. Indentation is automatic and two styles are available. While most programming environments concentrate on detecting errors, Alice is designed to prevent them.

Although a definite plus for developers and programming students alike, syntax-directed editing takes some getting used to. For example, changing every occurrence of Begin to End with a traditional text editor is a quick search-and-replace operation. But with a syntax-directed editor this is nearly impossible to accomplish, because performing such an operation would leave large sections of the program syntactically invalid. Alice treats a program like a structure of blocks within blocks, and operations such as moving, deleting, and inserting are usually performed on an entire block at a time.

Alice is extremely user-friendly, particularly for those acquainted with Pascal. I started writing and running programs without opening the manual. The user interface is built around a logical system of menus; functions are available from the PC's function keys or from Alice's command line. Error messages are clear and helpful, and DOS commands can be executed from within the Alice environment.

Programmers will appreciate Alice's talent for directly accessing DOS and the PC's hardware. Alice's many enhancements to standard Pascal will be welcome as well, especially the ability to output enumerated values. For example, if you issue the declarations

```
type color = (red,green,blue);
vax x: color;"
```

and want to print out the value of x later on, Alice allows you to simply use write(x). Any other version of Pascal, including Turbo Pascal, would require an IF or CASE statement:

```
case x of
   red: write('red');
   green: write('green');
   blue: write('blue')
end
```

Given the overwhelming success of Turbo Pascal, it's not surprising that Alice is being promoted as a logical companion to Borland's firstborn. But Alice is neither a superset nor a subset of Turbo Pascal—while the two intersect in many areas, Alice includes some significant extensions to Pascal and ignores some of its conventions altogether. For example, Alice programs don't require forward declarations—mandatory in Pascal when a procedure is mentioned before it is defined. If you avoid using Alice's obvious extensions to Pascal, it's easy to write programs that Turbo Pascal can compile. However, don't expect to run unmodified Turbo Pascal source code through Alice.

Alice is a godsend for experienced programmers who need to cut development time, and a real boon for beginners, especially if they know how to design programs but are unfamiliar with Pascal's syntax. Software Channels is apparently pursuing the student market and plans to release a Pascal textbook based on Alice in the near future. *—Michael A. Covington*

Alice version 1.3
Graham Software Corp.
Software Channels, Inc.
212 King St. W
Toronto, Ontario
M5H 1K5 Canada
713/359-1024
List price: $95
Requirements: 256K (320K for large-memory model), one disk drive, DOS 2.00 or later version
Not copy protected

Richard Ozaroff is a freelance writer and vice president of a national investment advisory service. Jeff Angus manages publications production for the Software and Educational Products Group at Boeing Computer Services. Donald B. Trivette is a consultant and freelance writer living in Wrightsville Beach, North Carolina. Judy Getts is a freelance writer and editor in Wauwatosa, Wisconsin. Stephen A. Blumenthal is vice president of regulatory relations for the Securities Industry Association in Washington, D.C., and a PC World *Contributing Editor. Michael Covington researches artificial intelligence and advanced programming environments at the Advanced Computational Methods Center at the University of Georgia.*

The most significant development in monochrome graphics since the Hercules Graphics Card.

Announcing the Hercules Graphics Card Plus.

Four years ago, the Hercules™ Graphics Card brought high resolution monochrome graphics to the IBM® PC for the first time. And revolutionized the world of personal computers.

Now, it's happening again.

Because now there's the Hercules Graphics Card Plus. A giant step forward in technology that creates a whole new standard for graphics hardware and a world of potential for software.

Three modes are better than two.

Until now, graphics cards have had only two modes to work with: text and graphics.

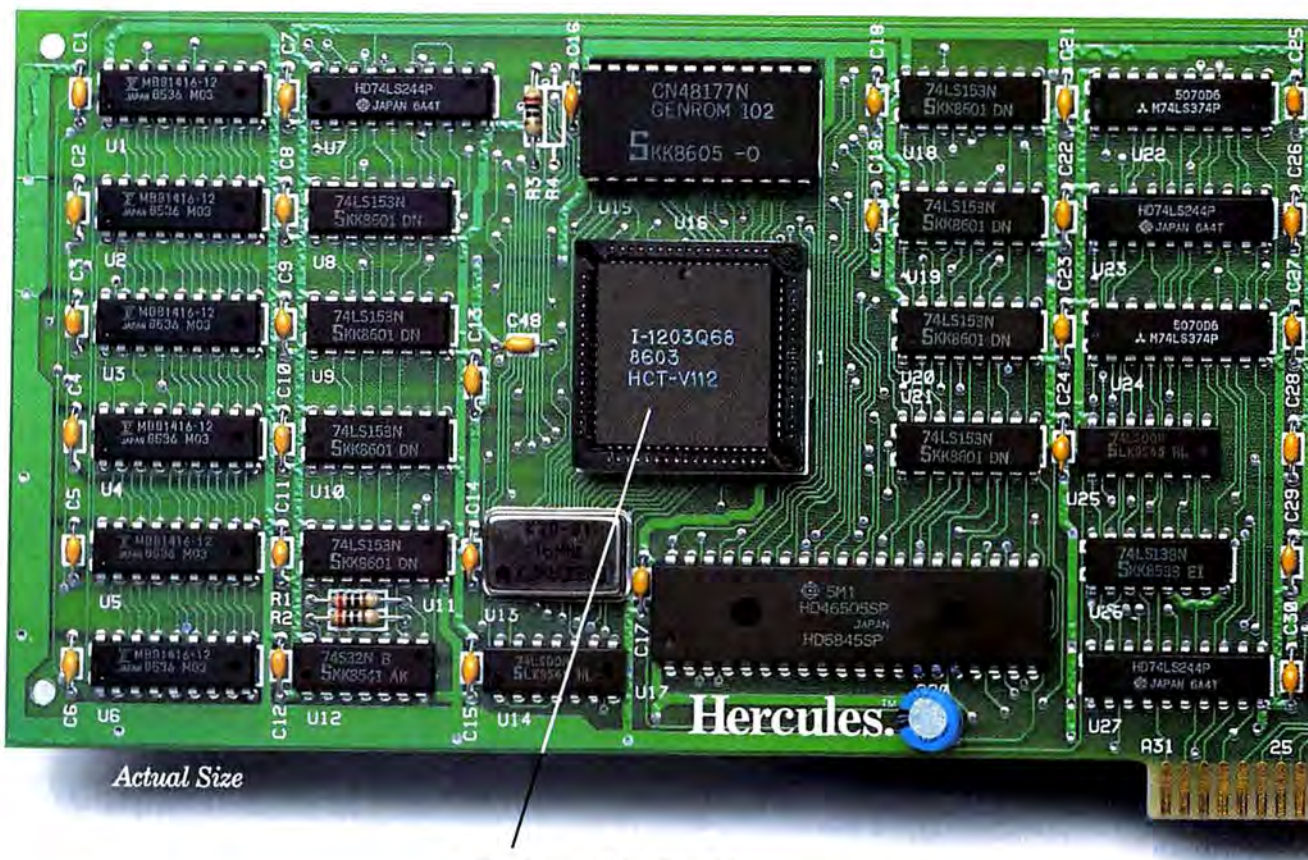
Text mode is very fast, but it's limited to 256 pre-programmed characters.

Graphics mode, on the other hand, lets your software create as many characters as you want. But for text processing, graphics mode can be slow, painfully slow.

Enter a new, third mode.

Called RamFont.™

Two years in development, RamFont gives you the best of both worlds. It blends the blinding speed of text with the flexibility of graphics.



The heart of the Graphics Card Plus: the V112 microchip, Hercules' next generation video processor that makes the RamFont mode possible.

Enough flexibility to blow the doors off the 256-character limit of text mode.

Because RamFont can handle an astonishing 3072 different characters of various widths and heights.

Instead of 256 canned, unchangeable ones.

The future according to RamFont.

With all these characters and fonts to work with, software will never be the same again.

RamFont word processors, for example, will put italics, boldface, and scientific characters right on the screen with standard text. So you can see what you're about to print.

RamFont spreadsheets will use smaller characters to display larger amounts of information. So you can get the big picture.

RamFont integrated packages will mix true text and graphics and turn your PC's screen into a fast-lane version of the Macintosh's.™

The Hercules Printer Cable—a $40 value, free with each Graphics Card Plus.

And if you happen to be one of those geniuses who's fluent in five languages, you'll be able to type a letter in all of them.

Simultaneously.

A Herculean feat.

How did we manage to combine the radical new RamFont on the same card with Hercules' legendary sharp text and high resolution 720x348 graphics and still be 100% compatible with the original Hercules Graphics Card?

It wasn't easy.

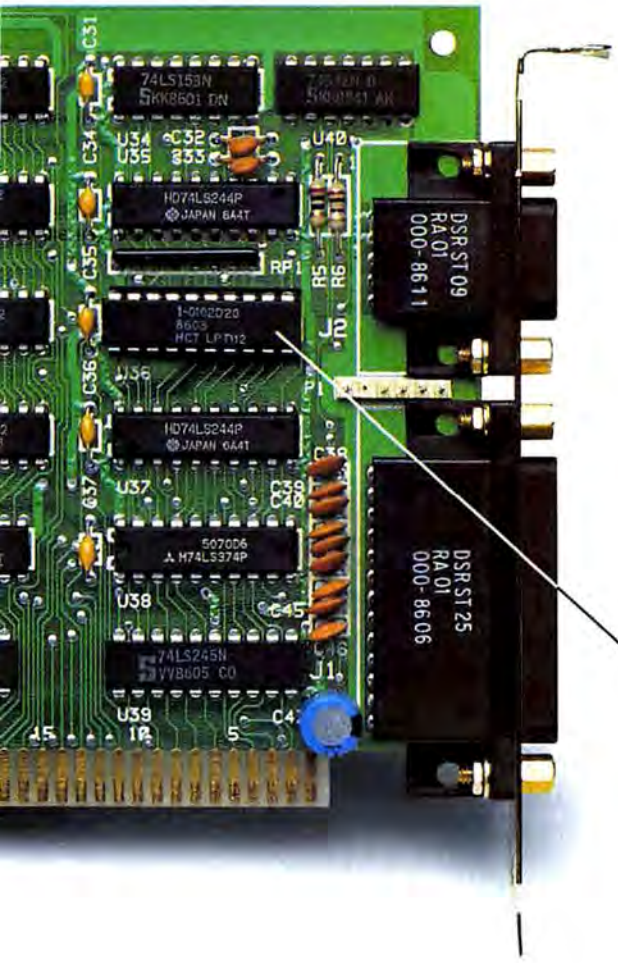
In fact, it took two years and all of the sophisticated CAD tools at our disposal to create our exclusive V112 microchip.*

This totally new generation of video processor is at the heart of every Hercules Graphics Card Plus.

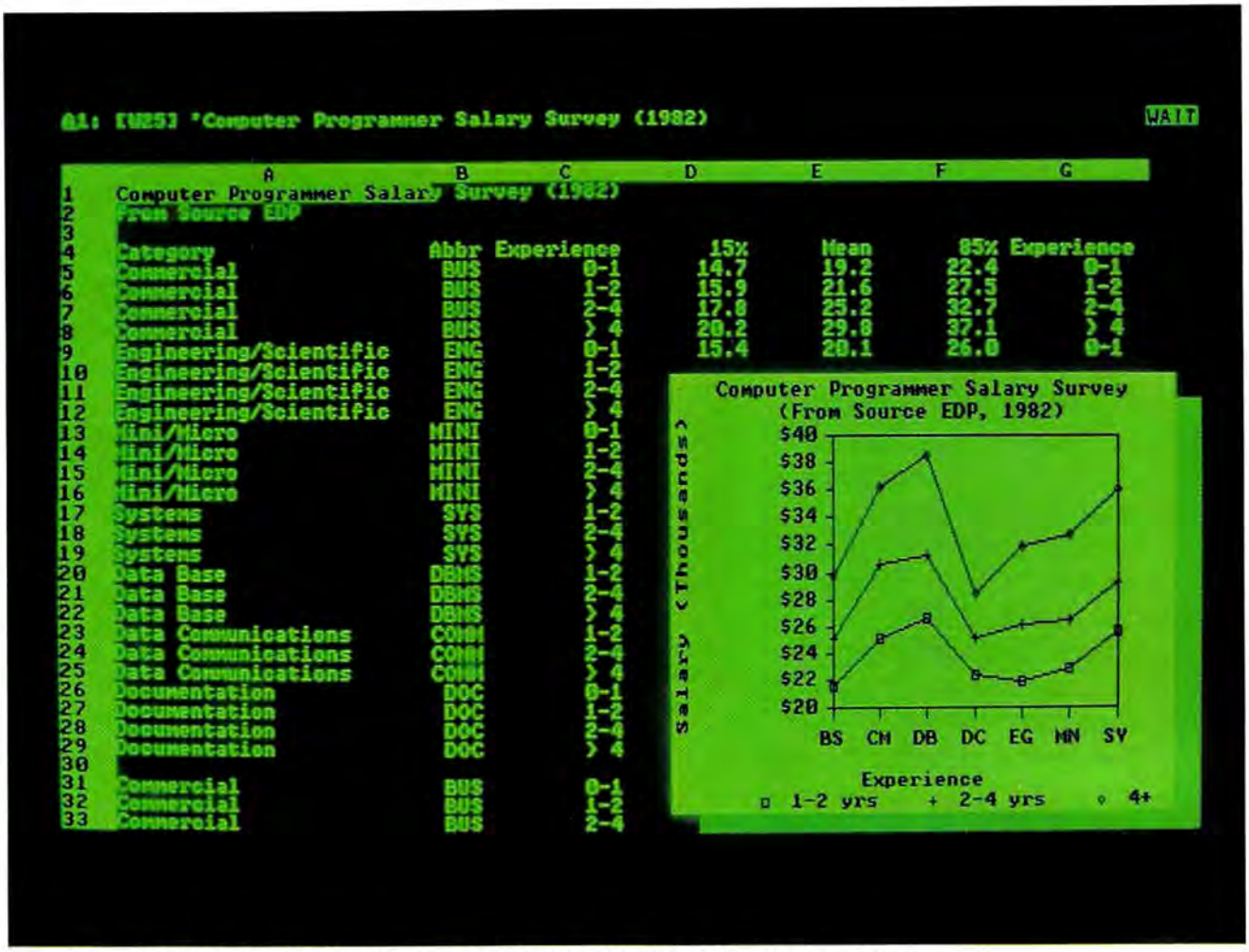
It's also at the heart of a revolution in software that's beginning right now.

Turn the page and you'll see what we mean.

**Patent applied for.*



Another Hercules innovation: the new LPT112. It's a parallel printer port on a chip.



Lotus 1-2-3 Rel. 2 in the RamFont mode of the Graphics Card Plus: fast scrolling, a 90-column by 38-row screen and a pop-up graphics window.

Software will never be the same again.

The trouble with most new hardware introductions is that there isn't any software available to introduce them to.

Not so with the new Hercules Graphics Card Plus.

It runs everything the original Hercules Graphics Card runs.

Better yet, it comes complete with the software you need to start using the revolutionary new RamFont mode right now with some of the world's favorite programs.

Lotus blossoms.

Of course, if you want to talk about the world's favorite programs, you have to start with Lotus® 1-2-3.®

You won't recognize Release 2. Because now you can put nearly twice as much information on your screen, scrolling right and left and up and down at speeds you'll remember nostalgically from the days of Version 1A.

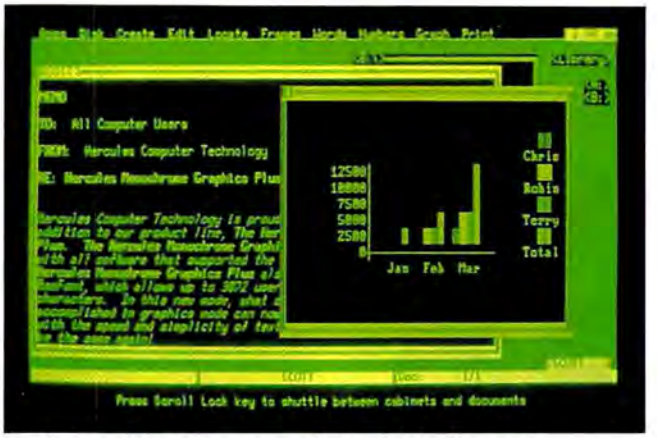
Another thing you won't recognize is that cute little graphics window. You can thank RamFont for that.

Now that RamFont is with us, you can pop up a graphics window any time you're in the mood and still keep your 1-2-3 spreadsheet in the background.

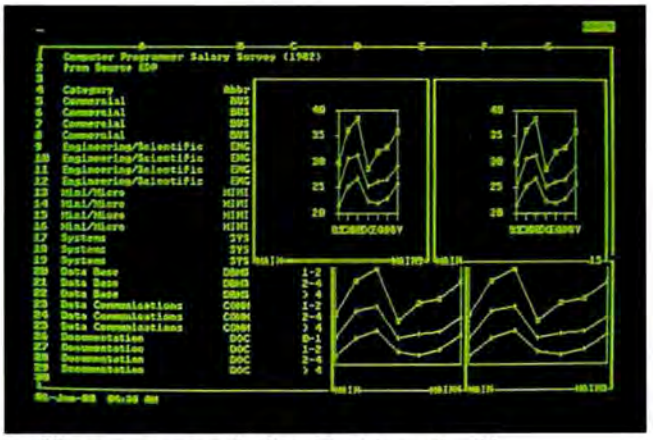
And you can do the same with Symphony,™ of course.

Or, if your tastes tend toward Ashton-Tate®'s Framework™ II, you'll be pleased to hear that you can really

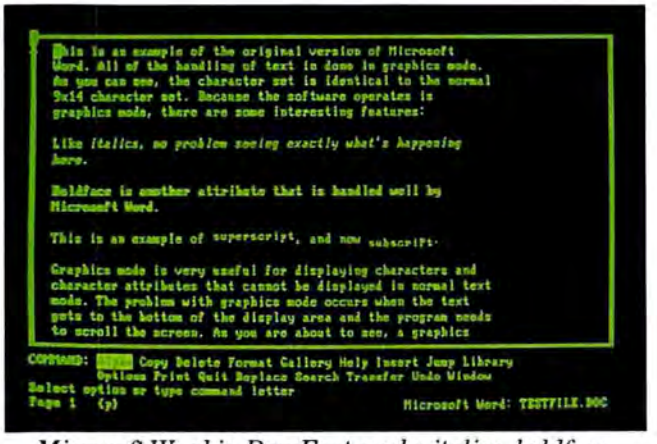
The Graphics Card Plus in RamFont mode showing multiple fonts created using FontMan,™ a Hercules program that comes free with each Card.



Ashton-Tate's Framework II with italics and boldface and speed in the RamFont mode of the new Hercules Graphics Card Plus.



The programmable RamFont is so flexible, Symphony can mix true text and graphics.



Microsoft Word in RamFont mode: italics, boldface and small caps—plus speed and lots of it, at last.

burn rubber with its word processor.

The revealed Word.

Speaking of word processors, remember a couple of pages ago how we said they would be forever changed? Well, the change has already begun.

For example, the Hercules Graphics Card Plus with RamFont makes Microsoft® Word a whole new program.

Suddenly the italics, boldface, superscripts and subscripts scroll superfast. Which means you don't have to twiddle your thumbs waiting for the screen to catch up with your fingers.

More to come.

As time goes by, more and more major programs will take advantage of the extraordinary capabilities of RamFont.

Which gives you two choices.

You can buy a Hercules Graphics Card Plus and look forward to getting your socks knocked off.

Or you can buy another card and watch while technology leaves you and your socks behind.

To help you make up your mind, we've prepared a little surprise for you on the next page.

Just make sure you're sitting down.

HERCULES
Graphics Card Plus

$299.

Shocked?
We thought you'd be.
Imagine, the new Hercules Graphics Card Plus with the power of RamFont plus everything that made the original Hercules Graphics Card the monochrome standard.
At about half the old price.
Now that's progress.
Call 1-800-532-0600 ext. 203 (in Canada call 1-800-323-0601 ext. 203) for the name of an Authorized Hercules Dealer near you and we'll rush you a free info kit.

Hercules.™
We're strong on graphics.

Address: 2550 Ninth St., Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063

Trademarks/Owners: IBM/IBM; Macintosh/Apple; Lotus, 1-2-3, Symphony/Lotus; Microsoft/Microsoft; Framework II/Ashton-Tate; Hercules, RamFont, FontMan/Hercules.

Circle 77 on reader service card

From the Hardware Shelf

PC World offers first impressions of recent hardware releases

AT&T's new compatible tries to make the best of both worlds, a couple of 20MB hard disks look for a place to call home, monochrome graphics get a new look, and a pedestrian printer appeals to bargain hunters.

Edited by Eric Knorr

AT&T 6300 Plus

Once, in the halcyon days of the PC boom, every new machine was met by a throng of anxious buyers, each hungrier than the last to gobble up the latest, fastest, or most exotic box in the store. But as sales flattened and consumer frenzy gave way to circumspection, manufacturers intent on survival turned to designing products for buyers with special needs.

With the new 6300 Plus, AT&T is joining the clan of narrow-niche giants. Offering hybrid XT/AT compatibility and a curious combination of UNIX and DOS, the pricey Plus seems to have more personalities than Tony Perkins at a roadside motel. To those just passing through, the machine's 6-MHz 80286 microprocessor and three 16-bit expansion slots would suggest an AT compatible. Guess again, ma'am, because those 16-bit slots only accommodate AT&T's boards. In Ma Bell's parlance, the Plus is "a super XT with AT capacity."

Like last year's 6300, the Plus offers a dapper Italian design, a 15-inch-square footprint, and 640-by-400-pixel monochrome (or color) text and graphics display. The motherboard now holds up to 1MB of RAM, and user memory can total a hefty 7MB if you purchase all three of AT&T's 2MB expansion boards. A serial port, a parallel port, and a clock/calendar are standard motherboard equipment. AT&T offers two configurations: a $5420 version with a 20MB Seagate hard drive, one 1.2MB floppy drive, and 512K RAM; and a $5095 version with a 360K floppy replacing the hard drive. Both prices include the

(continues)

John Greenleigh

Combining DOS and UNIX in one box, AT&T's 6300 Plus could be dubbed "The PC With Two Brains."

In the past, word processing software was either easy to learn and use, or fast and powerful.

Never both, sometimes neither.

With new OfficeWriter 5.0 you can have it all.

Simplicity and power are the words that best describe new 5.0.

It was designed for people who work with computers but don't necessarily think like them.

In short, it's wonderfully simple to operate (like the things of your childhood).

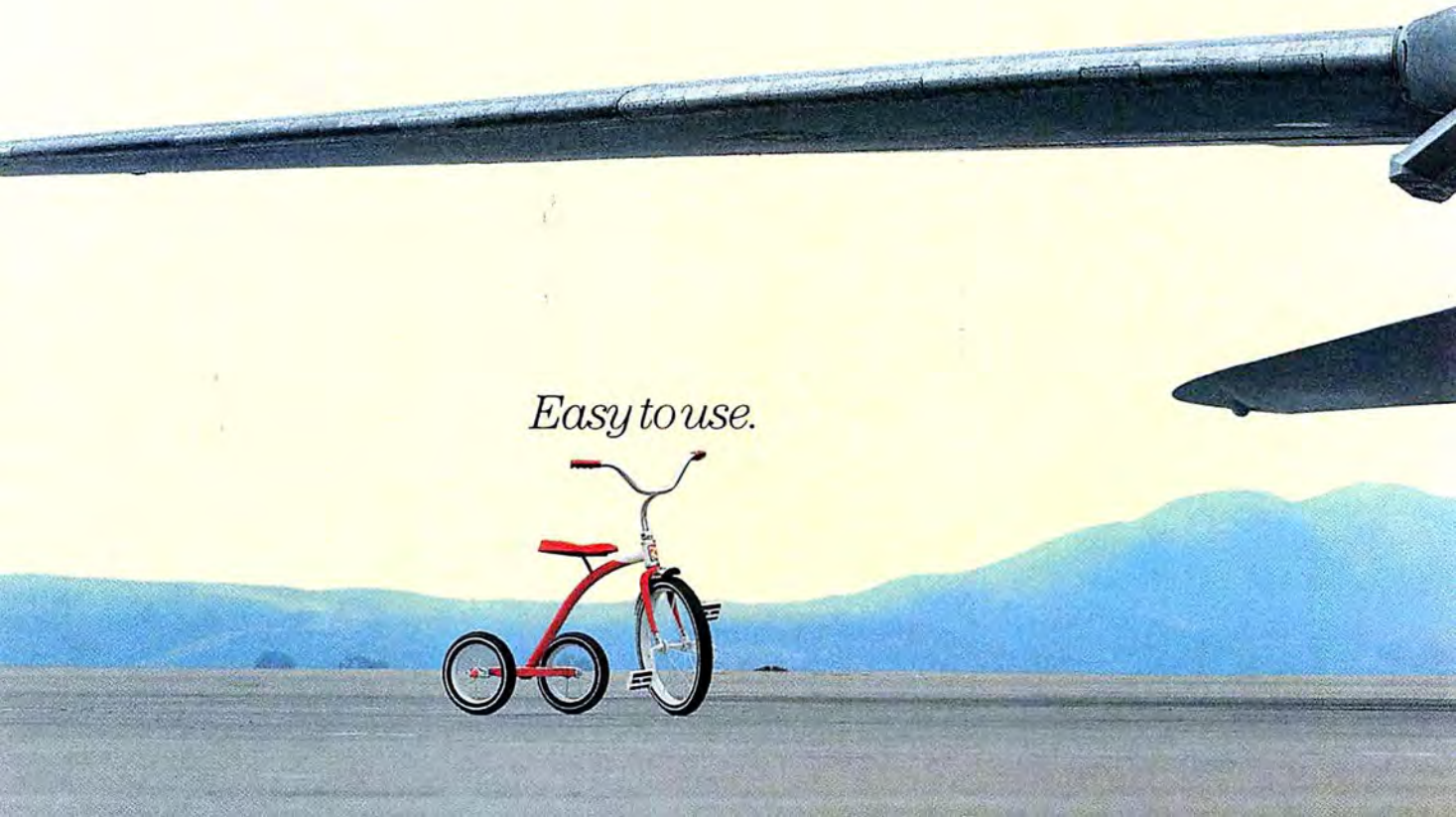
It quickly creates confidence rather than anxiety for the user (which makes you look smart for buying it).

And it has the speed, features and power to keep you ahead of the game (which makes you glad it's around).

And while the ideas behind OfficeWriter are new, the principles on which it was built are well established.

In fact, *PC World* described us as... "Approaching perfection. Office Solutions has done a fine job of integrating power and ease of use into a product...for a full range of office jobs.

Until now, all word processing software fell into one of these two categories.



Its simplicity, logical command, and speed of execution set OfficeWriter apart..."

Corporate giants like GE, Mobil Chemical, Wells Fargo Bank, University of Wisconsin, and Peat Marwick Mitchell, just to name a few, agree. Because they've made OfficeWriter their choice for word processing software.

Take us for a 30 Day Joyride.

Quite honestly, we think OfficeWriter 5.0 fills the huge gap created by other word processing software.

But don't take our word for it. Instead take OfficeWriter 5.0 for a 30 day trial. Put it through your paces and really get the feel of it.

When you're through, you won't be satisfied with software that only gives you half of what you need.

You'll want it all. OfficeWriter 5.0. To arrange your joyride, see your local dealer or call **(800) 228-0747**, in Wisconsin call (608) 274-5047.

OfficeWriter 5.0

Fast and powerful.

Circle 533 on reader service card

monochrome monitor and MS-DOS 3.10.

Ultimately, however, the 6300's ability to run UNIX is the basis of its "Plus" designation. In yet another AT&T attempt to make UNIX palatable to DOS devotees, the Plus's Simul-Task Operating System Merge treats DOS as a single task within the UNIX environment, enabling you to flip between the two habitats with ease. This cozy arrangement has its price, however. The UNIX/Simul-Task package lists for $195 and runs only on the high-end version of the machine; at least 1.5MB total RAM is recommended if you want to squeeze in any DOS applications.

UNIX is a hungry beast, hogging 80 to 85 percent of the 20MB hard disk and devouring all available memory, unless you carefully cordon off an area for DOS. Once installed, however, the UNIX/Simul-Task user interface provides a clear, window-driven menu system, allowing you to choose from numerous system functions, diagnostics, and UNIX applications. You can toggle between UNIX and DOS with one touch of the special <Message/Window> key, located at the top right of the numeric keypad.

The DOS-UNIX tandem is not without its idiosyncrasies. FDISK, CHKDSK, DSKCOMP, FORMAT and SYS are classified as "bad commands." Still other DOS functions require odd machinations and lengthy procedures. To change the CONFIG.SYS file, for instance, you must modify the DOS file using Simul-Task, an intimidating 20-minute process.

In addition to its split-personality mode, the 6300 Plus can be used as a DOS-only or UNIX-only machine. The UNIX configuration would be ideal for a UNIX network or for developing C language applications. In the DOS world, AT&T claims the Plus runs applications 150 percent faster than the XT and 25 percent faster than older ATs. In a sample testing of software, which included *1-2-3*,

Why an Amdek monitor is a better investment than buying from Mr. Blue Chip.

Buying a monitor is an important decision. After all, it's a key component of your computer system that must have the capabilities of matching your application needs.

There's no question that ordering a "bundled system" is easier than selecting individual components. But the easy way isn't always the best way. And when it comes to monitors, there's none better than Amdek.

WordPerfect, VP-Planner, Super-Key, Symphony, and *Nightmission Pinball,* the Plus zipped its way to compatibility. Despite its speed and pleasing design, however, the 6300 Plus would be wildly overpriced as a mere XT compatible.

Although costly, AT&T's new entry is easy on the eyes. The high-resolution monochrome monitor wears a nonglare screen and sits on a convenient tilt-and-swivel stand, as does the optional color monitor. The keyboard layout resembles the Selectric's and has function keys lining the top edge and LED lights dotting the <NumLock>, <CapsLock>, and <ScrollLock> keys. The touch is a little loose, however, and you may find yourself cursing whoever put <Ctrl> below the <Shift> key. (Unfortunately, IBM's new keyboard also uses this arrangement.) Moreover, the keyboard connector won't take an IBM plug, although AT&T offers its own PC-like keyboard as an option.

The 6300 Plus is a dream come true if your allegiance is split between UNIX and DOS. Otherwise, the machine should prove a marketing nightmare for AT&T, as few users can afford this kind of personality crisis. For users who cling to their DOS identity, the Plus's power and flexibility are marred by hardware incompatibility and a high price tag. *—Paul Meyers*

6300 Plus
AT&T
1776 On-the-Green
Morristown, NJ 07960
800/247-1212
List price: with monochrome monitor, 512K, one 1.2MB and one 360K floppy disk drive $5095; with 20MB hard disk instead of 360K floppy drive $5420; UNIX System V release 2 with Simul-Task DOS Merge $195; EGA-compatible color monitor and adapter $945; 512K Enhanced Memory Expansion Board (expandable to 2MB) $449

(continues)

Once you compare the quality, features, options and price you'll see that ordering the first three letters that pop into your head doesn't necessarily give you the best return on your investment. Because soon after you compare, it'll become very clear that Amdek is clearly the finest in monitors.

Amdek features a complete line of monitors—from full color RGB's to single color monochromes. What's more, Amdek offers monitors that are capable of supporting a full range of graphic boards.

And every Amdek is backed by a 3-year warranty on the CRT, and two full years on all other parts and labor.

It's no wonder Amdek has sold over one million units to date. Now the only wonderment is why anyone would pay more for anything less than an Amdek.

AMDEK
Clearly the finest in monitors.

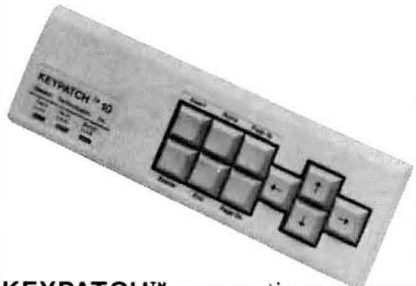
2201 Lively Boulevard, Elk Grove Village, IL 60007
Phone: 312/364-1180, TLX: 280-803
Circle 204 on reader service card

ELIMINATE NUM-LOCK with KEYPATCH™ a micro-processor based mini-keyboard. Provides separate 10 key screen/cursor control pad, leaving a full time 10 key number pad on parent keyboard.

Plugs into connector of IBM PC, XT, AT and compatible keyboards. No software required. Tapes to an unused portion of your keyboard. Takes up no desk space! A must for spread sheets, word processing, program ming, etc.

KEYPATCH™
IBM PC-XT Model - $84.95
Most Compatibles - $89.95

KEYPATCH™
IBM AT Model $92.95



KEYPATCH™ saves time, saves space, reduces errors, eliminates frustration, improves efficiency.

YOU DON'T NEED
A NEW KEYBOARD —
YOU JUST NEED **KEYPATCH™**

Plus $2.00 shipping/handling (U.S. only)
Cal. residents add 6% sales tax
Visa, Mastercard, Check, Money Order
For immediate shipment:
Genest Technologies, Inc., 1331 E. Edinger Ave., Santa Ana, CA 92705, Inside CA 714-547-0880
Outside CA 1-800-826-9641
™ Patents Pending
KEYPATCH is a trademark of Genest Technologies, Inc
IBM is a registered trademark of International Business Machines Inc

Circle 78 on reader service card

Western Digital Portafile

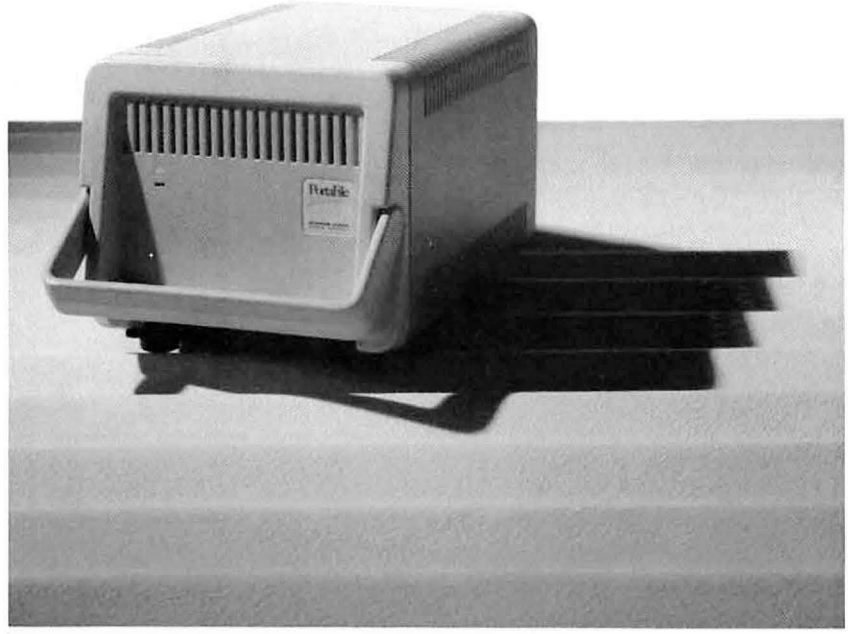
Osborne. Kaypro. Compaq. In an industry where empires rise and fall on a carrying handle, it's only faintly cynical to maintain that a product's packaging is as important as its innards. Now the folks at Western Digital have come up with yet another luggable box: Portafile, an external hard disk that provides a 20MB moveable feast of mass storage.

A diminutive 10¼ inches deep by 6¼ inches wide by 5½ inches tall, the 8-pound Portafile comes with a 3-foot cable, a half-slot interface board, little rubber feet, and of course, the redoubtable handle. Touted as a traveling companion for portable computer users, this abbreviated item should also intrigue those who crave data security. Portafile is, after all, the hard drive you can lock up for the night.

Beneath Portafile's steel skin is a shock-mounted 3-inch Fuji drive, a Western Digital controller, and a 30-watt power supply. The company claims the drive can handle up to 50gs at rest and 7gs while operating. Western Digital also provides a park program to augment the Fuji's automatic head-locking feature.

Installing Portafile is relatively straightforward. Two banks of DIP switches on the unit and another on the board determine the drive's capacity plus its designation as C: or D:—Portafile cannot be ad-

(continues)



John Greenleigh

Western Digital's Portafile gives you 20MB of hard disk storage for the road.

"We knocked their socks off."

This new PFS:Professional File came through just like you said it would. Can a guy be in love with a database program? All I know is that it let me pull in data from the company files in seconds, and I could break down bid numbers the way I've always wanted to. And the crosstabs gave me details I'd never even considered before. It all made sense to me. And it sure made sense to the client. I just called to say thanks for the tip, Bill. I owe you one.

PFS:® Professional File

File Management and Reporting Software

Power. *Manages large data bases, up to 4 million bytes. Powerful searching including alphabetic, numeric, "and," "or," "not" and record browsing. Sorted retrieval. Global updating. Mailing labels, up to 64 across. Full reporting and crosstabs on 64 columns.*

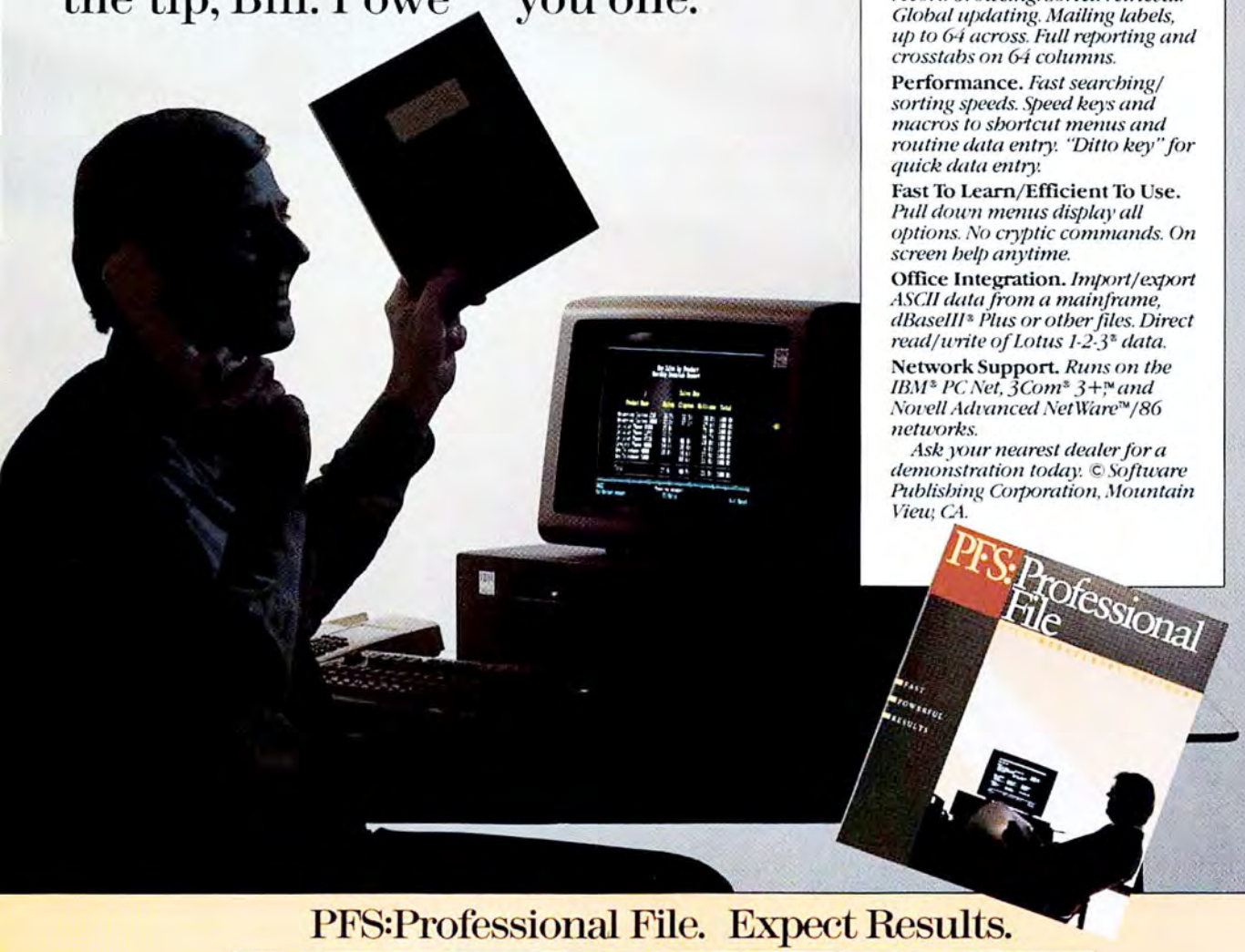
Performance. *Fast searching/sorting speeds. Speed keys and macros to shortcut menus and routine data entry. "Ditto key" for quick data entry.*

Fast To Learn/Efficient To Use. *Pull down menus display all options. No cryptic commands. On screen help anytime.*

Office Integration. *Import/export ASCII data from a mainframe, dBaseIII® Plus or other files. Direct read/write of Lotus 1-2-3® data.*

Network Support. *Runs on the IBM® PC Net, 3Com® 3+,™ and Novell Advanced NetWare™/86 networks.*

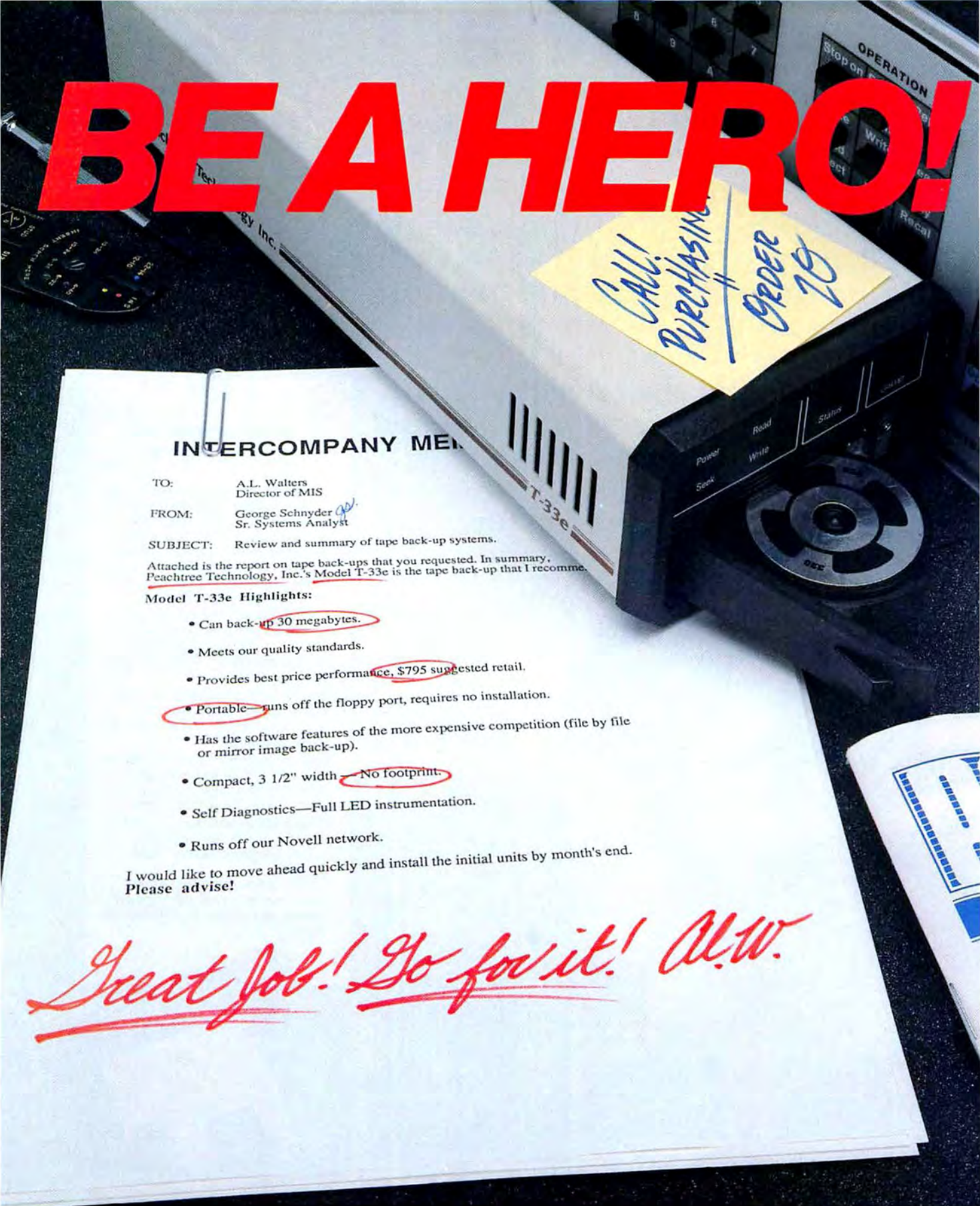
Ask your nearest dealer for a demonstration today. © Software Publishing Corporation, Mountain View, CA.



PFS:Professional File. Expect Results.

PFS: FILE owners call 1-800-255-5550 for upgrade information.
(IBM and compatible PC owners only: Alaska and Canada call 1-303-799-4900).

BE A HERO!



Peachtree Technology, Inc.

3120 Crossing Park, Norcross, Georgia 30071, Telephone (404) 662-5158 Sales (404) 662-5556

Circle 674 on reader service card

KURTA

Desktop Performance

Desktop technology that's years ahead. It'll blow you away.

Create your own images, graphs, or trace from graphics directly to your personal computer. Personalize your own menus for desktop publishing, computer aided design, engineering, spreadsheet and database applications.

Increase your performance with the fastest, most accurate graphic input tools available.

See your dealer, or send for information on Kurta's graphic input system. Call Kurta direct for the dealer nearest you.

KURTA®

CORPORATION

4610 S. 35TH STREET, PHOENIX, ARIZONA 85040
(602) 276-5533.

NAME

ADDRESS

CITY STATE ZIP

© KURTA CORPORATION 1986

Circle 809 on reader service card

dressed as drive E: or beyond. Portafile has two external ports: one for hooking up with the controller and another to connect with a second Portafile, addressed as drive D:.

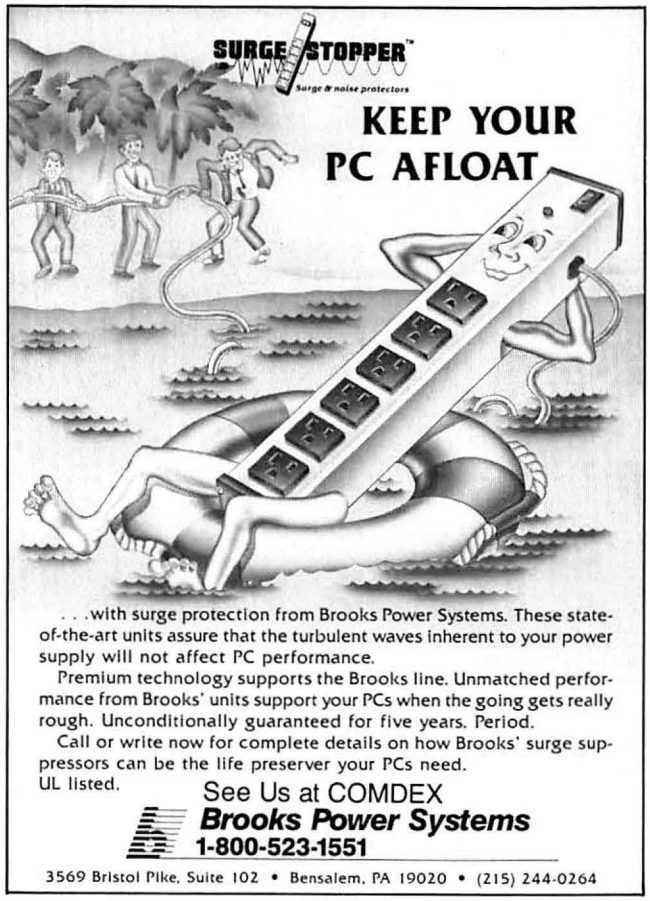
Once you've set the switches, you pop in the 8-bit, half-slot board, connect the cable, and set Portafile's self-propelled installation program rolling. This utility borrows a few files from your DOS 3.10 disk, initializes and formats the drive, makes a directory for itself, and transfers key files to a floppy disk you provide. The last maneuver neatly fashions a floppy-based reinstallation program in the event something untoward occurs. In addition, Portafile is bundled with *Xtree*, a menu-driven hard disk management package from Executive Systems.

Mindful that putting Portafile to good use assumes interface boards have been installed at both ends of your journey, Western Digital has priced the board at a manageable $129. Otherwise, you'll need to rip open your PC, pull out the board, and schlepp the entire assemblage with you—hardly a paradigm of portability.

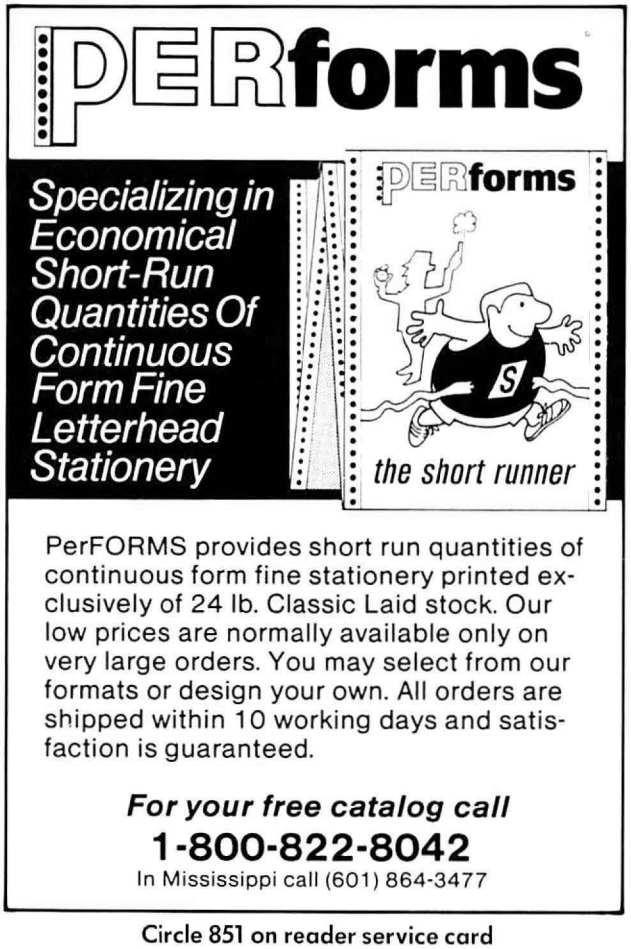
Much as I relished the prospect of adding this spiffy new peripheral to my collection, my initial encounters with Portafile were inauspicious. Early on, I lost the ability to boot from drive C: and was forced to slip DOS into drive A: to start the system and access the errant box. Then, inexplicably, I began to experience the heartbreak of sporadic seek errors. Sensing the possibility of microwave interference, I tried removing my accelerator board from the slot adjacent to the interface board, but the seek errors persisted.

On request Western Digital obligingly shipped another unit, which performed flawlessly. In standard *PC World* tests that force a hard drive to sequentially read and write a 100K and a 1MB file

(continues)



Circle 705 on reader service card



Circle 851 on reader service card

What's easier than Dac-Easy™?

BALANCE™...the Self Teaching Accountant from Royal American Technologies.

The package that is now helping HUNDREDS of companies in a broad range of industries to run more efficiently and profitably.

ORDER ENTRY AND SALES ANALYSIS

$99.95

- Instant Invoicing
- Unlimited number of Vendors
- Handles Active, Future, Back Orders and On-Hold for Credit Orders
- Automatic credit limit verification
- Ad Hoc Order Status inquiries
- Packing Slips/ Picking Slips
- Order Confirmations, Credit Notes
- Complete Order History and Sales Management reports

INVENTORY CONTROL AND ANALYSES

- Develop your own stock code number (alpha-numeric)
- Physical inventory count sheets
- Flexible stock label printing for items or stock bins
- 6 pricing levels
- Complete inventory management reports

ACCOUNTS PAYABLE

- Produces cash requirements report
- Supports unlimited number of vendors
- Check printing supports most standard check formats (design your own check format on screen if needed)
- Produces complete Accounts Payable Reports

ACCOUNTS RECEIVABLE

- Full control over receivables
- Automatic posting of recurring customer charges or interest
- Flexible year-end closing dates
- Customized inquiry and report
- Complete set of Accounts Receivable Reports

BILLING

- Automatic plus last minute invoicing
- Uses standard invoices (customized formats that you design on screen)
- Statements and Reminders
- Design your own
- Flexible ageing 30/60/90/120 or 7/10/14/21 days or any combination
- Complete Reports

GENERAL LEDGER AND FINANCIAL REPORT WRITER

- A 20-digit alpha numeric account code allows unlimited number of Department Accounts and Sub-Accounts
- Handles Multi-company and Divisions easily if needed
- Specific General Ledger accounts may be accessed by Name Key search if account number is not known
- Standard Chart of Accounts can be easily modified as needed
- Design your own Reports. Six Standard G/L Reports are provided:
- Chart of Accounts Report
- Transaction Audit Report
- Trial Balance
- Profit & Loss Report
- Balance Sheet
- Budget Comparison Report
- The G/L Module may be used as a Stand-Alone Cashbook system
- A customized Report Writer feature gives easy access to the financial report format you need

BILL OF MATERIALS

- All files are always in balance
- Modules can run integrated or stand-alone
- Supports service or product related companies
- Load and Go in 15 minutes

SALES LEAD MANAGEMENT

- Tutorials provided On-Disk for sample companies
- Password options on any function
- LAN version available
- Custom Report Writer provided

CLIENT TIME AND BILLING/ JOB COSTING

POINT OF SALE

- Payroll Management for large or small companies
- Hourly or salaried employees
- Multiple deductions
- Weekly, Bi-Weekly, or Monthly
- Built-in Federal and State Tax tables (all States)
- Pay Check, Pay Slip and W-2 printing
- A unique Pay Slip "Spreadsheet" image onscreen
- Unlimited number of departments or cost centers
- Complete set of Payroll Management Reports
- The Payroll Module is extremely efficient. (Typical processing time for 80 employees paid weekly is 2 hours per week.)

PAYROLL MODULE

FEATURES	BALANCE SERIES $99.95	DAC-EASY™ $69.95	EASY BUSINESS™ $595.00 per module
On screen context sensitive help available at all times	YES	NO	YES
On screen editing for errors	YES	NO	YES
Multi-client/Multi-company capabilities	YES	NO	YES
Payroll available	YES (extra)	YES (extra)	YES
On disk tutorial	YES	NO	YES
Custom report writer	YES	LIMITED	YES
Upgrade path to multi-user LAN version of package	YES	NO	YES

VARS, System Integrators and Dealers, your inquiries are always welcome.

Head office: (415)397-7500

ROYAL AMERICAN *Technologies Corporation*™

"We have been using BALANCE Series for 2½ years. Our staff were able to use it with no previous PC experience!"
Mr. John Tilley, Accountant
Texiles Division, Dunlop Group

BALANCE Series was our first PC accounting system. Our financial reporting requirements were extensive. The package performed extremely well in this area!"
Mr. Bruce Cook, Manager
Air Conditioning Division, Hitachi

"We have over 100 client companies. BALANCE Series is extremely easy to install. We have most of our clients on the system within 2-3 days!"
Mr. Mike Kuhn, Accountant
Micro Management Services

"The Payroll is superb. We have 30 employees. It saves us hours each week!"
Maurice Silver, President
Tower Knitwear

Royal American Technologies
201 Sansome, Suite 500
San Francisco, CA 94104

(800) 654-7766
In California (800) 851-2555
Ask for Operator 100.

Please rush me: ____ copies of BALANCE at $99.95 per copy; ____ copies of PAYROLL at $75.00 per copy. I've enclosed $5.00 for postage and handling. California residents add 6% sales tax.

Name _____

Address _____

_____

City _____

State _____ Zip _____

Phone _____

Payment: ☐ Check ☐ Money Order
☐ Cashiers Check ☐ AMEX
☐ VISA ☐ MASTERCARD

Expiration date _____

Card Number _____

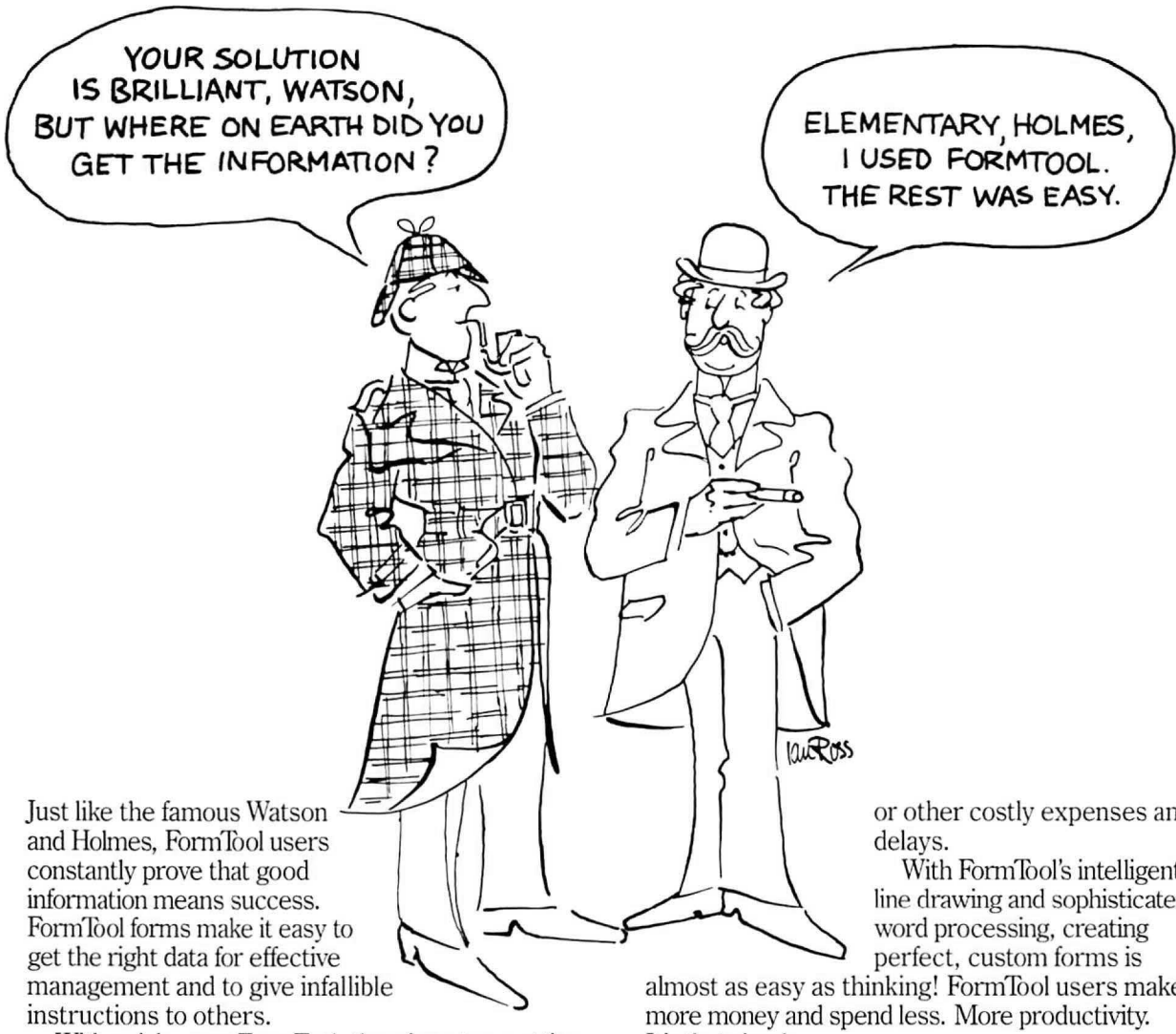
Signature _____

30-Day Money-Back Guarantee on BALANCE and PAYROLL (less postage and handling). There is a $10 restocking fee if the disk envelope is opened.
Not copy protected.

System Requirements: IBM (PCjr, PC, XT or AT)[1] or other compatibles. 128K RAM, 80 or 132 column printer, 80×24, monitor, MS-DOS[2], PC DOS[1] 2.0 or later.

[1]Trademarks of International Business Machines Corp
[2]Trademark of Microsoft Corp
Dac-Easy is a trademark of DAC Software, Inc
Easy Business is a trademark of Easy Business

Circle 453 on reader service card



Just like the famous Watson and Holmes, FormTool users constantly prove that good information means success. FormTool forms make it easy to get the right data for effective management and to give infallible instructions to others.

With quick, easy FormTool, there's no typesetting or other costly expenses and delays.

With FormTool's intelligent line drawing and sophisticated word processing, creating perfect, custom forms is almost as easy as thinking! FormTool users make more money and spend less. More productivity. It's that simple.

FORMTOOL'S NEW POWER-PACKED FEATURES:

- **Single keystrokes** make screen-wide horizontal and vertical lines with perfect intersections, corners, T's, double lines, and grids.
- Form-oriented **word processing** with wordwrapping, reformatting, justifying, and centering.
- Multiple form **windowing,** variable character and line spacing, standard and custom page sizes, auto tab stops.
- **Multiple type fonts,** styles and sizes, large characters, direct access to graphic symbols, horizontal & vertical typing, foreign character sets.
- **Move and drag** marked areas – even to other forms. Perfect fit of merged blocks.
- **"Plug-in-and-print"** using most dot matrix, laser, or inkjet printers. Sideways feature included free.
- **Form organizer gives** complete history and specifications. You can actually **see** all forms before editing selection.
- **NEW MERGE.** Fill in forms easily or specify dBASE, DIF, or ASCII data files and let FormTool merge it into your new form.

Forms design manual, sample forms, on-line help, and printer customizing utility included. Add $4.50 for shipping. Add $10 for international sales. Florida residents add 5%. Visa, MC or check. FormTool 2.0 on sale 9/15/86 and requires: IBM PC/XT/AT or 100% compatible (256K RAM minimum). No graphics card required.

$95.00 with all new 2.0 features.

See your dealer or call: 1-800-231-1149 (toll free) or 1-305-531-5486 in Florida.
Or write: BLOC Development Corporation: 1301 Dade Blvd., Dept. P.W., Miami Beach, Florida 33139

FormTool®

Because productivity is everybody's business.

FORMTOOL 2.0 WITH SIDEWAYS PRINTING AND MERGE (dBASE & spreadsheet compatible).

© 1986 BLOC Development Corp.

Circle 50 on reader service card

Make Any Computer Do Exactly What You Want With McGraw-Hill's

Contemporary Programming & Software Design Series

Make no mistake. Almost all books and courses on "programming" teach you only the final 5% of the total programming process—namely, how to code in a specific language . . . information of little value if you don't know how to reach the point in the programming process when you are ready to code.

With the Series, however, you'll learn to create your own programs from scratch, even modify off-the-shelf programs. You'll learn enough BASIC and machine language to get you started on the remaining 5% of the programming process.

From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

That's why McGraw-Hill's new Contemporary Programming and Software Design Series teaches you how to create your own software . . . either from scratch or by making key modifications to existing programs.

There is nothing magical about it. You learn the process of building a computer program step-by-step with McGraw-Hill *Concept Modules* sent to you one at a time, once a month. Each of the ten modules in the Series takes you through an important step in the development of the structure and detailed logic of a program, including testing, debugging, and documentation.

Unique Interactive Hands-On Instruction

Each module includes an easy-to-understand guide PLUS a 5¼" floppy disk containing typical programs and interactive instruction that you can run on IBM PCs, PC compatibles and Commodore 64 and 128 computers for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.

The Crucial 95%—Learn the Foundation of Computer Programming

While the Series includes interactive disks that run on specific computers, everything you learn you can apply to any language or machine. Why is this possible? Because McGraw-Hill knows programming is far more than coding a program into the computer using a specific language. In the real world of computers, 95% of the programming process is carried out using design techniques that are independent of specific language or machine. It is this crucial 95% that you thoroughly understand and master in the Series.

Build Your Own Personal Software Library

The sample programs you work with throughout the Series are excellent learning tools. But they're more than that. By combining the sample programs onto one master disk, you'll have the start of your own personal software library. In addition to the programs you've written and modified throughout the Series, you'll also receive dozens of the most popular public domain and user-supported programs, such as data base manager, word processor, calendar generator, appointments reminder and much, much more.

15-Day No-Risk Trial

To order your first module without risk, send the postage-paid card today. Examine the first module for 15 days and see how the Series will help you make your computer do exactly what you want it to do!

If someone has beaten you to the card, write to us for ordering information about the Contemporary Programming and Software Design Series.

McGraw-Hill
Continuing Education Center
3939 Wisconsin Avenue
Washington, DC 20016

Take the Law Into Your Own Hands.

Save Legal Fees By Using LegalEase.™

Now you can use your PC to get the solid protection you need for every business and personal dealing. Instantly! And, because LegalEase™ lets you do it yourself, you save the cost of expensive lawyers. LegalEase pays for itself the first time you use it.

This is a simple, ready-to-use business and legal forms system for IBM® PCs. Its easy-to-read, on-screen menus lead you directly to the right legal document...from a library of more than 150 time-tested LegalEase™ contracts, agreements, leases, notices, waivers, releases and binding business forms.

You just retrieve, edit and print using the LegalEase™ menu system and word processor or you may use any standard word processor including WordStar® and MultiMate.™ And by ordering your LegalEase™ software right away, you'll get PC WRITE word processing FREE.

LegalEase™ was created by Boston attorney Richard H. Gens especially for smaller and medium-size businesses, and individuals—based on 34 years of drafting and enforcing legal documents.

It comes to you complete, with a users manual and a range of such useful legal documents as:

- Promissory Notes (7 versions)
- Notice of Delinquent Account
- Security Agreement (2 versions)
- Power of Attorney (2 versions)
- Short Form of Residential Lease
- Commercial Leases (2 versions)
- Bills of Sale (4 versions)
- Lease of Personal Property
- Offer of Employment
- Employment Agreement
- Employee Non-Compete Agreement
- Notice of Defective Goods
- Contract for Sale of Goods
- Escrow Agreement
- Notice of Shareholders' Meeting
- Notice of Directors' Meeting
- Minutes of Annual Meeting
- General Partnership Agreement
- Real Estate Brokerage Agreement
- Simple Form of Will
- Realty Trust—Nominee

New! Real Estate Module of LegalEase™
Contains all basic Real Estate forms. And, also comes with a FREE copy of PC Write® $69.95 plus $7.50 postage and handling.

Soon To Be Released! Corporate Module of LegalEase

LegalEase™ requires an IBM® PC, XT, AT or compatible, DOS 2.0 or higher and 128K RAM.

Yes, please send me: ☐ LegalEase™ at $129.95 plus $7.50 postage and handling.
☐ Real Estate Module at $69.96 plus $7.50 postage and handling.
☐ SAVE NOW by ordering both packages for $179.95 plus $15.00 postage and handling.
(Mass. residents add 5% sales tax. Outside USA add $10 per copy.) All packages include your FREE copy of PC Write and have a 30-day money-back guarantee!

☐ Enclosed is my check/money order
Charge to my ☐ Visa ☐ MasterCard ☐ American Express
Card No. _____ Expir. Date _____
Signature _____

NO COD'S OR PURCHASE ORDERS. Outside USA make payment by credit card or by bank draft, payable in US dollars drawn on a US bank.
Name _____
Address _____
City _____ State/Zip _____

LegalEase™
HDG Software, Inc. 54 Whitney Street, Sherborn, MA 01770
1-800-628-2828 Ext. 706
For faster service, call us at (617) 651-1881. PCW 1186

LegalEase™ is a Trademark of HDG Software, Inc.
Copyright 1986, HDG Software, Inc.

Circle 442 on reader service card

Get In on the PC Market Action

Your *PC World* Action Ad takes you to the heart of the IBM PC marketplace. These ⅓-page gems provide a cost-effective way to reach over 275,000 *PC World* readers. Place your ad with Carol Watson at 800/435-7766 (800/435-7760 in California).

and then perform a series of random seeks, no seek or data errors were detected. Western Digital touts Portafile's average access time as 80 milliseconds, over 180 percent faster than the company's own 20MB FileCard. Specs aside, Portafile's speed proved more than adequate under real-life working conditions.

With Maynard and Microcomputer Memories hawking similar hard disks at comparable prices, there's little doubt that transportable hard drives are this season's Hello Kitty. (Western Digital has also worked out a deal with Xidex, which is releasing Portafile under its Dysan and Storage Master labels.) This is a trend for those with disposable dollars; however, at $1500, Portafile will set you back a sight more than comparable board-mounted drives. And for those who think portable hard disks have the same integrity as the Bernoulli Box, consider: You're toting not just the media but also the guts of the drive, a dicey proposition if, like me, you're not interested in dodging g-forces. Portafile may be especially handy if you're the stay-at-home type. *—Ken Greenberg*

Portafile
Western Digital Corp.
Enhanced Peripherals Division
2300 Main St.
Irvine, CA 92714
714/863-0533
List price: with 10MB $1295, with 20MB $1495

(continues)

The new 24-pin C-715 Reliant. The last printer you'll ever buy.

If you've been looking for the ultimate business printer—one that has the print quality of a daisy wheel, but is three times faster; one with the software compatibility of popular 9-pin dot-matrix printers, but is easier to use; one with the ability to mix text and high-resolution graphics of a laser printer, without the high price—your wait is over.

The C. Itoh ProWriter® C-715 Reliant is the last printer you'll ever buy. Here's why.

High-speed letter quality.
The 136-column C-715 prints drafts at up to an astounding 300 cps and will print a typical business letter in under 30 seconds with its blinding 100 cps, needle-sharp true-letter-quality print mode.

Ultimate software compatibility.
The remarkable Reliant has the unique ability to *become* a Toshiba P351,® an IBM ProPrinter XL,® an Epson LQ-1000,® or a Diablo 630® simply by inserting a credit-card-sized Identity Card—the smallest emulation cards available. So you get instant "custom" compatibility with virtually any software ever written.

And with features like a standard 32K buffer, the Reliant can store and print up to 16 pages of text while your computer is free to do other work.

But that's just the tip of the iceberg. The C-715 does nearly everything but make coffee in the morning.

You've never seen easy like this.
Selecting print functions is easier than ever before with the C-715. By merely pressing a button on the front control panel, you can select functions like character pitch, print quality, margins and buffer size. The selected mode is then displayed on our easy-to-read 16 digit LCD screen. So you can say good-bye to dip switches.

Paper handling is a breeze on the Reliant, too, with features like a push/pull tractor, bottom feed, automatic paper loading and an optional sheet feeder. You can load single-sheet paper without removing fanfold or multi-part forms from the tractor. And with the Reliant's seven-million-character ribbon life, you'll load a new ribbon three-and-a-half times less often.

Express yourself.
With the C-715 and optional plug-in font cards, you can express yourself in a variety of attractive typefaces. And a variety of colors. And if you combine the Reliant's standard color capability with its ultra-high graphics resolution of 180x360 dpi, you'll get brilliant business presentations in seven vivid colors.

Your last printer.
If you're looking for the ultimate office printer, the C. Itoh ProWriter C-715 Reliant is the last printer you'll ever need to buy.

But you don't have to take our word for it. Prove it to yourself at your nearby C. Itoh Digital Products dealer today.

Upgrade.

C.ITOH

C. Itoh Digital Products, Inc.
19750 South Vermont Avenue, Suite 220
Torrance, California 90502
(213) 327-2110 or (800) 423-0300

Toshiba P351 is a registered trademark of Toshiba America, Inc. IBM ProPrinter is a registered trademark of International Business Machines Corp. Epson LQ-1000 is a registered trademark of Epson America, Inc. Diablo 630 is a registered trademark of Xerox Corporation.

Circle 743 on reader service card

If "60 Minutes" Were On Your PC, You Could Watch It In 6½ Minutes.

With PC-elevATor, the world's fastest PC accelerator board. Now at a special price: $895.

Mike, Andy and the gang pack a lot of information into "60 Minutes." And they're fun to watch. You cram a lot of data through your PC. But it's no fun staring at your monitor as a recalc, a sort or a compile crawls along at a snail's pace.

After all, time is money. And time lost is money wasted. Tick, tick, tick.

But you can make time, and your PC, fly. And cut your computing costs. With PC-elevATor™. Widely acclaimed as the fastest plug-in accelerator board. For your PC, XT, Compaq or any compatible.

With an 8 MHz 80286 chip, PC-elevATor scores 9.2 on the Norton SysInfo scale. That's the standard benchmark of computer speed. It means you can run your PC more than 9 times faster. So you can do sixty minutes of computing in 6½.

No other board in its class can touch that performance. At our regular $1195 price, you would have made a wise investment. But now at $895, you get a megabyte of high-speed RAM on board. That's like getting an expanded memory (EMS) board thrown in for nothing.

Want even more? We also offer a 10 MHz high-performance version, and a 12.5 MHz deluxe version for specialized applications. You can also add a second megabyte of memory to any of our boards. And an 80287 floating point coprocessor (5, 8 or 10 MHz) for super number crunching.

Don't let time pass you by. Call us today. And find out how PC-elevATor can save you time and money.

Otherwise, the "60 Minutes" crew might start nosing around your office. To find out why your computer is wasting so much time and money.

Seriously, Andy, this is no joke.

8 MHz PC-elevATor
Now only $895
(617) 492-0700

APPLIED REASONING

Applied Reasoning Corporation
86 Sherman Street, Cambridge, MA 02140

Circle 860 on reader service card

Array Technologies Graphics Solution

When the Hercules Graphics Card unshackled monochrome monitors, users flocked to the new high-resolution graphics standard, and graphs abounded where once there were only characters. But what if your software was written for IBM's Color/Graphics Adapter (CGA) and lacked a Hercules driver? Compaq's monochrome display answered this question with a dual-function video adapter: Character-based applications switched on Compaq's high-resolution character mode, while graphics programs used the board's monochrome CGA emulation.

The people at Array Technologies are clearly students of history. Their eclectic video display board, Graphics Solution, emulates both the Hercules Graphics Card and the CGA on either a color or monochrome monitor. To further sweeten the pot, this chameleon-like device also does monochrome and color impersonations of Plantronics' ColorPlus, a color graphics adapter capable of producing 16 simultaneous colors instead of the CGA's paltry four.

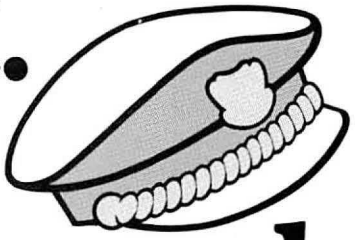
In Hercules-emulation mode, Graphics Solution matches its predecessor's hard-edged 720-by-348-pixel monochrome graphics. As with the Hercules board, you can disable graphics functions to make Graphics Solution emulate IBM's Monochrome Display Adapter,

(continues)

NEW

TOPS IN ITS CLASS.
PROVIDES A NEW LEVEL
OF CONVENIENCE FOR
MS-DOS USERS.
InfoWorld

Point.
Shoot.
Take
Command.



Rip full throttle through your data with this time-saving control program from Peter Norton. The Norton Commander™ software gives you a fast, powerful *point and shoot* method to perform your computer operations. Point to a directory and The Commander jumps to it. Point to your data file and The Commander runs your data with its matching program. Speed through listings, update files like lightning. Delete. Copy.

Built-in sweep functions manage your disk. Add your own user menus for one-key operation. *And it doesn't eat up your screen while it's doing it.* Easy to use with keyboard or mouse. The Norton Commander. The quickest way to enhance your PC, and *take command.*
The Norton Commander. Designed for the IBM® PC, PC-AT, and DOS compatibles. At your software dealer or order direct for $75* from Peter Norton Computing, Inc., 2210 Wilshire Boulevard, #186, Santa Monica, CA 90403. 213-453-2361. Visa and Mastercard welcome.
*Subject to shipping and handling charges.

THE NORTON COMMANDER™

THE QUICK AND EASY
HARD DISK MANAGER

The Norton Commander™ is a trademark of Peter Norton Computing, Inc. © 1986 Peter Norton Computing IBM® is a registered trademark of International Business Machines Corporation.

Circle 621 on reader service card

QUALITY: an American achievement.

Ask your dealer about **FREE** 90 day On-site Service*

AMERICAN 286-A™ PERFECT SYSTEM

Purchasing a compatible is a wise decision. You can find powerful systems at competitive prices without compromising quality.

The American 286-A™ (formerly American AT) is an IBM AT® compatible with a proven record in reliability. The four-layer motherboard ensures low noise and minimal interference. It passes IBM's diagnostics test with flying colors. Supported by only the best, the American 286-A uses major national brand components for data storage units.

The American 286-A offers unprecedented compatibility. Supporting all popular business and education applications and networking systems, the American 286-A emulates IBM operations.

And, the American 286-A won't leave you stranded. We back the American 286-A with a 12 month warranty on parts and labor.

System characteristics:

- 6MHz/8MHz switchable clock speeds.
- Up to 3.5 Mb memory expandable.
- Includes MS-DOS® 3.1 software and system manual.
- Enhanced chassis design.
- 12 month limited warranty on parts and labor.
- Reliable 4-layer motherboard.
- Socket to support the 80287 math co-processor.
- Eight I/O expansion slots.
- AT/XT switchable keyboard.
- 1.2 Mb diskette drive with controller.
- Color or monochrome graphics card.
- Serial/parallel interface card.
- 33 Mb (formatted) fixed disk drive with 40 ms access time.
- 20 Mb tape backup.
- American Mouse with free Compu-Brush graphics program.
- FCC approved; class 15J, part B.

AUTHORIZED DISTRIBUTOR AND SERVICE CENTERS:

California Micro, Inc.
Los Angeles, CA (800) 792-6500

Imagine Computers
Goleta, CA (800) 344-2964

PC Land, Inc.
Tustin, CA (714) 730-6723

Computer Professionals
Lakewood, CO (303) 232-4009

Computer Peripheral Warehouse, Inc.
Deerfield Beach, Fl (305) 481-2170

PC Distributor
Orlando, FL (305) 648-8200

The Super Source
Norcross, GA (800) 241-8579

Mid America
Carmel, IN (317) 846-3101

CPU Distribution, Inc.
Burnsville, MN (612) 894-9153

Asibem, Inc.
Bluespring, MO (816) 229-2442

Computer Wholesalers
Lincoln, NE (402) 466-1962

Micro Configuration East, Inc.
Brooklyn, NY (718) 941-2512

Microsel
Oklahoma City, OK (405) 787-4354

Power House Sales
Sioux Falls, SD (605) 335-7181

American Computer Distributing
Chattanooga, TN (615) 870-1073

Columbia Data Systems, Inc.
Columbia, TN (615) 381-4650

Inter-Micro Distributor, Inc.
Alberta, Canada (403) 438-3997

Paris Sud Electronique Composant
Paris, France (1) 69.20.66.99

MAJOR DEALERS:

Computerland of Whittier
Whittier, CA (213) 945-8321

Elek-tek, Inc.
Chicago, IL (312) 677-7660

Inacomp Computer Center
Columbus, OH (614) 431-2230

Inacomp Computer Center
Saginaw, MI (517) 790-1360

Executive Business Machines
Hickory, NC (704) 324-9035

See us at COMDEX/Fall '86 November 10-14, 1986

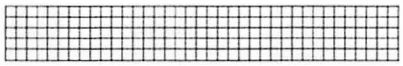
American
COMPUTER & PERIPHERAL, INC.

Corporate Office: 2720 Croddy Way, Santa Ana, CA 92704 USA • Tel: (714) 545-2004 • Fax: (714) 545-2146
Northeastern Office: 830 Busch Court, Columbus, OH 43229 USA • Tel: (614) 846-5433 • Fax: (614) 846-7656

*IBM AT and MS-DOS are trademarks of International Business Machines and Microsoft Corporations, respectively.

*Effective October 1, 1986. Subject to Intelogic Trace geographic restrictions and regulations.

Dealers Circle 771 on reader service card
End users Circle 770 on reader service card



or configure Array Technologies' unit to coexist with another video board.

When mimicking the CGA in monochrome, Graphics Solution assigns a different gray value to each hue in the IBM board's palette. The result is as crisp as the CGA's 320-by-200-pixel resolution will allow, although it's sometimes necessary to adjust your monitor's contrast to distinguish different shades. As an added bonus, Graphics Solution's monochrome CGA emulation provides a more readable character set than that offered by the CGA.

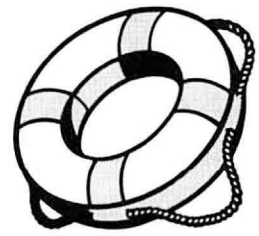
Those who have programs such as *Symphony*, that have the appropriate driver, will probably want to employ the wider color spectrum offered by Graphics Solution's ColorPlus emulation. This impersonation supports up to 16 simultaneous colors (or monochrome shades) with 320-by-200-pixel resolution, or four simultaneous colors in high-resolution 640-by-200-pixel mode. In high resolution, you can theoretically jack up the maximum number of colors to 16, although you need special software to support this configuration. The manual provides complete driver modification instructions for raising the color ante, a mode that uses all 64K of the board's RAM.

Installing Graphics Solution is a matter of slipping in the half-slot board and setting your machine's DIP switches appropriately. The board's imitative capabilities are hardware based, so there's no software to install. On-board DIP switches enable you to configure the little wonder for standard

(continues)

You know I can rescue your data.

It's no secret. Thousands of business and home users have used my Norton Utilities™ software to restore precious data erased or deleted by accident. Mr. Kriley of Los Angeles lost his thesis and found it using my *UnErase*™ feature. He writes: "I owe my degree to Peter Norton." Computer pundit Jim Seymour says "Norton has saved my posterior with *UnErase* so many times—it's wonderful, Peter!"



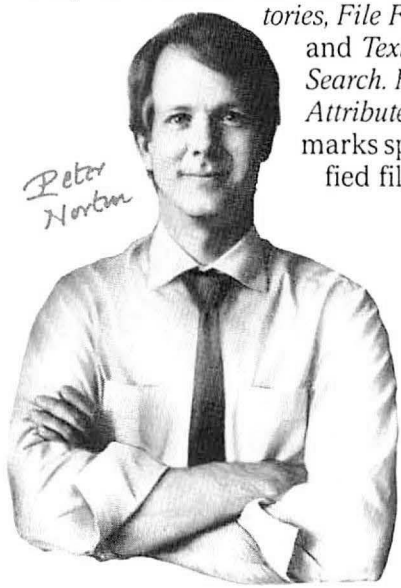
A life saver for your data.

UnErase is a powerful utility that lets you systematically search for lost data and retrieve it with a few simple commands. It makes The Norton Utilities the highly acclaimed industry standard for data recovery.

Now what can I do for you *every day?*

You don't lose data every day. That's why there's more to the package than just the *UnErase* program. My other utilities perform a wide variety of organizational and maintenance tasks that keep your PC organized and your data secure. They have names like *List Directories, File Find* and *Text Search. File Attribute* marks specified files so they cannot be altered or erased. *Wipe File* deletes data by file. *Wipe Disk* clears your entire disk.

Other utilities measure available file space, test your disk for damage, and measure your computer's performance. *PC Magazine* calls The Utilities "Indispensable." *The New York Times* says "Don't compute without it." Peter McWilliams (*The Personal Computer Book*) says "You'll bless this disk." Dozens of features keep your data in line. Every day.



The Norton Utilities. Designed for the IBM® PC, PC-AT, and DOS compatibles. Available at Computerland and most software dealers. Order direct for $99.95 from Peter Norton Computing, Inc., 2210 Wilshire Boulevard, Santa Monica, CA 90403. 213-453-2361. Visa and Mastercard welcome.

THE NORTON UTILITIES™

DATA RECOVERY

DISK MANAGEMENT

A life saver for your data.

The Norton Utilities™ and *UnErase*™ are trademarks of Peter Norton Computing, Inc. © 1986 Peter Norton Computing. IBM® is a registered trademark of International Business Machines Corporation.

Circle 628 on reader service card

Complete Systems Shipped Overnight

TURBO XT $799

• 4.77 & 6.77 mhz • 2 Drives
• 640K • Serial Parallel Clock
• Keyboard

BOARDS

MULTIFUNCTION

Quadram Quadport AT	CALL
Quadram Quadboard 384K	$179
Quadram Liberty	CALL
Quadram EMS Plus	$329
AST Sixpak 384K	$219
AST Sixpak Premium	CALL
AST Rampage XT/AT	CALL
AST Ramvantage PC/AT	Call New, Low Price
Thesis Fastcard V OK	New!
Ram Board 512K half card	$169

VIDEO/GRAPHICS

AST Preview	$289
Hercules Color	$179
Hercules Graphics Plus	CALL
IBM Color	$198
IBM Monochrome	$198
Quadram EGA	$375
Color Card w/par.	$129
Monochrome Graphics Herc. comp. w/parallel	$149

NETWORK

Orchid PCNET	CALL
Quadram Quadnet IX	CALL

EMULATION

AST 5251 mod 11/12	CALL
DCA IRMA	CALL
Forte Data 3278	CALL

MASS STORAGE

FLOPPY DRIVES

Half Height 360K (bl/grey)	$98
Half Height 1.2MB (gry)	$147
Tandon TM100-2	$125
Toshiba Half Height	CALL

INTERNAL HARD DRIVES

All hardware drives complete with controllers, mounting hardware & instructions. All are formatted, tested & have 1 year warranty.

Seagate 10MB	$399
Seagate 20MB	$499
Seagate 30MB	CALL
Seagate 20MB for AT	$599
Seagate 30MB for AT	$729
Priam 40MB/60MB for AT	$1395/1595
Priam 40MB/60MB for AT	$1425/1625

DISK CARDS

CMS 10MB/20MB	$499/699
Hardcard 10MB/20MB	CALL
Mountain 10MB/20MB	CALL

DISK SUBSYSTEMS

Bernoulli Box 20MB/40MB	New Low Prices
Sysgen Flatpak 20/20 & 20/60	CALL
Tallgrass all models	CALL

TAPE DRIVES

Irwin 10MB/20MB inter.	from$499
Irwin 10MB/20MB exter.	CALL
Tallgrass 4060	$1349
Sysgen Smart Image 20 & 60	CALL

MODEMS

Hayes 1200/1200B	$395/$329
Hayes 2400/2400B	$596/526
Migent 1200 Internal	New $109
US Robotics Password 1200/2400	CALL
US Robotics Courier	CALL
Ventel 1200 w/XTALK	CALL

AT&T 6300

$1899

• AT&T Monochrome Display
• 2 Drive • 640K • Complete

CHIPS

64K/128K/256K
8087/80287 6 HMZ & 8HMZ
CALL FOR MARKET PRICE

MONITORS

MONOCHROME

AMDEK 310A	$168
IBM Monochrome	CALL
Princeton Graphics MAX-12[E]	$175
Quadram Amberchrome	CALL

COLOR

Amdek 600/722	$429/528
IBM Enhanced Color	CALL
Mitsubishi Color Monitors	from $349
Princeton Graphics HX12/HX12E	$436/526
Quadram Enhanced color	NEW!

COMPAQ AT&T

Compaq products available in retail stores only
Visit our showrooms in ATLANTA, CHARLOTTE, DURHAM & RALEIGH.

The Oldest Computer Store in the South • Since 1975

TURBO AT 286 $1899

- 6/8 mhz • 640K • 1-2 MB Floppy
- Serial Parallelport Clock
- AT Keyboard
- 20MB drive

1-800-241-0286

SUPPLY HOUSE

PC Mart Diskettes box	$18
case	$159
Maxell Disckettes box	$28
case	$258

PC MART™

Personal Computer Centers

1485 Northeast Express NE

Atlanta, GA 30329

INFORMATION

1-404-634-5995

SOFTWARE

Ashton Tate Framework II	Call
Andrew Tobias Managing Your Money	$129
Ashton Tate dBase III Plus	Call
Borland Sidekick	$39
Borland Turbo Pascal w/BCD & 8087	$79
Borland Turbo Lighting	$65
Borland Prolog	Call
Borland Superkey	$49
Borland Reflex	$69
Clipper dBase Compiler	CALL
Computer Associates IUS	
Accting Series	from$299
Decision Resources Chartmaster	$239
Decision Resources Signmaster	$189
Decision Resources Diagrammaster	$259
Digital Research Gem Draw Collection	CALL
Digital Research Gem Colllection	CALL
Easy CADD	CALL
Funk Software Sideways	$48
Harvard Total Project Manager	CALL
Hayes Smartcom II	$89
IBM Displaywriter III	$369
Lattice C-Complier	$298
Lifetree Volkswriter Deluxe	$169
Microsoft Windows	$79
Microsoft Word 3.0	CALL
Microstuff XTalk XVI	$109
MultiMate latest	CALL
Multimate Advantage	CALL
Norton Utilities	$59
Open Systems Accounting Series	CALL
Prodesign II CAD software	CALL
Rosesoft Prokey	$99
Satellite Software Wordperfect 4.1	CALL
Software Publishing Co PFS Series	from $79
Sorcim Supercalc III	$219

PRINTERS

DOT MATRIX

Brother HR1509	$398
Brother 2024L	CALL
Brother Twinwriter 5 Dot Matrix & Letter Quality	CALL
Epson LX-86	CALL
Epson FX-85/FX-286	CALL
Epson LQ-800/LQ-1000	CALL
IBM ProPrinter	$425
Okidata 182	$239
Okidata 192/193	$385/525
Okidata 292/293	CALL
Okidata 2410	CALL
Toshiba 321/341/351	New Low Price!
Toshiba 351 Color	CALL

LASER/LETTER QUALITY

Brother HR15 XL	CALL
Brother HR25/HR35	$568/$798
Corona LP300 Laser	$2395
Epson DX20/DX35	CALL
IBM Quietwriter II	$1,259
Quadram Quadlaser	In Stock

PLOTTERS

Houston Instruments	CALL
IO Line Plotters	CALL

all models available for quick delivery

Miscellaneous

Mousesystems PC Mouse w/paint	$139
Microsoft Mouse serial/bus	from$129
Keytronics 5151/5153	CALL
Keyboards for PC and AT	from $69
Quadram Microfazer 8K	$129
Quadram Microfazer II	CALL
Tripplite Isobar	from $45
Tripplite UPS 400	CALL
Curtis Protectors	from $29

**Monitor Not Included*

IBM®

AT Enhanced $3495

- 6 mhz • 1-2 MB Floppy • 512K
- 20 MB Drive • Serial Parallel Clock

Circle 525 on reader service card

MicroCom Systems
OUTSTANDING SOFTWARE
For IBM PC's and Compatibles

$3.50 PER DISK
SMALL QUANTITIES

$3.00 PER DISK
FOR TEN OR MORE

$1 OFF 5 DISKS OR MORE WITH THIS COUPON

☐ CAD 1 — Altamira, an object oriented CAD program, and Supergraph 3. Color gr. req'd.
☐ COMM 1 — The ever popular QMODEM 2.0E modem communications program.
☐ COMM 2 — PROCOMM 2.3, an excellent modem program with terminal emulation.
☐ COMM 3 — Communications utilities to be used with QMODEM or PROCOMM.
☐ DATABASE 3 — The Pbase relational database manager with query language.
[2] FINANCE 1,2 — (2 disks) PC-Accountant and a personal finance manager.
☐ GAMES 1 — Chess, 3-D Packman, Kong, Spacewar, Janitjoe, and more. Color gr. req'd.
☐ GAMES 2 — Qubert, Pango, Centipede, Monopoly, Zoarre, and more. Color gr. req'd.
☐ GAMES 3 — Blackjack (you set rules), Arm Chair QB, and Empire (war game).
☐ GAMES 4 — Star Trek, the original Collossal Caves ADVENTURE, and Castle.
☐ GAMES 5 — The HACK adventure game from the universities. Like Rogue.
☐ GAMES 6 — Pinball, Othello, Dragons, Sopwith (fly one), and more. Color gr. req'd.
☐ GAMES 7 — Round42 (16 color graphics), Backgammon, Risk, and more. Color gr. req'd.
☐ LANGUAGE 2 — The renowned SMALL-C compiler and a C interpreter!
☐ LANGUAGE 3 — 8086/8088 assembler, disassembler, and tutorials.
☐ LANGUAGE 4 — 370 assembler language on the PC! A must for IBM 370 users.
☐ LANGUAGE 5 — Turbo Pascal interactive debug, pop-up help, formatters, etc.
☐ MUSIC 1 — Many clever tunes, and an excellent color graphics music editor.
☐ ORGANIZER 1 — DESKMATE, a sidekick clone, and the JUDY calendar program.
☐ ORGANIZER 2 — Menu driven project management using critical path scheduling.
☐ ORGANIZER 3 — The PC-OUTLINE windowing outline editor/thought organizer.
☐ PICTURES 2 — High res digitized graphics pictures. Color graphics required.
☐ PINUP 2 — Provocative high res digitized graphics pinups. Color graphics required.
☐ PRINTER 1 — Font and sideways utilities, spoolers, banner makers, and more.
☐ SPREAD 1 — The PC-CALC spreadsheet program.
☐ UNIX 1 — A Unix command shell and various Unix commands for DOS. Emacs, etc.
☐ UTILITIES 1 — A collection of invaluable general purpose DOS utilities. A must.
☐ UTILITIES 2 — More invaluable general purpose utilities including NEWKEY.
☐ UTILITIES 3 — A comprehensive set of debugging and diagnostic utilities.
☐ UTILITIES 4 — The Ultra File Utilities; Norton-like utilities for diskettes.
☐ WORD 2 — Waterloo Script (like IBM's SCRIPT) text formatter for the PC.

— NEW (LATEST) RELEASES —

[4] COMM 4,5,6,7 — (4 disks) Latest RBBS Bulletin Board System 14.1A.
[2] DATABASE 1,2 — (2 disks) File Express 3.7, menu driven database manager.
☐ EDUCATION 1 — Interactive DOS tutorial for new PC users. Makes learning DOS painless.
☐ LANGUAGE 1 — The artificial intelligence languages LISP (XLISP 1.6) and PROLOG.
☐ LANGUAGE 7 — Pascal interpreter/compiler. Great for learning/debugging Pascal.
☐ PRINTER 2 — Letter quality print for your Epson compatible printer.
☐ WORD 1 — PC-WRITE 2.6, a powerful and complete word processing system.
☐ WORD 3 — The PC STYLE writing style analysis program.

Cost of Disks _____
CA Res 7% Tax _____
Ship/Handling $1.00
Total Enclosed _____

MicroCom Systems
P.O. Box 51657, Palo Alto, CA 94303

Circle 739 on reader service card

monochrome or RGB monitors as well as for composite color or monochrome displays. Composite monitors use the supplied adapter, which plugs into the board's external 9-pin connector.

For an extra $49, you can buy a piggyback parallel port module that brings the rear bracket's Centronics connector to life. The port can be configured as LPT1:, LPT2:, or LPT3:, or disabled. If you need a serial port as well, a $79 parallel/serial package adds a serial connector on its own bracket, plus the requisite cable. COM1:, COM2:, and disabled are the configuration options.

Array Technologies also supplies a diagnostics program and a menu-driven mode-switching utility. The latter's name is a little misleading; the utility merely allows you to switch between text attributes—for instance, from 132-column text to 80-column text. More substantial modifications such as changing monitor type or emulation mode must still be accomplished by fiddling with DIP switches, which are not accessible from the outside of the computer.

At a mere $299, this board of many guises matches the price of the Hercules Graphics Card while adding the power of two other boards—plus the handy color emulation modes. With a multimode adapter, however, remember to check your DIP switch settings; connecting a monochrome monitor to the board when it's set for color would likely result in a blown display (hence the lack of automatic mode-switching à la Compaq's video board). If your graphics needs are varied, or if you don't have a color monitor and your favorite program runs only with the CGA, Graphics Solution could well live up to its name. —*E. K.*

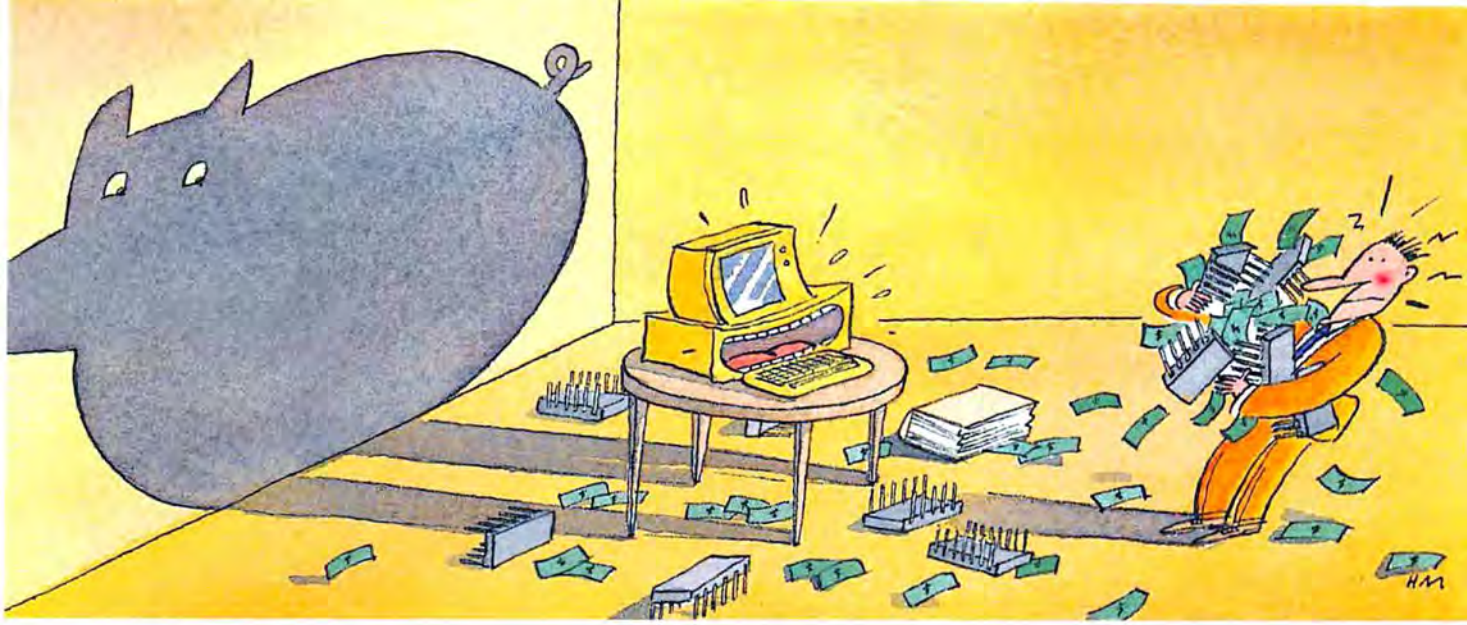
Graphics Solution
Array Technologies, Inc.
450 Esna Park Dr.
Markham, Ontario
L3R 1H5 Canada
416/477-8804
List price: $299, parallel/serial module $79, parallel module $49

Plus Development Hardcard 20

Last June *PC World* ran three of the slick new hard disk cards through their paces. When the dust settled, Plus Development's 10MB Hardcard was crowned king of the hill for its swiftness, simplicity, and rugged design. But now, less than six months later, 10MB just doesn't cut it anymore. To keep pace with the times, Plus Development has released the Hardcard 20, a bold new contender with 21.2MB of formatted cargo room.

The new Hardcard 20 looks like a mirror image of its older brother, offering the same sleek functionality and handy installation. The inch-wide, metal-encased board slides easily into one slot, and technophobes will appreciate the one-step formatting process. Typing C:INSTALL C: formats the disk,

(continues)



PROBLEM: Most concurrent processing systems take everything you've got, and give back very little.

THE SOFTLOGIC SOLUTION: DoubleDOS™

True multitasking that's quick, painless and powerful.

A lot of people had the same simple idea – make a PC environment where your computer does one thing in the background while you work on something else in the foreground. Problem is, the way some people designed their systems, they're just not simple at all.

Look at products like TopView™ or Windows.™ Not only do they cost a fortune, they take gobs of RAM and half a lifetime to learn. Worse yet, they don't even run much software. And what they do run is slow.

$49.95 DoubleDOS $99.00 Windows $175.00 TopView

DoubleDOS costs less and consumes less RAM than other well-known systems.

So why not get DoubleDOS instead? It's the easy, economical, memory-efficient system that runs all your PC programs, and runs them two at a time.

With DoubleDOS, you can sort a database at the same time you write a memo. Print a spreadsheet while you update accounting. In fact, do almost any two things you want with the software you already have. Best of all, DoubleDOS is fast and simple to use. So you'll be running it in a matter of minutes.

Here's all you need to know to run DoubleDOS.

Unless you know all about .PIF files, interrupt vector swaps and the like, you won't exactly breeze through the set-up procedures for TopView and Windows. Not like DoubleDOS. Just tell it how to divide your memory, and that's it. You're ready to load and run your software right from that familiar DOS prompt.

Say you've started a sort routine in dBASE. Instead of waiting for it to finish, just press "Alt-Esc." Your dBASE screen instantly disappears, and up comes another DOS prompt. Simply load another program and go to work. Meanwhile, dBASE crunches away off-screen.

Press "Alt-Esc" again and dBASE pops back on while your other program continues in the background. Switch back and forth all you want.

Your programs load and run exactly as they would ordinarily. No lost features. No cramped, clumsy windows. No complex menus and new commands. Just "Alt-Esc."

Multitasking in the fast lane with DoubleDOS.

Aside from what it does, the best part of DoubleDOS is what it doesn't do. And that's slow your computer to a crawl.

In contrast to systems like TopView that permanently divide CPU time between the foreground and background, DoubleDOS constantly evaluates the processing requirements of each program it's running. With DoubleDOS, the program that needs more power, gets it. So all your work gets done faster.

Can over 50,000 DoubleDOS owners be wrong?

If you're too busy trying to get work done to suffer through the debugs, updates and fuzzy standards of other concurrent software systems, try DoubleDOS. It comes to you thoroughly field-tested and work-proven by thousands of satisfied users.

So why pay more? Especially when you can have the full power of proven multitasking software for just $49.95.* Look for DoubleDOS at better computer dealers everywhere, or order direct by calling SoftLogic Solutions today at 800-272-9900 (603-627-9900 in New Hampshire). Or send the coupon below.

You'll save even more when you buy DoubleDOS along with other SoftLogic products, including Disk Optimizer, Software Carousel and Cubit. Ask for details.

DoubleDOS $49.95*

YES! Please send me _____ copies of DoubleDOS at just $49.95* each.

Name _____

Company _____

Address _____

City _____ State/Zip _____

Check Enclosed ☐ VISA ☐ MC ☐ AMEX ☐

Card # _____ Exp. Date _____

Signature _____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
800-272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

8

Call today: 800-272-9900

Circle 866 on reader service card

*Plus $5.00 shipping and handling.
TM signifies manufacturer's trademark.

Use BASIC?

Look what EndUser Software has for you.

BASIC Before Your Eyes

BASIC has evolved into a powerful language, and whether you stay with it or go on to other languages, here is a fun, nearly effortless way to learn an important skill. This entertaining, interactive tutorial was created by a veteran BASIC instructor and is like having a personal teacher. By the end you'll be programming on your own.

Get far more from your PC than you ever expected–for only $29.95. With EndUser Software, end-user satisfaction is guaranteed.

Hardware requirements: IBM PC family or compatibles, 128K memory, monochrome or color monitor, DOS 2.00 or higher.

A lot of great software . . .
A great little price:

$29.95

BASIC Before Your Eyes #EU-105

Order by phone
800/222-2990
800/526-8000 in Canada

(Credit card orders only)
Or send check or money order
(U.S. funds payable through a U.S. bank) to:

EndUser Software
P.O. Box 10120
Palo Alto, CA 94303-0976

California residents add appropriate sales tax.
NO POSTAGE, HANDLING, OR CREDIT CARD SURCHARGES on U.S. and Canada orders.
Orders outside U.S. and Canada: Add $15.00

John Greenleigh

Although mundane in appearance, Star Micronics' NL-10 provides serviceable dot matrix printing for a bargain price.

slaps on DOS (2.00 or above) from drive A:, and installs Plus Development's nifty Hardcard Directory.

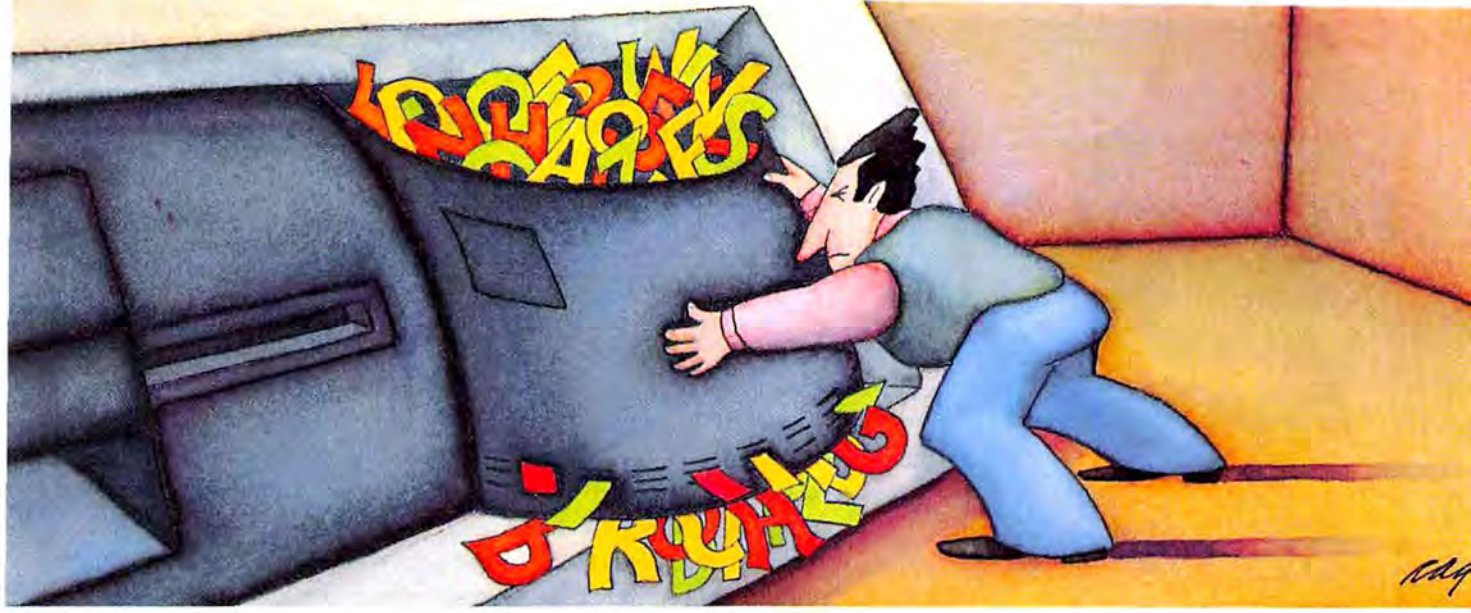
The Hardcard Directory is a shell that enables you to run DOS and up to 16 software applications from a central menu. A preprogrammed AUTOEXEC.BAT file calls up the Directory, so the menu is the first thing you see after starting your system. The manual clearly explains how to install your applications within the shell, and if you're a hard-core DOS user it's easy to disable the Directory and get the lone C> prompt.

Like many of its peers, the Hardcard 20 supports an abundant selection of machines, including the IBM PC, XT, and 3270 PC; the Compaq Portable, Portable Plus, and Deskpro; as well as the dual-floppy 10MB version of AT&T's 6300 PC. In an IBM or Compaq computer already housing a factory 20MB drive, the unit can serve as a second hard disk, its low, 8-watt average power drain protecting your power supply from undue strain.

The Hardcard 20 is as rugged as its 10MB forerunner, boasting a 40,000-hour mean time between failure rating and a nonoperating shock resistance amounting to 100gs. After every power-down, the Hardcard 20 automatically parks its read/write heads, preventing irreversible damage to the disk, the data, and your ego.

This heir to the throne possesses all the traits that made its predecessor fly, including an impressive 3-to-1 interleave factor and voice-coil actuator read/write heads. Voice-coil technology is more efficient and accurate than the stepper

(continues)



PROBLEM: Handling your need for more megabytes, without spending megabucks on a new drive.

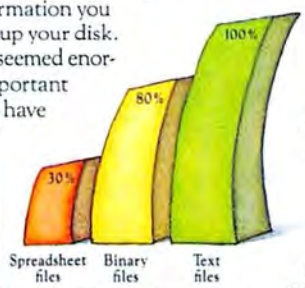
THE SOFTLOGIC SOLUTION: Cubit™

Now get up to twice the capacity from all your storage media.

You know what happens. The more you use your computer, the more information you create. And the faster you fill up your disk.

The 10MB drive that once seemed enormous is now jammed with important files. That 20MB that should have lasted years is crowded in a matter of months.

Of course you could keep buying bigger hard drives. Or you could get Cubit and get the maximum storage space from the drives you already have.



With Cubit, you'll get as much as 100% compression on data files, effectively doubling the storage capacity of all your magnetic media.

What is Cubit?

In brief, Cubit is an advanced software tool that automatically reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved. Some programmers call this effect "data compression," others, "disk expansion." Either way, the result is the same.

Here's how it works. When Cubit compresses a file, it first compares each word to its massive English word dictionary. Words that match are reduced to a predetermined code of just one, two or three bytes each. It then saves the abbreviated version to disk. Decompression works just the opposite.

To accommodate other words and symbols, Cubit uses two more compression techniques. One assigns new, shorter codes to unusual words. Another compresses according to the frequency of character strings in non-text data. So no matter what kind of files you create, Cubit ensures maximum space savings.

Best of all, you'll be using the same fast, reliable data compression techniques used on mainframe computers for decades.

How much disk space will you save?

Because the vast majority of data created on PC's is standard ASCII text—letters, numbers and other English language symbols—we've optimized Cubit for word processing and database files. With these, you'll get a minimum of 50% expansion on up to a full 100% or more.

At the same time, you can expect a significant 30% to 50% improvement with other kinds of data. Including spreadsheet files, program code, graph and image files, even binary data.

And Cubit works just as well with floppies and tape cassettes as it does with hard disk drives.

Run Cubit where you want, when you want.

Maybe you'll want to use Cubit for all your files, or maybe just some. So Cubit lets you specify exactly which files to work on and which ones to leave alone.

In RAM resident mode, Cubit works quickly and invisibly, compressing and decompressing right from within any program you run. Or use Cubit's powerful file management mode. It supports wild-card and global file names, and addresses sub-directories up to thirty levels deep.

Save time and money, as well as disk space.

A compressed file is a smaller file. So with Cubit, back-ups take less time, as well as less space. And communicating compressed files means significant savings on phone line charges.

Any way you look at it, Cubit will pay for itself in no time. And that's especially true now.

Special limited time offer.

Buy Cubit now and you'll save even more. Because for a limited time, you can buy Cubit at the special introductory price of just $49.95.* But hurry. This special price won't last long.

Ask for Cubit at your computer dealer. Or order directly from SoftLogic Solutions by calling 800-272-9900 (603-627-9900 in NH), or mail in the coupon below.

Special pricing is available when you buy Cubit along with other SoftLogic products including DoubleDOS, Software Carousel and Disk Optimizer. Ask for details.

Cubit™ $49.95*

YES! Please send me____copies of Cubit at this special introductory price.

Name_____

Company_____

Address_____

City_____ State/Zip_____

Check Enclosed ☐ VISA ☐ MC ☐ AMEX ☐

Card # Exp. Date

Signature_____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
800-272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

8

Call today: 800-272-9900

*plus $5.00 shipping and handling.

Circle 447 on reader service card

HOW TO TURN YOUR IBM PC® INTO A BANKER.

Here's how to make the investment in your IBM PC really pay off.

With SPECTRUM,℠ the electronic home banking and information system from The Chase Manhattan Bank, N.A. Teamed up with your PC, SPECTRUM is your direct link to Chase. And the start of a better way to manage your money and your time.

A push of a button lets you pay bills electronically, anywhere; transfer funds; keep records; and more. Even get vital financial information and trade stocks* at discount rates.

Right at home, anytime–with complete security. All, including electronic mail, starting at just $5 a month. And, with 2 months free for new subscribers, now's an even better time to get control of your finances. Call today for your free demo diskette.

CALL TOLL FREE 1-800-522-7766

CHASE

© 1986 The Chase Manhattan Bank, N.A./Member FDIC
IBM PC is a trademark of International Business Machines Corp.
*Stocks are traded through Rose & Company Investment Brokers, Inc., a Chase affiliate/Member NYSE and SIPC.

motor method used by many hard disk card manufacturers, including Mountain Computer, Western Digital, and Maynard. In fact, the Hardcard 20's manual lists its average access time as a peppy 49 ms–significantly faster than the 65 ms demonstrated by the 10MB Hardcard. During testing (see the Portafile review for details), no disk read/write errors occurred.

Although its $895 retail tag may be cause for pocket pause, the Hardcard 20 delivers plenty: speed, ease of installation and use, and freedom from cardiac arrest when you slam your Compaq against the airport escalator. Plus Development's new baby is simply one of the sleekest, slimmest, and swiftest performers in the hard card game. *–Art Wilcox*

Hardcard 20
Plus Development Corp.
1778 McCarthy Blvd.
Milpitas, CA 95035-9990
408/946-3700
List price: $895

Star Micronics NL-10

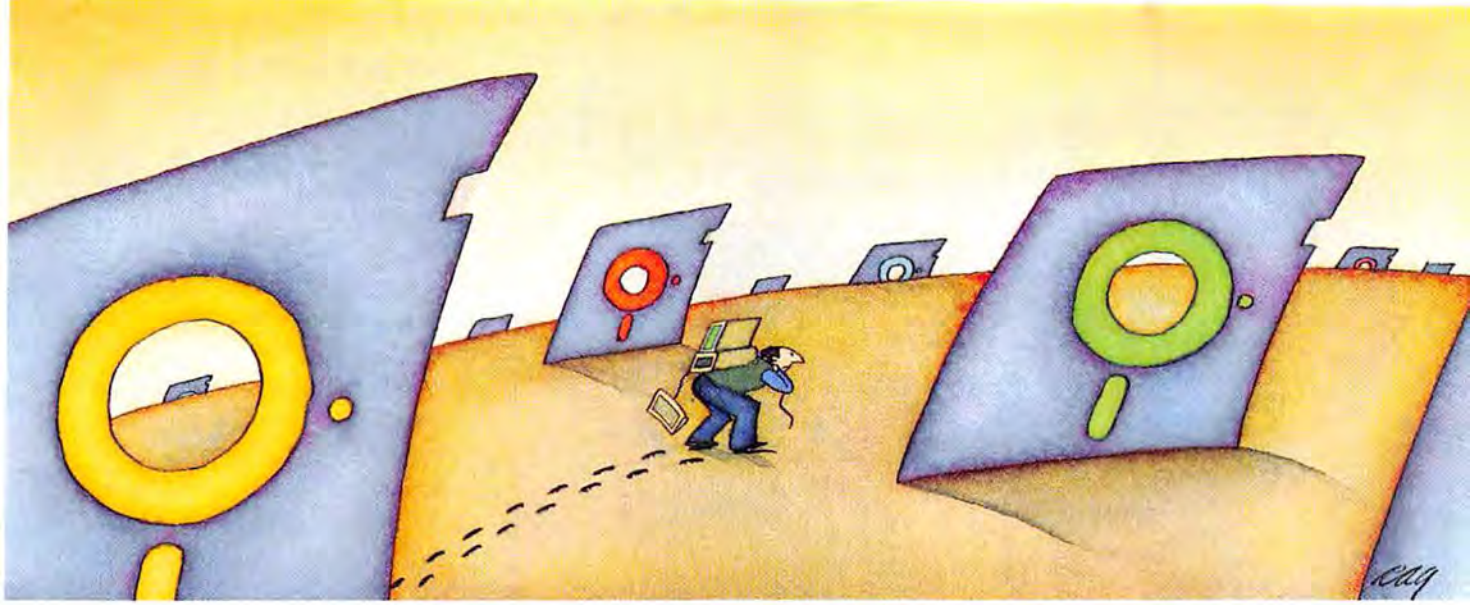
Look up the word *printer* in a PC dictionary and you'll probably find a picture of the NL-10. Designed to meet an individual's printing needs but lacking the toughness of an office workhorse, this no-nonsense, Epson-compatible machine provides basic near letter quality (NLQ) printing at a bargain basement price.

The NL-10's 9-pin printhead cranks out drafts and graphics at a respectable 120 characters per second (cps). For NLQ copy, a poky 30 cps prevails, produced with a double pass technique. Both draft and NLQ modes employ Star's version of the Courier typeface, which resembles the output of a Smith Corona manual typewriter. Relatively close scrutiny is required to discern the tiny dots that compose NLQ letters, yet this print is generally considered unacceptable for critical correspondence.

Front panel controls activate spartan but adequate print options, such as printing modes and draft densities (including condensed print). Boldface, paper feed, and on-line switches are also up front and accessible. Unlike most dot matrix printers, the NL-10 requires separate interface cartridges to emulate the IBM Graphics Printer or to use the Escape P Standard Control Set employed by Epson, Panasonic, and Citizen. Cartridges are $60 each, so be sure to check your software for compatibility.

For those willing to brave the mysteries of BASIC and escape codes, the NL-10 supports a variety of software-controlled features in both draft and NLQ modes. These include underlining, superscript, subscript, italics, and elite or pica type. The machine also produces expanded, condensed, and emphasized print styles and 10 international character sets, all of which

(continues)



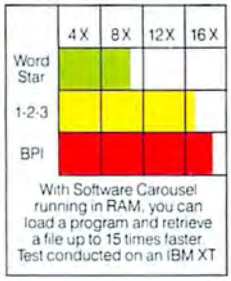
PROBLEM: There's just no easy way to move from one software program to another.

THE SOFTLOGIC SOLUTION: Software Carousel

Now you can keep up to 10 programs loaded and ready to run.

Hard to believe, but some people are happy with just one kind of PC software. Well, this is not a product for them.

But if you're someone who depends on many packages, all the time—someone who'd use several programs at once if you could, well now you can. With Software Carousel.



With Software Carousel running in RAM, you can load a program and retrieve a file up to 15 times faster. Test conducted on an IBM XT

Why call it "Software Carousel"?

In some ways, Software Carousel works like the slide projector you're used to. You load a handful of pictures, view one at a time, then quickly switch to another. A simple idea, with powerful possibilities for computing.

Here's how it works. When you start Software Carousel, just tell it how much memory you have, load your software and go to work.

Need to crunch numbers? Switch to your spreadsheet. Need your word processor? Don't bother saving your spreadsheet file. Just whip over to your document and do your work. Snap back to your spreadsheet, and it's just like you left it.

With up to ten different programs at your fingertips, you'll have instant access to your database, communications, spelling checker, spreadsheet, word processor, RAM resident utilities, languages, anything you like.

Reach deep into expanded memory.

This could be the best reason ever for owning an expanded memory card, like the Intel Above Board, AST RAMpage, or any card compatible with the L/I/M Extended Memory Standard.

Software Carousel puts programs into this "high-end" memory for temporary storage when they're not in use. And switches them back out when you want them. It's fast, efficient, and easy.

If you want, Software Carousel will even use your hard drive for swapping. Just allocate a portion for storage, and go to work.

Sidekick, Superkey and Ready. All at the same time.

You know what happens if you try loading two or more RAM resident utilities at once. You get crashed keyboards, frozen screens, all kinds of interference between programs fighting for control.

With Software Carousel, you can have as many accessories and utilities on-tap as you want. Just load different ones in different Carousel partitions. Since they can't see each other, they can't fight.

The easy way to maximize PC power.

With all this power, you might think Software Carousel is complicated and difficult to use. Not so. Set it up once, and it will remember forever. Better still, Carousel will look for the programs you use most often, and optimize them for the quickest access.

Special holiday offer – free* SoftLogic software.

As a special holiday bonus, you can get another SoftLogic Solutions product free when you buy Software Carousel and Disk Optimizer – the software that speeds up your disk by cleaning up your files.

Take your choice of either Cubit or DoubleDOS.

See the coupon below for details. But don't wait. This offer expires December 31, 1986. SoftLogic Solutions products are available at your software dealer. Or by calling SoftLogic Solutions at 800-272-9900 (603-627-9900 in NH).

Free Holiday Offer!

Buy Software Carousel and Disk Optimizer and get your choice of either Cubit – the software that packs more data onto less disk space – or DoubleDOS – the software that lets you and your computer work on two different tasks at once.

Enclose proof of purchase for Software Carousel and Disk Optimizer, both registration cards, this coupon, and $5.00 (check or money order) for shipping and handling (UPS). Offer expires Dec. 31, 1986. Allow up to four weeks for delivery.

YES! Please send my free copy of ☐ DoubleDOS ☐ Cubit (check one)

Name _____

Address _____

City _____ State _____ Zip _____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
(800) 272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

8

Software Carousel $49.95*

*plus $5.00 shipping and handling.

Circle 744 on reader service card

can be combined in a single document. Other options include proportional printing and double- or quadruple-size characters for headlines and special effects.

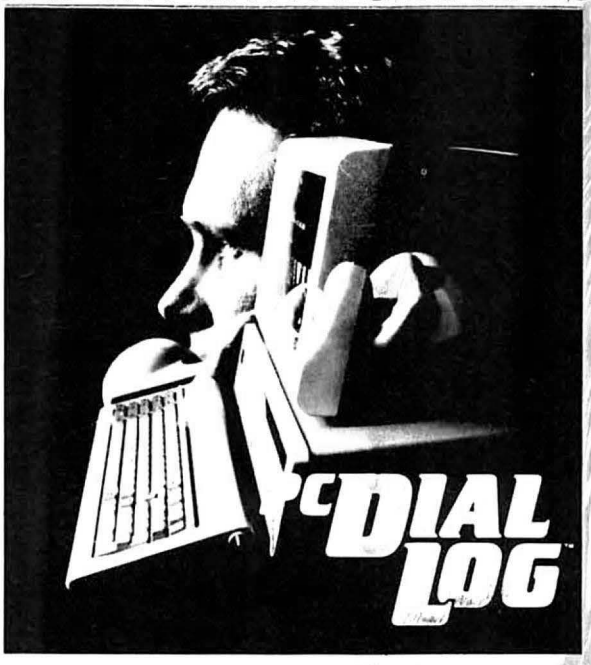
Finding the NL-10 a nesting spot in a crowded office space should prove effortless. Measuring about 13 inches by 16 inches, the NL-10 is a trim 3½ inches high and weighs a mere 13 pounds. It houses a built-in tractor feed, plus a single-sheet guide that's little more than a flat piece of plastic backed by a metal bar—but it works.

Setup is virtually idiotproof. You attach a platen knob, slide in an ink cassette, mount the printer cover, and plug an interface cartridge into the back. This printer is so generic, you half expect it to display a universal price code instead of a nameplate. But if bare-bones printing is all you need—and a low, low price is what you want—the NL-10 may be a suitable companion. *—Wes Nihei*

NL-10
Star Micronics
200 Park Ave. #3510
New York, NY 10166
212/986-6770
List price: $310, interface cartridges $60 each

Paul Meyers is an independent San Francisco television producer specializing in science and technology. Ken Greenberg is Southwest Editor, Art Wilcox is a Contributing Editor, and Wes Nihei is the Editorial Assistant for PC World.

IMAGINE WHAT YOUR COMPUTER COULD SAY WITH PC DIAL/LOG™



PC DIAL/LOG™ consists of an expansion card, software and a cable that connects a Touch Tone® telephone directly to your computer. When installed the PC Dial/Log™ automatically dials and answers the phone, saves and sends telephone messages and stores and forwards telephone calls.

IT'S SIMPLE, with direct installation and a menu-driven program. These features make PC Dial/Log™ convenient and easy to use.

UNPARALLELED VOICE QUALITY made possible by the Votrax® voice digitization process enables PC Dial/Log™ to deliver the best low-cost voice reproduction.

VOTRAX'S® SOFTWARE INTERFACE PROGRAM, THE TOOL KIT, created especially for the developer whose application includes PC Dial/Log™, will help save valuable programming time.

Other Votrax® Products
—Personal Speech System™, Type-'N-Talk™ Stand-Alone Devices
—IBM, Apple II, Commodore 64 Plug In Board Synthesizers
—Votrax® Speech Chips

APPLICATIONS including appointment scheduling, telemarketing, marketing surveys, financial updates, inventory status reports, dispatching and order entry are just some of the many ways that PC Dial/Log™ can be used.

WE WELCOME DEALERS AND DISTRIBUTORS to contact Votrax® regarding our complete line of products. Our reputation has been built on quality products and outstanding customer service that are sure to satisfy you.

AN UNBEATABLE PRICE at only $495*; PC Dial/Log™ is the lowest priced digital board available today. Please contact Votrax® directly for additional information.

*Plus shipping and handling.

votrax

VOTRAX/CMC Int'l, Inc.
"Technology That Talks"
1394 Rankin, Troy, MI 48083
1-800-521-1350
In Michigan 313-588-0341
TWX-8102324140 Votrax-TRMI
For a voice demonstration call 313-588-2926

Circle 700 on reader service card

Your PC Market-Maximizer Account

The *PC World* Directory is a highly cost-effective way to enter the profitable IBM PC market—available in three- and six-month contracts. This comprehensive listing is your best bet for high returns with a minimal advertising investment. See this month's Directory for details.

PROBLEM: The more experience your hard disk has, the harder it has to work.

THE SOFTLOGIC SOLUTION: Disk Optimizer™

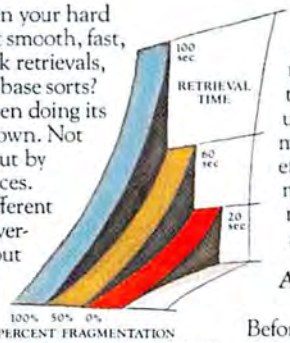
Your hard disk will run faster when it's not chasing around after files.

Remember the old days when your hard drive was new? Remember that smooth, fast, slick performance? Those quick retrievals, rapid saves, lightning-like database sorts?

Well ever since, DOS has been doing its best to slow your hard drive down. Not by slowing down the motor, but by breaking your files up into pieces. Storing different chunks in different places. Data files, programs, overlays and batches that started out in one seamless piece are now scattered all over.

Loading is slower. Sorting is slower. Retrieving, backing-up. Everything takes longer because your disk has to work harder.

Problem is, it's something that happens so gradually you may not notice the difference. At least, not until you see the dramatic improvement after using Disk Optimizer.



The more fragmented your files get, the longer they take to retrieve.

File fragmentation—It's a problem you can see.

Watch your hard drive the next time it reads or writes a file. Each "blip" of the LED means the drive-head is moving to another place on the disk—either to pick up or lay down another chunk of data.

And the truth is, head movement takes time. Far more time than actual reading and writing. What's worse, all this head movement causes extra wear and tear that can shorten the life of your drive.

Disk Optimizer—Tunes up your disk by cleaning up your files.

Disk Optimizer works by finding all the scattered pieces of your files and putting them back together where they belong. Next time your drive reads it, there's just one place to look.

And the results are often dramatic. Reading and writing times may be cut by as much as two thirds. Database sorts that used to take hundreds of head moves now proceed quickly and efficiently. And since head movement is now at an absolute minimum, your disk drive will lead a longer, more productive life.

Analyze, scrutinize, optimize.

Before you optimize, you'll probably want to analyze. So Disk Optimizer shows you, in percentages, how much fragmentation has taken place—on the entire disk, in individual directories, or for groups of files you specify using global or wildcard names.

Plus, there's built-in data security that lets you assign passwords to as many files or file groups as you want.

And the File Peeker gives you an inside look at the structure of files. It's a great way for non-programmers to learn more about computers, and a powerful tool for professionals who want to analyze the contents of their disks.

Get your hard drive back in shape—at a special low price.

When you think about it, it's simple. The longer you own your hard drive, the more you come to depend on it. But the longer you wait to get Disk Optimizer, the less performance you'll have.

Special holiday offer—free* SoftLogic software.

Now, as a special holiday bonus, you can get another SoftLogic Solutions product free when you buy Disk Optimizer and Software Carousel—the software that lets you keep up to ten programs loaded and ready to run.

Take your choice of either Cubit or DoubleDOS.

See the coupon below for details. But don't wait. This offer expires December 31, 1986. SoftLogic Solutions products are available at your software dealer. Or by calling SoftLogic Solutions at 800-272-9900 (603-627-9900 in New Hampshire).

Free Holiday Offer!

Buy Disk Optimizer and Software Carousel and get your choice of either Cubit—the software that packs more data onto less disk space—or DoubleDOS—the software that lets you and your computer work on two different tasks at once.

Enclose proof of purchase for Software Carousel and Disk Optimizer, both registration cards, this coupon, and $5.00 (check or money order) for shipping and handling (UPS). Offer expires Dec. 31, 1986. Allow up to four weeks for delivery.

YES! Please send my free copy of ☐ DoubleDOS ☐ Cubit (check one)

Name _____

Address _____

City _____ State _____ Zip _____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
(800) 272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

8

Disk Optimizer $49.95*

*plus $5.00 shipping and handling.

Circle 559 on reader service card

You don
over

It took two years.
And lots of self control.
But making Hardcard™ thin was the only way to make it right.
And the only way to make 10MB or 20MB fit in a single slot.
The other plug-in hard disks, because of their portly profiles, take up one and a half or two slots. Hogging precious space you may need in the future for modems, memory boards, network cards and turbo-chargers. Not to mention all the peripherals that are just now being invented.

Hardcard (left) is the only hard disk drive on a card thin enough to fit in a single slot inside your IBM® PC, PC/XT or PC-compatible. The other plug-ins take up to two slots. They should try our reducing program.

get thin night.

Actual size.

Fat drives also tend to move slower. Gobble up more power. And endanger the health of your data.

So it's good to know that the same meticulous engineering that makes Hardcard slim makes its chances of failing even slimmer.

In fact, Hardcard has a reliability rating (MTBF) two to four times that of other plug-in drives.

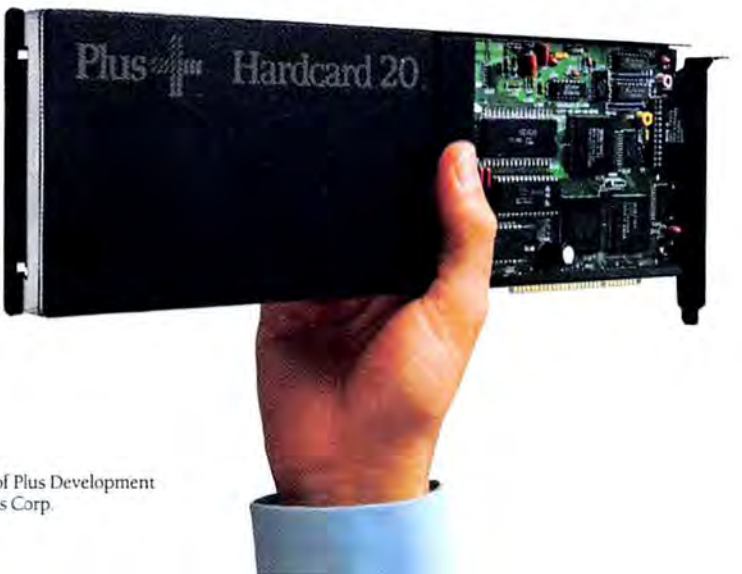
So see your local computer dealer for a demonstration.

Or call (800) 826-8022 for the dealer nearest you.

But do it now.

A product this thin can move pretty fast.

Hardcard™ from Plus™

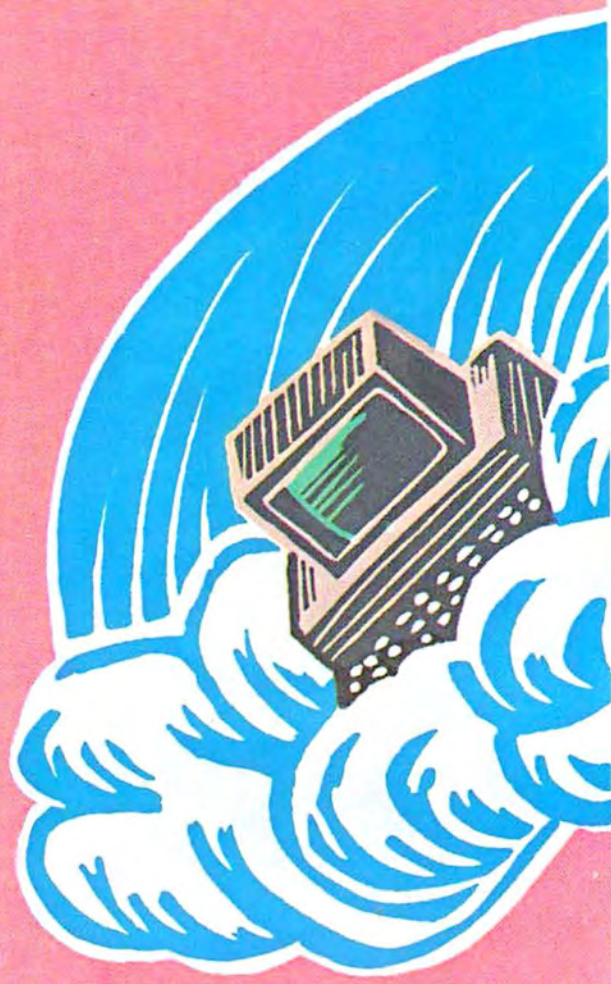


© 1986 Plus Development Corporation. Plus and Hardcard are trademarks of Plus Development Corporation. IBM is a registered trademark of International Business Machines Corp.

Circle 455 on reader service card

Better Than Big Blue?

When the subject is no-name IBM compatibles, the question is no longer how can you possibly buy one, but how can you possibly not buy one? Still, a few words to the wise are in order.



David Needle

They come bearing familiar-sounding names, the interchangeable imprints of anonymous Far Eastern assembly lines–PC+, ARC 286, Sun Nova PC/XT, XT/Turbo, Magnum XT/Mark 2, SST/286, American 286-A, Dynamic XT: labels dreamed up to connote IBM compatibility or power, or both.

They're part of a tidal wave of so-called no-name PC and AT clones, personal computers–usually assembled there and sold here–that mimic, and in some cases exceed, the functions and features of the IBM PC family. All for a fraction of the price.

Low prices have spurred individuals who might otherwise not have considered a DOS machine to lay down their cash. "Cheap clones are still a relatively

Scott Baldwin

small—but noisy—part of the marketplace," says computer consultant Russ Walter in Somerville, Massachusetts. But for an increasing number of users, price breakthroughs and the advent of the "generic PC" have meant admittance to the game.

"I couldn't afford an IBM machine," says Jim Griebel, proud owner of a Sun ST, an XT compatible sold by Suntronics of El Segundo, California. Griebel

It's true that systems at these prices are far from fully loaded—indeed, many are little more than boxes waiting for you to fill them up with essentials.

compares the Sun ST to an XT but notes that the clone, true to form, moves a few steps beyond the genuine article. It runs at a quick 8 MHz and packs two disk drives, 640K, a monochrome monitor, Hercules-compatible graphics, and an AT-style keyboard—all for $995, a cool $1000 off IBM's list (even after last summer's price cuts) and $300 less than the ballyhooed (and Korean-made) Leading Edge Model D.

The Sun ST actually rises well above the price floor. After buying his system this past spring, Griebel saw a comparable unit advertised for $750 at a competing store. Check the ads in the back of *PC World* or any other major computer periodical; you'll be stepping into a price war that would do a VCR shop proud. Computer Dynamics in Austin is advertising an XT clone for $495; San Francisco's Micro 1 will sell you a PC work-alike for $375. The action in stripped-down AT compatibles has broken the $1000 barrier: Best of Chicago lists an AT clone at $999, while Data Bank of Hayward, California, has nudged the tariff to $795.

It's true that systems at these prices are far from fully loaded—indeed, many are little more than boxes waiting for you to fill them up with essentials—but buying an off-brand often means obtaining better-than-name-brand performance without sacrificing reliability.

Still, buyers aren't taking promises of reliability on faith. And they shouldn't. When vendors are remote or anonymous, buyers give up the comforts of the traditional PC purchase. Cautions Roy Krantz of Wally Computer Associates in Boston, "Low-cost clones are great for people buying their second and third units, not for first-time buyers who might need to get their machines fixed."

Whatever your level of expertise, no-names require a more circumspect approach to buying. Additional vigilance is needed precisely because you can't generalize about manufacturers and mail-order firms—or even about a single vendor's source of supply. Computer novices, who are more likely to get stung by components that fail or phones that don't get answered, need to be especially alert.

Here, we'll suggest a few rules of the road pertaining to PC and AT compatibility—what you get for your money; where the machines come from; how to evaluate sales promises; what might go wrong; and what to expect in the way of service and support (see the sidebar "The Rules of the Road").

Exploring the Milieu

The emergence of mail order as a source of low-cost, serviceable—occasionally even superior—systems is what's making all these bargains possible. From 47th Street Computer to Mainstreet Computer, mail-order houses everywhere are serving up the house blend, staking their reputations, if not their manufacturing capital, on the line.

This massive assault on PC prices began 18 months ago when Tandy and Leading Edge began to move in earnest toward three-figure pricing. Of late, they have been joined in the $1000-to-$1500 waters by Epson, Wyse, Televideo, and now Tandon. Suddenly the compatibility question that once so bedeviled companies like Corona and Eagle has been answered, in part by BIOS providers Phoenix Technologies and Award Software and silicon houses like Chips & Technologies. With PC and AT compatibility almost a commodity—coupled with a precipitous drop in the cost of memory chips, CPUs, and disk drives—mail order is enjoying a heyday.

"We're here to stay," says Michael Dell, the 21-year-old president of PC's Limited, perhaps the most visible purveyor of cheap clones and, increasingly, the firm that is leading mail order toward respectability. Dell claims that 68 percent of his business consists of repeat customers and that a hefty portion of them buy for their corporations. In what may start a trend, PC's Limited is moving aggressively from the role of mail-order conduit to outright manufacturer.

PC's Limited is in the vanguard in more ways than one. Says Jerry Schneider, president of Washington's Capital PC Users Group, "In the early days, PC's Limited had growth problems and messed up shipments. They've since beefed up their supplies and now offer a 30-day, no-questions-asked guarantee. They've gone beyond compatibility to setting standards."

Ironically, as the manufacture of PCs becomes a commodity business, some key industry players remain on the sidelines: IBM decries commodity pricing (even as it cuts prices 18 percent), and Tandy, in a company magazine, chides Asian suppliers and insists that it'll never sell a $500 PC. Even the offense is holding back a little—PC's Limited, which is on the verge of releasing a $999 AT, vows not to break the $500 barrier. Quips Dell, "We won't offer a $595 XT—we're taking the high road."

Before you pore over pages of mail-order ads, keep the tiers of PC pricing in mind. The top rungs of the price ladder tend to be occupied by IBM, AT&T, Compaq, Sperry, Hewlett-Packard, NCR, and Zenith. Moving down by $500 to $750, you're apt to find Tandy, Epson, ITT, Televideo, Tandon, Leading Edge, Kaypro, Cordata, and Wyse. Below them are the mail-order firms, the most visible of which include PC's Limited, Kamerman Labs, PC Source, PC Designs, Wells-American, Micro Mart, and Conroy-LaPointe (which at press time had just filed under Chapter 11 but maintained that business would continue as usual).

In your quest for a cut-rate PC, don't neglect two of the larger computer retailers, Businessland and ComputerLand. Both have plunged into the generic-PC fray, affixing their logos to systems supplied by established companies like Wyse Technology.

Compatibility Redefined

While not the murky issue it once was, IBM PC and AT compatibility is hardly a given. An *XT* or *AT* somewhere in a clone's name implies adherence to the IBM standard. But you have to check for yourself.

At its essence, PC compatibility isn't a gray area; it's defined by performance. Either your favorite software runs or it doesn't. Because a few firms are now packaging and selling firmware routines that emulate IBM's BIOS, vendors have fewer reasons to stock machines that stray from the IBM line.

"Two years ago compatibility was defined by eight or ten machines," says Richard Levandov, marketing vice president of Phoenix Technologies. "Today, 70 to 80 companies use us, and we're selling 12,000 to 15,000 ROM licenses per month."

Because there isn't a cookie-cutter quality to even the Phoenix BIOS, you have to dig a bit deeper. Jerry Schneider doubts the adequacy of heretofore "standard" compatibility tests like *The Norton Utilities, Flight Simulator,* and *1-2-3*. He suggests that some machines have been engineered to run the established benchmarks and thus appear more compatible than they are. Schneider cites purported clones that went into convulsions when attempting to load certain memory-resident programs.

> *Inside your garden-variety no-name clone are apt to be components strikingly similar—or downright identical—to what you'd find in a comparably equipped IBM machine.*

"It gets down to the ROM BIOS, the durability of the machine over time, and whether it will be compatible with future products," says Schneider. If you've found a clone that can handle *Jet, SuperKey,* VDISK, and *IBM Diagnostics* without choking, you can be reasonably sure it's sufficiently compatible.

The glib advice is, don't rely on standard tests but try out as much of your everyday software as you can—no mean feat to perform by mail. If you lack access to the clone in question, your alternative is to ask

The Rules of the Road

1. Insist on strict compatibility. If you can't physically test software, grill the vendor with questions and request a written guarantee of IBM compatibility.

2. Avoid surcharges. Note that a "money-back guarantee" may include a 15 percent restocking fee if you return the system.

3. Seek out service. Look for vendors that maintain toll-free hot lines, regional service centers, and bulletin boards. If you need to ship the unit back, the vendor should pay the freight at least one way.

4. Don't buy without a warranty, and try to get one that includes parts and labor. Look for a minimum one-year warranty on the entire machine, not simply on the motherboard.

5. Scout out additional service on your own. If you have only a short-term warranty, check out a local computer dealer or service firm that can tend to your machine on short notice.

6. Find out exactly what your system consists of. Some "bargain" systems may include a poor-quality monitor with barely adequate resolution. And the XT designation doesn't mean the system comes with a hard disk.

7. Distinguish bundled extras from bundled essentials. A full 640K of RAM is nice, but a copy of DOS is mandatory—as is a video board.

8. Consider your senses when buying by mail; ask about the feel of the keyboard and the sound of the fan—product characteristics an enticing ad can't convey.

a passel of questions and hunt for compatibility clues (see *From the Hardware Shelf*, *PCW*, March 1986).

Start with the CPU. It obviously must be a member of the Intel family (8088, 8086, or 80286; the 80186 is but a distant cousin). What's the machine's clock speed? If it's a "turbo" PC, the microprocessor should be an 8088-2 or an 8086-2 running at 8 MHz (and be switchable to the PC's 4.77-MHz clock rate, either via the keyboard or system switches). Who wrote the BIOS? Does it include support for the EGA and for IBM's Token-Ring network? And most important, an ability to run DOS 3.00 and 3.10 is not negotiable.

Look at the machine (even if it's merely a sketchy rendering in an ad). Is it the spitting image of the XT or the AT? How many keys on the keyboard? Does the keyboard layout follow the PC's? The AT's? IBM's enhanced keyboard? Then consider the specs. What's the maximum resolution of the graphics board? Of the monitor? Do the serial and parallel connectors match IBM's? Does the system accept 8-bit (and, for AT compatibles, 16-bit) expansion boards that conform to the IBM bus structure? If you want to use the machine on a local area network, be advised that some high-speed disk controllers prove pesky on a network; is an alternate disk controller available?

So don't take advertising claims of 100 percent AT or XT compatibility at face value. Ask whether the system can handle your application programs of choice. And try to get all such commitments in writing as a condition of purchase.

9. Demand Class B FCC certification. Be certain your system meets the more stringent FCC guidelines on emissions; Class C approval is not sufficient.

10. Choose a vendor that promises quick delivery. The better mail-order houses offer bonuses if they fail to ship within two weeks of your initial order.

11. Get references on various vendors (one way is to contact local user groups). Ask each vendor for the names of satisfied customers, and find out whether the firm specializes in corporate accounts, small businesses, or individuals.

What's in a No-Name?

Inside your garden-variety no-name clone are apt to be components strikingly similar—or downright identical—to what you'd find in a comparably equipped IBM machine. Indeed, many compatibles manufacturers rely on the same independent parts suppliers as IBM.

These shared sources have made for an abundance of readily available, easily installable components such as disk drives, memory boards, power supplies, and fans. The better clone suppliers, like American Computer & Peripheral of Santa Ana, California, trumpet the presence of brand names encased in their no-names; American draws attention to the 40MB Seagate drive in its American 286-A Perfect system.

Just to put things in perspective: 70 percent of the parts in the IBM PC aren't made by IBM. In fact, IBM doesn't manufacture as many of its own components as, say, Tandon, which fabricates the internal workings of its disk drives, or Tandy, which makes circuit boards, molds its own cabinets, and even spins its own copper wire.

If parts have a generic quality and if integrated circuits, once burned in, can't fail, why the fuss over reliability? The concern stems from the eclectic nature of the clone business. It's not always obvious what company actually manufactured a given unit, where it obtained parts, and how it assembled them. Jim Griebel's Suntronics system, for example, came with three manuals "written in Taiwanese English" that omit the name of the manufacturer. Suntronics assembles systems with parts from a variety of sources—an approach that exemplifies the clone phenomenon. PC's Limited's Michael Dell reports that his firm has relied on various vendors for its $795 Turbo PC, but lately has begun extolling "American technology" and is assembling its AT compatibles in Austin.

Similarly, two machines from the same vendor may be built of parts from different sources—not all of them equally trustworthy. Using multiple suppliers isn't intrinsically harmful (and may even be necessary to avoid shortages), but it might make diagnosing and solving problems more difficult.

PC's Limited is increasing the amount of assembly it does in the United States, as well as the percentage of parts purchased from American firms. Dell is convinced that certain components—like keyboards—simply aren't made as well in Korea or Taiwan.

"The bothersome thing about some of the machines from Taiwan is not knowing where the chips come from," says Barry Dobyns, a Los Angeles consultant and hacker who has built several PC-compatible systems. Dobyns says some manufacturers use reject chips that initially appear acceptable. "Companies buy them by the barrel from Intel, which otherwise discards chips that fail reliability tests. While some chips are melted down, others end up in unmarked PC clones."

While you have no way of knowing which Far Eastern component suppliers are more reliable than others, you should be aware that some countries generally have better reputations for quality assurance and product integrity.

According to most observers—including Cordata founder Robert Harp, who farmed out his firm's

production there—Korea is turning out the steadiest crop of machines. South Korea is home to such mammoth electronics combines as Samsung, Lucky-Goldstar, Daewoo, and Hyundai. (Interestingly, the Leading Edge Model D, along with a number of other Korean-made compatibles, was designed by Up-to-Date Technology, a firm headquartered in Silicon Valley.)

Korea is followed by Taiwan, where Multitech—which manufactures systems for ITT, among others—and Mitac reign supreme. Quality is said to be less predictable in Hong Kong, Singapore, and Malaysia.

Remember that lesser-known vendors can have a subtle advantage over some of the bigger players: Fairly obscure firms are more likely to use standard, off-the-shelf parts—particularly for the motherboard—than to depend on custom hardware. Even if a major supplier employs superior technology, proprietary parts are harder to fix and more costly to replace. You'll want to find out whether the vendor you buy from stocks an adequate supply of spare parts.

FCC Calling

It's no coincidence that the no-name clone phenomenon hit its zenith at about the same time that the FCC cracked down on systems that violated its emissions standards.

By law, all computers sold in the States must comply with FCC Class B regulations governing interference with other electronic equipment. As Barry Dobyns explains, "Any electronic device acts like a radio—it's not only an antenna but a receiver. You've got problems if it's transmitting so loudly that it disturbs other devices." The faster the PC, the more susceptible it is to noise.

PCs lacking FCC approval that are inadequately shielded (and are thus prone to transmission troubles) can generate errors when running software—glitches that are impossible to duplicate or trace.

Many Far Eastern clones were designed to adhere to the FCC's initial, more lenient Class C regulations and had to be retrofitted for Class B. When perusing ads and calling around for a PC or AT clone, consider nothing less than Class B compliance.

Batteries Not Included

If, as Leading Edge president Michael Shane proclaims, all that matters is price and features, what do you get for your modest outlay when you buy a no-name compatible?

You can't always tell by scrutinizing mail-order ads. While many systems are equipped with 640K, two disk drives, and a power supply mighty enough to keep Rhode Island glowing for a week, there are omissions. You're not likely, for example, to get a monitor and its adapter or a hard disk and its controller along with a system that carries an astoundingly low price.

Think of the $400 PC as akin to a starter home; you have the foundation, but you'll need to reinforce the structure here and embellish it there. As a rule, the lower the price, the more you should pin down what you're getting and how much you'll need to spend for the extra power you want.

Subject your candidates to a fierce barrage of questions. Is an XT clone merely "ready" for a hard disk, or is one already in place? If the unit is equipped with a 10MB hard disk, how much will a factory upgrade to 20MB or 30MB cost? What capacity floppy drive or drives come with the system? If you'd prefer not to have a 1.2MB drive, can you swap it for a 360K drive? Can you mix and match drives? Will the unit support an internal tape drive? How many storage devices can the disk controller support? How large is the power supply? Can it be switched for use in foreign lands?

As a rule, the lower the price, the more you should pin down what you're getting and how much you'll need to spend for the extra power you want.

How much memory comes with the system? (If you're considering a turbo PC, particularly one that runs above 8 MHz, make certain that system RAM is fast enough for the system clock.) If the motherboard isn't fully populated, can the mail-order vendor fill out RAM for you later? How many free slots does the unit have with the disk controller and graphics board in place? Are serial and parallel ports included? What

sort of graphics configuration is standard? Can you substitute an Enhanced Graphics Adapter (or clone) for a color graphics board? Is DOS 3.10 part of the package? Disk BASIC?

Once you've concluded your inventory of the hardware, you'll need to turn your attention to setup, service, and support. Are setup and installation straightforward? How comprehensive and literate is system documentation?

And you might as well ponder what's apt to go awry. According to Barry Dobyns, some clone users are plagued by a monitor that interferes with their floppy drives. Moreover, he says, "Certain Taiwanese clones don't have fuses, and that means the entire machine could fail, not just the power supply." Dobyns recommends a small investment in a surge suppressor: "It's more important than a parachute."

Tell It to the Judge

Perhaps because transactions are not completed face-to-face, mail-order purchases continue to be characterized by more than their share of unhappy endings.

Reuben Stiskin, a Boston consultant, scoured mail-order ads for a low-cost system and eventually found one "too good to pass up": an XT clone for under $1400, with 640K; a graphics board; a monochrome monitor; serial, parallel, and game ports; and free shipping.

Shortly after he received the system, trouble began. On unpacking the unit, Stiskin noticed it didn't include MS-DOS, as promised. Because he already had a copy of PC-DOS 2.10, he wasn't too worried, assuming that that version would work on the new machine.

PC-DOS started right up, but a series of programs, including *Microsoft Word 2.0* and *Framework*, didn't. The mail-order firm advised him to run PC-DOS 3.10 or MS-DOS instead of the version he was using. "They said PC-DOS 2.10 was 'full of holes so big you could drive trucks through them,'" he recalls.

Stiskin was ready to ship the thing back, but until then he hadn't read the fine print in the ad, which mentioned a 15 percent restocking fee for returned merchandise. He assumed—incorrectly—that the surcharge didn't apply to him because his system didn't work. Stiskin sent the unit back anyway, and is attempting to negotiate a full refund sans restocking fee.

The moral, of course, is to beware of restocking fees and other not-so-fine print. But while such catches and hidden levies exist, most mail-order buyers are satisfied with their systems. Fast-buck artists aren't apt to withstand the scrutiny of a discerning public or remain capable of shelling out the cash for endless streams of ads.

Beware of restocking fees and other not-so-fine print. But while such catches and hidden levies exist, most mail-order buyers are satisfied with their systems.

When you buy, try to eliminate surprises. How soon can the vendor ensure delivery? The better mail-order houses offer a modest rebate on future purchases if machines aren't shipped within two weeks.

Does the vendor offer a money-back guarantee? Wells-American and PC's Limited, among others, permit 30-day no-risk trials. Tech PC of Santa Ana, California, touts its one-year warranty, backed by "hundreds of MSC [Momentum Service Centers] outlets nationwide." AMT, another Santa Ana supplier, offers a 90-day parts and labor warranty, extending that to a year for the motherboard. A great many mail-order firms offer warranties that run for a year and cover the entire machine.

Unwritten rules seem to govern warranties, service, and support. Cutting "frills" is one way to produce a cheap PC, and surcharges like restocking fees may be among the hidden costs of buying cut-rate systems if something goes wrong. It's also wise to weigh the significance of a one-year warranty from a firm that may have a track record somewhat shorter than 12 months.

A Matter of Support

All no-names are not created equal—nor are they supported equally. If mail-order firms are reluctant to offer potential customers airtight product guarantees, they do an even better job at keeping overhead down where support is concerned. Expect to pay one-way freight charges on repairs, and don't be surprised that a company lacks a toll-free hot line or that contracts with service providers like TRW or Sorbus are unavailable.

That's not to say mail-order firms leave buyers in the cold. While PC's Limited shies away from third-party service contracts as too expensive, Dell plans to establish eight regional support centers. But he's also eager to leave some maintenance chores to corporate customers, many of which maintain in-house service departments.

Does the vendor offer a money-back guarantee? Wells-American and PC's Limited, among others, permit 30-day no-risk trials.

Joel Kamerman, head of Kamerman Labs in Portland, Oregon, is equally committed to customer support. "Long term, it won't be acceptable to have customers pay a restocking charge to send back machines," Kamerman says. His firm is investigating the feasibility of nationwide servicing for its PC line.

Other vendors are also beefing up their support apparatus. American Computer has established a read-only bulletin board for users in need of assistance. For San Francisco Bay Area customers of Club AT in Fremont, California, telephone support can be augmented by a site visit from a technician, assuming at least ten Club AT machines are on the premises.

Evaluate your ability to service the machine you have your eye on. If you're technically proficient at troubleshooting and replacing parts, the service limitations of mail order shouldn't be a major deterrent. If opening up the box gives you the shakes but you otherwise like what mail order offers, ask about toll-free telephone support. Will the vendor pay freight charges both ways? What's the typical turnaround time for repairs? Is an extended warranty available? Has the firm set up a bulletin board? Have any user groups been established?

Sell It Again, Sam

Resale value is probably the last thing on your mind when you invest in a low-cost PC compatible, and that's probably for the best. Just as you wouldn't expect great demand for used Yugos three or four years from now, you can trust that low-cost PCs won't bring much in the resale market (see "Used PCs: Oldies but Goodies" in this issue). Or so says Alex Randall, head of the Boston Computer Exchange, an on-line broker of pre-owned PCs.

That doesn't faze Joel Kamerman. "What amazes me about this market is that it doesn't go away—it keeps getting bigger," he remarks.

No doubt about it—the no-name clones are making a name for themselves.

David Needle is a freelance computer writer in Menlo Park, California.

*A*Star Model 200 (AT compatible)*
Wells-American
3243 Sunset Blvd.
West Columbia, SC 29169
803/796-7800
List price: 1MB RAM, 1.2MB disk drive, 20MB hard disk $1995; monochrome monitor $139; monochrome adapter $119

AT Jr
AMT 286-E
American Micro Technologies (AMT)
14751 Franklin Ave., Bldg. B
Tustin, CA 92680
714/731-6800
List price: with 640K RAM, two 360K disk drives, 4-MHz/8-MHz dual-speed clock $699; monochrome monitor $149; monochrome adapter $79; 20MB hard disk $399; AMT 286-E with 640K RAM, 1.2MB disk drive $1399

Club AT (AT compatible)
Club AT
46707 Fremont Blvd.
Fremont, CA 94539
415/490-2201
List price: with 512K RAM, 1.2MB disk drive $1295; monochrome monitor $138; monochrome adapter $99; 20MB hard disk $355

Conroy-LaPointe Model 2 (XT compatible)
Conroy-LaPointe
12060 S.W. Garden Pl.
Portland, OR 97223
800/547-1289, 800/451-5151 Oregon
List price: with 256K RAM, two 360K disk drives $789; monochrome monitor with adapter $206; 20MB hard disk $489

Kamerman Labs XT and TCS-7000
Kamerman Labs
7861 S.W. Cirrus Dr.
Beaverton, OR 97005
503/626-6877
List price: Kamerman Labs XT with 640K RAM, one 360K disk drive $734; monochrome monitor $177; monochrome adapter $104; 20MB hard disk $461; Kamerman Labs TCS-7000 with 1MB RAM, 1.2MB disk drive $1885

PC's Limited Turbo PC and 286[8]
PC's Limited
1611 Headway Circle, Bldg. 3
Austin, TX 78754
512/339-6962
List price: PC's Limited Turbo PC with 640K, one 360K disk drive $795; monochrome monitor $129; monochrome graphics adapter $159; 20MB hard disk $449; PC's Limited 286[8] with 1MB RAM, 1.2MB disk drive $1495; 20MB hard disk $579

Proline XT and AT
Micro Mart
Technology Corporate Campus
3159 Campus Dr.
Norcross, GA 30071
404/449-8089
List price: Proline XT with 640K, one 360K disk drive, monochrome monitor with adapter $859; 20MB hard disk $435; Proline AT with 512K, one 360K disk drive, monochrome monitor with adapter, 1.2MB disk drive $1902; 20MB hard disk $575

Sun ST and 286
Suntronics
12603 Crenshaw Blvd.
Hawthorne, CA 92050
213/772-0024
List price: Sun ST with 640K, two 360K disk drives, monochrome monitor with adapter, 8-MHz clock $985; 20MB hard disk $590; Sun 286 with 640K, 1.2MB disk drive $2236; monochrome monitor $115; monochrome adapter $95

Tech PC/XT and PC/AT
Tech PC
1911 Betmor Ln.
Anaheim, CA 92805
714/754-1170
List price: Tech PC/XT with 256K, one 360K disk drive $729; monochrome monitor with adapter $200; 20MB hard disk $200; Tech PC/AT with 512K, 1.2MB disk drive $1999; 20MB hard disk $400

Used PCs: Oldies but Goodies

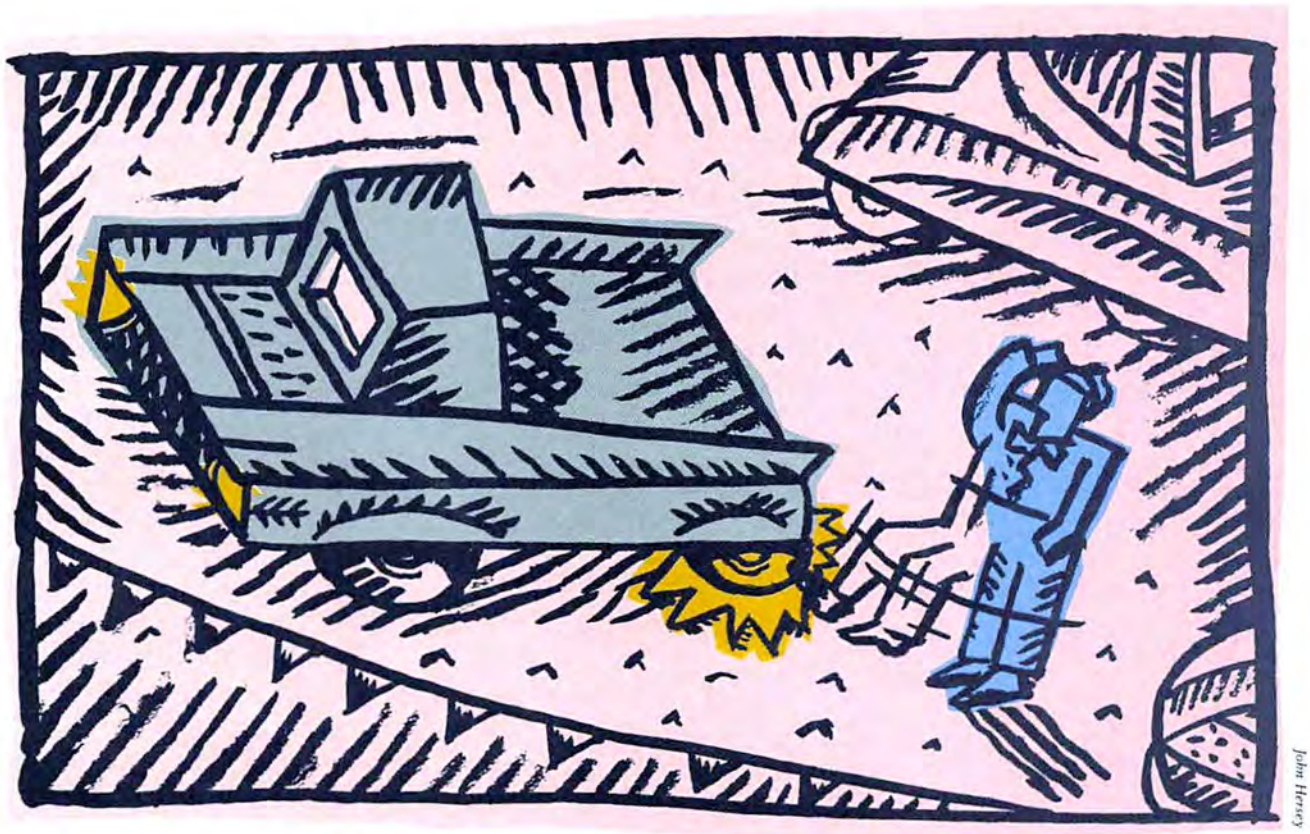
Buying a secondhand PC is a gamble, but with a little effort you can pick the long-distance runner in any crowd. A PC jockey shares tips for laying your money on a star performer.

Steve Cummings

Until recently, tracking down a good secondhand PC was about as likely as winning the Kentucky Derby at 20-to-1 on a horse named Old Geezer. But today large numbers of IBM PCs, XTs, and compatibles are emerging on the resale market. Some have been cast off by former home computing enthusiasts; others are being unloaded by micro managers eager to standardize in-house computers or upgrade to faster AT-class machines. One man's poison is another man's meat, however, and users in need of inexpensive computing power are snapping up these secondhand offerings. But given the coming flood of inexpensive and powerful AT clones and the generous supply of proven XT compatibles, should you invest in a used PC? The answer is simple: if it's cheap enough.

Due to the free-fall in PC prices, last month's deal on a used PC may be today's retail list price for a new machine. Clearly, a secondhand PC ought to cost a lot less than a new one, but just how great the price spread should be depends on your budget and system requirements. Generally, you'll find the best deals on complete, souped-up systems. If the previous owner has loaded the machine with expansion boards and attached some useful peripherals, like a printer and a modem, you may save hundreds of dollars more than is implied by the seller's asking price. Any software you get as part of the bargain will also reduce related expenses, but you must carefully check licensing requirements (see the sidebar "Speculating on Secondhand Software").

Many consumers fear that used PCs will break down, leaving them stranded, unable to access necessary data. But in fact, some technical types maintain that a working used machine is a safer bet than a brand new one (except for mechanical parts): Chips that have worked for several hours, for example, are unlikely to fail for years.



John Hersey

Nonetheless, you should make absolutely certain that service for the PC is available, especially if the original warranty has expired. Plenty of third-party companies repair brand name PCs from manufacturers such as Compaq and Zenith, but finding parts and service for little-known or discontinued brands may be virtually impossible. Unless you come across a clone system with a ridiculously low price, you'll probably want to confine your search to brand name machines.

If you're not a novice, buying a secondhand PC can be quite convenient. Complete, working systems spare you installation and configuration hassles, especially if the seller is a friend or business associate who's available for occasional hands-on help. If you're a business buyer out to equip a large office or department, you probably shouldn't waste time hunting for similarly configured used machines in volume—large sacrifice sales are still uncommon. But if you're lucky, you may find two or three kindred PCs without much trouble. If your company has in-house service technicians, one of them can accompany you on your used-computer forays and put to rest any qualms about repairs.

On the Trail of a Used PC

You can look for bargain machines in an ever-increasing number of places. PCs are sold by private parties through want ads, at computer swaps, and over electronic bulletin boards. Cost-conscious managers arrange direct sales of underused PCs to employees, and computers that were formerly the property of now-defunct departments or entire companies are occasionally sold at auction.

Retail outlets and brokerage services specializing in the secondary market for PCs are cropping up around the country. Services such as the Boston Computer Exchange and California's Micro Xchange put buyers and sellers in touch with one another by phone, charging a commission on completed sales. Sellers must warrant the equipment for 30 days, and an optional escrow service ensures that funds and equipment are transferred properly. Most PC retailers don't carry much used equipment, but you can ask them to put you in touch with customers who are upgrading to AT-class machines and want to sell their older PCs. Familiarize yourself with the going rates by checking the Boston Computer Exchange's weekly newsletter for prices on common system setups and by perusing the local classified ads. When you compare costs, be sure the packages concerned are identically equipped.

No matter where you look for your used PC, you need to know the sweet deals from the lemons. Begin by establishing rough guidelines for your eventual purchase, based on your requirements and your budget.

Choose the brand and the model. Decide in advance whether you want to stick to a specific brand or whether you're willing to consider several lines. Your main criteria for settling on any certain brand should be its ability to run your software and the availability of service. If you already own a particular brand, you may want to stick with it to minimize service complications and the need for retraining.

Once you've made a choice, familiarize yourself with any changes in the product line so you can decide which models are acceptable. The motherboard of the original IBM PC, for example, holds only 64K of RAM, compared to the current model's 256K. If you buy the original, you must add a memory expansion board to run most of today's software, and you may have to upgrade the BIOS chips before adding an enhanced graphics adapter or a bootable hard disk. To check the manufacturing date of the BIOS chips, run the BASIC program shown in Listing 1. A date of 10/27/82 or later means no upgrade is needed. When considering clones, note that older, lesser-known models may not be as compatible as the newer ones.

Establish your minimum requirements. How much memory does your software require to run at a tolerable speed? Do you store enough information to need a hard disk, or will floppy drives do? Is a color monitor essential? How about a modem? You're not likely to find a used system that exactly matches your requirements, but you'll want to estimate the cost of missing devices, such as a graphics board or a serial adapter. If you need to add components, test them with the used PC to ensure that everything works together properly.

Scout out service. Getting the machine repaired quickly and cheaply is critical in case of disaster—a fact that should help you narrow your choice of computers. Some dealers service only the brands they currently sell, and many of the smaller third-party service firms limit their coverage to IBM and Compaq machines. On the other hand, third-party service vendors are sprouting up everywhere. TRW's Customer Service Division, for example, has about 200 service locations and 3 service depots (carry-in only), and ITT Servcom maintains 180 service stations and 20 depots. TRW offers support nationally for PCs made by Multitech and Gulfstream Micro, and many of its local offices handle additional lines. ITT Servcom provides contracts for Zenith, Texas Instruments, and, of course, ITT machines and fully supports the discontinued Columbia and Eagle brands. Franchises such as the Computer Doctor provide quick walk-in service for a variety of machines.

Typically, service firms inspect and test your PC and then offer a contract priced according to

Getting the machine repaired quickly and cheaply is critical in case of disaster—a fact that should help you narrow your choice of computers.

whether you choose on-site service or a carry-in or mail-in plan. Many firms work on a time-and-materials basis as well. But such service is expensive: Local third-party repair companies charge $45 to $75 per hour, and national organizations charge an average hourly rate of about $90 (with a 2-hour minimum). For more information on the service outlets in your area, check the yellow pages or call the PC manufacturer for a list of authorized repair shops.

Kicking the Tires

Truly exhaustive evaluation of a device as complex as a PC may be impossible anywhere outside the factory itself. Fortunately, a few simple tests can provide a fairly accurate picture of a PC's current state of health.

The best way to judge a used PC, according to technicians and dealers, is to run the software you plan to use, making sure it works as expected. If the computer meets this challenge, it's a viable solution for your current computing problems, even if it isn't 100 percent compatible by some other benchmark. Nevertheless, if any incompatibility surfaces, you'll certainly want to investigate the system and its components in greater detail before you pull out your wallet.

Medical students learn that a patient's history is as important as physical examinations or lab tests in making a correct diagnosis. Similarly, when evaluating a computer, you should get as much background information as possible before beginning your tests. First, ask why the computer is being sold, and try to get a list of previous service calls. Then ask how and where the computer was used. Hours of heavy use weaken keys, switches, drive doors, and fan and drive motors, and the monitor's CRT wears out with time. A smoky or dusty environment soils parts, particularly floppy-disk drive heads and hard-disk filters. Wide variance in temperature and excessive humidity lead to premature failure of electronic and mechanical components. If the computer was driven only on Sundays rather than used as an inventory workhorse, you'll probably feel better about buying it.

Next, check whether a DOS and an operations guide come with your purchase. If the DOS is machine-specific, you'll want to be sure a DOS manual is included, especially if the hardware manufacturer is out of business. Some vendors will not sell manuals separately.

Finally, ask whether a warranty is included. Brokers and used-computer stores usually include a 30-day warranty on PCs, but private parties and other retailers tend to sell them as is. If the machine's original warranty is still good, call the vendor to find out whether it's transferable. IBM warrants a PC, XT, or AT no matter how many times it changes hands during the 90-day warranty period, as long as the machine was originally purchased from an authorized dealer; the policies of other manufacturers vary. Whatever the warranty promises, get it in writing.

Bear in mind that the seller, not the manufacturer, is legally responsible for honoring any additional warranty after the original warranty expires. Warranties need not be written; a seller may create a warranty simply by advising you that a particular product will meet your specific needs. However, it's prudent to assume a "buyer beware" attitude, although you can certainly take legal recourse in cases of clear-cut fraud.

```
10 DEF SEG=&HF000
20 FOR X=&HFFF5 TO &HFFFF
30 PRINT CHR$(PEEK(X));
40 NEXT
```

Listing 1: This BASIC program checks the manufacturing date of a PC's BIOS chips. If the date is 10/27/82 or later, no upgrade is needed to add an enhanced graphics adapter or a bootable hard disk.

Speculating on Secondhand Software

Thomas Howe

Dedicated hagglers have a credo: "It may be the wrong size, but did I get a bargain!" Everyone loves a good deal—the trick is finding the shoe that fits, or the software that performs. Once smitten by the bargaining bug, you may find yourself at a swap meet, flea market, or computer store, hungrily eyeing the piles of secondhand software. Warning: Proceed with caution. If the used software is cheap and reliable and the license is transferable, you have a bargain. If not, you have an expensive education.

A license to buy. The value of used software depends partly on whether you can transfer the license and receive the benefits conferred on registered owners: technical support, damaged disk replacement, and product updates. Generally, software manufacturers retain full ownership and license transfer rights on all the programs they sell. Ric Giardina, general counsel for MicroPro, explains that when you purchase a new MicroPro product, you are buying only the license, that is, the right to use the software on one PC at a time. But if you want to buy the program secondhand, you must obtain the manufacturer's consent to transfer the license.

Stanley Whitkow, general counsel for Ashton-Tate, says that the ubiquitous nontransferability provision in software licenses may not be nearly as rigid as you think. You can request the transfer of a *dBASE III Plus* license, for example, by sending Ashton-Tate's customer service department the product's serial number, your name and address, and the signature of the original registered owner. Note that if the registered owner upgraded from *dBASE III* to *dBASE III Plus*, Ashton-Tate will not allow you (the secondhand buyer) to register the old copy of *dBASE III*. Manufacturers' policies on transferring, upgrading, and replacing programs vary, so you should contact the vendor for detailed information before buying anything at a flea market, a swap meet, or even a reputable retail outlet. If you cannot legitimately transfer the license, you cannot legally use the program.

Even if you secure the license, the cost of the used program should be a fraction of its retail list price, especially since mail-order houses and swap-meet participants substantially discount shrink-wrapped versions of software releases. As a rule of thumb, the Used Computer Store in Berkeley, California, suggests that you pay one-half of the lowest mail-order price you uncover.

Taking a test drive. Secondhand software buyers may suffer from misencryptophobia: the fear of hidden defects in used program disks. Fortunately, if you can start

the software and get past the opening menu, the program is probably intact, although you'll want to make sure by testing its main functions. But watch out for software that permits only a limited number of installations. *dBASE III*, for example, allows just one hard disk installation, and you must uninstall it to use it on another machine. Protect yourself from possible duds by asking the seller for a written 48-hour return agreement, and test the program at home immediately.

You should always insist on getting the original program disks. Assuming that the owner didn't use the originals as working copies, this tactic will alleviate your concerns about damaged program files and protect you from copyright infringement liability. Ask about any patches the original owner may have made to change the appearance or the performance of the program, and find out how to remove them in case you don't like the patchwork. You might also look for a product packing list to find out whether the offering includes all the disks, manuals, keyboard templates, and other aids provided in a complete package.

When all fails. The software industry, unlike most others, insists on selling new products with almost no warranty whatsoever, so you might expect even less legal protection when used software proves defective. But ironically, warranty rights may be stronger when you buy used programs than when you buy new ones. The seller's conduct and written and oral statements constitute express and implicit warranties, and although products may be conspicuously labeled with disclaimers such as "no warranty," "as is," or "with all defects," some states do not permit disclaimers on consumer goods. Furthermore, in the cavalier mood of a secondhand sale, a seller may not disclaim a warranty effectively.

When you buy used software from a store, you may receive a very limited and/or conditional express warranty. For example, Berkeley's Used Computer Store offers a seven-day return policy with a 50 percent refund. But even in the absence of a warranty, a small-claims court may grant you a refund if the seller lied to you about the used software. A local attorney or consumer protection agency can best advise you of your specific rights.

Thomas Howe is a freelance writer in Greenbrae, California.

Hands-On Testing

Once you've asked the preliminary questions, you're ready to assess the computer for possible defects. Begin by visually inspecting all the components, including the inside of the system unit. You'll need a Phillips or a flathead screwdriver to remove the outer casing. Look for cracks, broken pieces, burns on the motherboard, and frayed wires or cables. A PC can continue to function with such obvious damage, but you'll want to be especially wary about buying it. Depending on the machine's history, cosmetic defects like scratches and dirt on the case may mean only that you're about to land a genuine bargain. But watch for nicotine stains on the keyboard—remember that smoke is the natural enemy of disk drive heads.

Check the integrity of all mechanical parts. Turn knobs and flick switches to make certain they move surely. Check to see that jacks and ports contain no missing or bent pins and that all connectors fit snugly.

Because the seller may not have configured the PC, you should also inventory its expansion boards. Find out whether the computer has been upgraded, because some components, like turbo boards and fast processors, cause compatibility problems. If you are considering a used XT or AT, remember that early PC expansion boards don't fit comfortably into the newer computers due to their wider mounting brackets.

Note, too, whether serial, video, or drive adapters are built into the motherboard rather than added as expansion boards—this feature may be convenient, but it's much more expensive to repair the motherboard than to replace a board. If a parallel port on the motherboard needs repair, a typical shop will simply swap the entire board, charging you about $350. Replacing the parallel port board, on the other hand, costs between $50 and $100.

Your next step is to turn the machine on, boot the operating system, and listen to the computer run. Loud grinding, clunking, or squealing sounds emanating from the power supply, the fan, or a disk drive may signal imminent failure. Some brands, however, make anxiety-provoking noises even when they are in robust health. If you hear anything suspicious, you may want to compare the sounds made by a new machine of the same model.

If the seller has diagnostic software for the computer, your work will be easier. Typically, routines to test the system board, memory, drives, keyboard, ports, and monitor are included. If you don't have access to the diagnostics, you can accomplish some of the same tests with a little extra effort. Even if you have the diagnostic software, though, you should probably double-check the results by performing the following tests.

Testing the performance of disk drives is crucial because without them you'll be unable to store or retrieve programs or data. A drive that suffers total electronic or mechanical breakdown is easy to detect—it doesn't work. On the other hand, thoroughly soiled heads, disaligned heads, improper drive speed, and insufficient clamping can cause occasional inaccuracies that may be much harder to detect. Bring a DOS disk containing FORMAT.COM so you can test each drive using this simple procedure: Format one or two blank floppy disks or the hard disk itself (after making backup copies of any hard disk files you want to keep). When the formatting process is complete, make sure the usable disk space corresponds to the drive's capacity (that is, if you have 360K floppy drives, your newly formatted disk should offer 360K). If it doesn't, the drive isn't working correctly.

IBM warrants a PC, XT, or AT no matter how many times it changes hands during the 90-day warranty period.

To further test the floppy drives, use the DOS command COPY *filename1* + *filename2* + *filename3* CON to display three files of 120,000 bytes each from a disk you've prepared for this test. If the machine has two floppy drives, copy the files on your test disk from one drive to another. Swap the disks and display the files once again. If any error messages appear, the drive heads probably need to be aligned before they can properly read the more densely packed data on the inner tracks.

Finally, try reading the same test files in another machine. If the used PC has disaligned drive heads, the other machine will probably have trouble reading the data.

If the machine has a hard disk drive, the drive will function even if a considerable percentage of its storage space is in bad sectors, but you're certainly better off if that figure is 1 percent or less. More important, find out where the bad sectors are located. If they're on tracks 0 or 1, you won't be able to boot from that hard drive. You might also want to use a diagnostic program such as the *The Norton Utilities* or *PC Tools* to further test the drive.

Exercise special care if the machine contains a hard disk dating from 1982 or 1983, because the old ones are especially prone to failure. And if the PC has a 63-watt power supply and a hard disk, note that any expansion boards will severely tax the power supply, so you'll have to replace it with a more powerful one.

You should make a special effort to test other mechanical parts that are prone to wear. Press every key on the keyboard, checking for loose or sluggish keys, and use a word processing program that employs <Ctrl>, <Alt>, and function key commands to ensure that the keys communicate properly with the PC. If the system includes a mouse or joystick, be sure that it works and that your software contains a driver to run it. Check any serial adapters that come with the system, and if a printer is available, print a test file. If the computer is equipped with a modem, try linking to another computer or calling a local BBS.

To check the monitor, begin by looking closely at the quality of the display when the monitor is off. A monitor that has endured heavy use will show characters burned into the screen, caused by the erosion of the phosphor coating on the inside of the CRT. When you use such a display, screen images won't be as bright as they should be, and you may even notice breaks in characters or missing pixels in graphic images.

Turn on the monitor and examine the display for possible fish-eyeing, jitter, wobble, horizontal and vertical hold problems, improper focus, and misalignment of text. Extensively used color monitors can suffer from incorrect colors and blurred images due to magnetic buildup. To check the monitor's color, run the BASIC color display test pattern program listed in this month's *Help Screen.*

You may also want to try the standard programs used to roughly gauge compatibility: PC-DOS (not MS-DOS) 2.10 and 3.10, *1-2-3,* and *Microsoft Flight Simulator.* Pay special attention to program communication with peripherals such as printers and mice.

When you've completed your tests, list any defects and subtract the cost of correcting them from the asking price. By researching current market prices, you should be able to determine whether worn but working parts or missing manuals are properly reflected in that price.

Clearly, choosing a used computer requires more time and effort than selecting a new PC. If the task seems daunting, you may want to hire a reputable technician to examine the used machines you consider. At least one of the nationwide third-party service companies, ITT Servcom, offers such a service. Whether you test the machine yourself or hire an assistant, begin your foray with a good sense of used-PC market values. Armed with the right questions, you're likely to find a reliable workhorse and save a substantial chunk of money in the bargain.

Steve Cummings is a freelance writer in Santa Cruz, California, who writes frequently about computers. Nancy Canning, PC World's *Technical Manager, provided technical assistance.*

Boston Computer Exchange
Box 1177
Boston, MA 02103
617/542-4414

ITT Servcom
1515 W. 14th St.
Tempe, AZ 85281-6988
800/528-6457

Micro X-change
1727 State St.
Santa Barbara, CA 93101
800/252-6429 Southern California,
805/687-1320

TRW
15 Law Dr.
Fairfield, NJ 07006
201/575-7110

The PC Hear and Now

The idea of chatting amiably with your PC is still a distant dream. But for some applications, PC-based voice recognition systems are a down-to-earth form of office and industrial automation.

Thais Mazur and Ives Brant

No computer technology has hatched greater expectations than voice recognition. Visions of kicked-back executives dictating to their machines and printing out flawless letters seconds later are etched in popular consciousness. But decades after the musings began, no such system exists, nor is a cost-effective one anticipated in the near future.

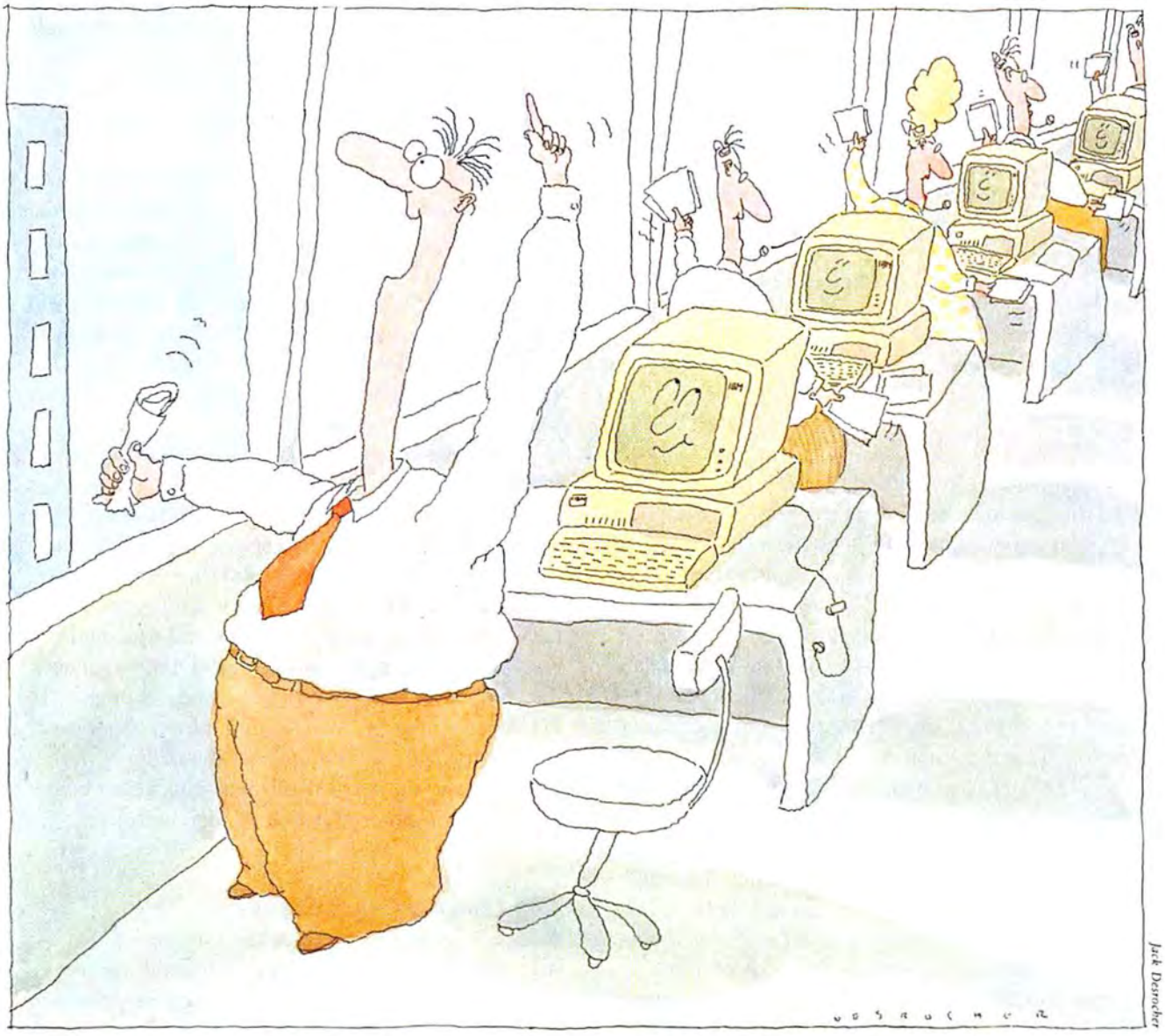
For the PC, even such modest objectives as recognizing multiple speakers remain elusive (see the sidebar "Words Into Bytes"). Scores of start-ups have announced that their particular combination of expansion board and software would render keyboards obsolete, only to find their product foiled by abundant errors, small vocabularies, and sluggish performance. As a result, many users perceive voice recognition systems as the ultimate vaporware.

Despite this checkered past, PC-based voice recognition products are in fact beginning to establish a foothold in the workplace. Rather than wait for a perfect system, end users are employing this technology in situations where a system's limited vocabulary and dependence on a single speaker are not severe constraints.

Currently, industrial and telemarketing applications are among the most practical. When factory workers have their hands full, a PC with a voice recognition board and software can efficiently record and process spoken quality-control reports. And for telemarketing, a PC-based voice recognition system (combined with auto-dialing and a recorded message) can make market research and telephone sales far less labor-intensive. If a keyboard is impractical and the scope of spoken data is narrow, voice recognition can be a valuable productivity tool.

Listening to Line-Workers

In factories and warehouses, logging quality-control and inventory data while work proceeds can promote efficient shop management. Ideally, having workers themselves record this information should cut expenses and increase accuracy. But for personnel who load pallets or check parts on an assembly line, the idea of simultaneously entering data with a keyboard is absurd. In such situations, a voice recognition system makes sense.



Jack Desrocher

Atlanta's West Point Pepperell, a fabric manufacturer for major garment makers such as Levi Strauss, uses PC-based voice recognition on the factory floor to enhance customer service. Pepperell ships its material in massive rolls, whose price depends on the number and severity of defects in the fabric.

"We're aiming for a paperless lab. With voice recognition, workers who don't know the first thing about a computer can simply feed data into a PC by voice."

Pepperell inspectors scrutinize each roll and read their findings into a wireless headset mike. A receiver on the PC plugs in to a phone jack on Votan's VPC 2000 VoiceCard, one of the few PC-based voice recognition boards that can parse continuous speech (see the sidebar "Figures of Speech"). The board translates spoken information about fabric defects and their locations into ASCII data, which is transferred to a custom data base application that Votan developed for the company.

The data base application automatically calculates each roll's price and produces a spreadsheetlike map of the defects. The map is then delivered to the customer, who uses it to plan the cutting of the roll into sections, thus avoiding the flagged flaws and reducing waste. Pepperell has found the VPC 2000 to be extremely accurate, even with background noise as high as 100 decibels—loud enough for the Occupational Safety and Health Administration to require that workers wear ear protection.

Pepperell also employs Votan's voice recognition system for warehouse inventory control. Formerly, when a length of fabric was cut from a roll, forklift drivers had to drive it to a location reserved for that type of fabric. Now drivers simply set the fabric in the nearest available space and send the location via wireless mike to the VPC 2000, which reads the data into an inventory control program. An inventory report provides a directory of fabric locations, yielding more efficient use of both warehouse space and forklift time. According to Gaines Nichols, senior engineer for Pepperell, "We've had a 30 percent increase in work production. Also, accuracy in quality and inventory control have improved significantly."

General Electric (GE) Carboloy Systems in Detroit employs a VocaLink board from Interstate Voice Products to control the quality of materials used to produce cemented carbide of tungsten (a substance in metal-cutting tools). Lab workers take samples from batches of various materials and call out test results into a microphone hooked up to VocaLink. The board then transfers the information to a custom-made data base program.

The VocaLink board also offers speech synthesis, enabling the system to talk back to users. This feature ensures that test results are accurately recorded: After receiving each spoken data entry, VocaLink repeats the entry aloud through an external speaker. If the interpretation is wrong, the lab technician states a correction code and tries again. For Bill Minnear, GE Carboloy production manager, the company's voice recognition system is integral to PC implementation. "We're aiming for a paperless lab. With voice recognition, that should be easy. Workers who don't know the first thing about computers can simply feed data into a PC by voice."

Computerized Cold Calls

In telemarketing, voice recognition is particularly cost-effective. Telemarketing systems are commonly software/hardware packages that use a modem to dial a list of phone numbers. When a connection is established, the system plays a recording of yes/no questions, the responses to which are digested by a voice recognition system and logged in to a data base. (Virtually any voice recognition system can differentiate between yes and no, regardless of who is speaking.)

Jersey Central Power and Light (JCP&L) uses TeleClerk, a PC-based telemarketing system from Valor Telecom. The system automatically calls homeowners and uses voice recognition to record yes/no

Photo courtesy of Votan

A worker in West Point Pepperell's Atlanta garment factory inspects a fabric roll and reads the findings into a wireless headset mike. A receiver on the PC connects to a voice recognition board, which transfers the information to a custom data base application.

responses to taped questions about household energy audits. JCP&L relied on touch-tone responses until a survey showed that 47 percent of JCP&L's installed base had rotary-dial phones.

Valor's system has branching capabilities, enabling it to follow a line of questioning that depends on previous reponses. For example, if a customer answers yes when asked if he or she has had an energy audit within the last six months, the system will inquire if a follow-up appointment is desired. If the answer is yes again, the system reads off a list of available appointment times.

When JCP&L put TeleClerk to the test, it saddled the system with a list of 4500 customers to call between 5 p.m. and 8 p.m. In that time TeleClerk called 3156 customers, offering each one a $15 energy audit package. From those calls, JCP&L received a 5.4 percent affirmative response, substantially greater than the 1.5 percent garnered by a direct mail campaign that proposed the same deal.

Voice recognition can also route incoming calls effectively. Timkin Company, a maker of ball bearings in Canton, Ohio, used to use an answering service to handle upwards of 250 customer calls a month. Now these calls are managed by an IBM PC equipped with Votan's VPC 2000 and custom-developed telephone management software. Customers seeking the nearest Timkin dealer begin by giving their zip codes to the voice recognition system, which is set up for speaker-independent recognition of the numbers 0 through 9. The system then matches the recognized zip code to a geographic location and reads out the telephone number and address of the closest Timkin dealer.

The system also acts as a telephone operator. A customer states the purpose of the call, and the voice recognition system directs the customer to sales, technical support, or general customer service. Because the system can handle continuous, speaker-independent recognition of word lists relating to each department, callers simply ask a question, and the system picks up on a key word. For instance, if a customer requests a price break on 100 boxes of ball bearings,

Words Into Bytes

Voice recognition is essentially a manifold matching process. Every sound a voice recognition system receives, be it a word or a background noise, is compared against a stored vocabulary that can range from a few hundred words to several thousand. This task is highly processing-intensive and one that software and hardware developers have attacked from many angles.

Most PC-based speech recognition packages are expansion-board/software combinations, ranging in price from $500 to $2500. A big factor in determining cost—and performance—is how much processing power these little wonders have on board. Some include their own 16-bit microprocessor, while others throw the burden of voice recognition on your PC's CPU. In the latter case, if you have an 8088-based machine, the recognition process may be too slow for practical use.

The software bundled with these boards generally has two basic components: a utility to create, edit, and store the system's vocabulary; and a set of drivers for existing applications. Voice recognition software usually takes a RAM-resident form like *SideKick* or *ProKey*, waiting to transfer commands to spreadsheet or data management programs in the foreground. The majority of systems also let you write your own drivers, enabling you to link up with any number of custom applications.

All PC-based voice recognition systems begin their herculean task with the same process: analog-to-digital conversion. Like a modem, a voice recognition board transforms sound into digital pulses. But instead of converting an ordered sequence of audio signals into ASCII code, the board turns speech—a disorderly bundle of analog frequencies—into bits of binary data.

A technique known as *sampling* is the key to converting a continuous analog waveform into digital signals. Anyone acquainted with digital recording technology will find this concept familiar. Basically, the analog-to-digital converter divides sound input into distinct frequency bands, calculating the amplitude of each discrete waveform at specified intervals. Each increment is assigned a numeric value, creating strings of numbers that represent the plotted waves. PC-based voice recognition systems typically sample sound every $1/100$ second.

The end product of the conversion process is a multilevel matrix of numbers that describes audio input. The actual recognition process begins with *early discrimination*—distinguishing between a digital description of background noise, such as a sneeze or a door slamming, and a digital description of human speech. Whatever the system determines to be ambient sound is subtracted from the digital matrix. For many systems, however, early discrimination breaks down when background noise reaches even a modest level.

From the Users Mouth

If the background noise can be filtered out, voice recognition software attempts to match the incoming matrix against the series of stored matrices, called *templates,* that make up the program's vocabulary. Most systems require that you build this vocabulary through training–that is, you say aloud each word you want recognized, enabling the system to store an accurate set of templates. Generally, you repeat these words several times so the system can construct a template of your "average" pronunciation of a word. Built-in numeric ranges allow for typical variations from sample to sample.

These speaker-dependent systems recognize only the person who does the training. Some speaker-independent systems are available for the PC, but they're generally limited to recognizing a few numbers or distinguishing yes from no. Accommodating one person's varying pronunciation of the same word is bad enough. Adjusting to idiosyncrasies in pronunciation among multiple individuals is beyond the powers of most PC-based systems.

A number of currently available speaker-dependent systems have been adapted for pseudo-independence. Instead of a single speaker, 10 or 20 speakers may train the system, generating a like number of templates for each word. This method's obvious drawback is that the maximum number of vocabulary words narrows dramatically. By contrast, true speaker-independent systems combine many possible voice patterns on a single template.–*T. M. and I. B.*

the voice recognition system runs through the listings, locates the word *price,* and switches the customer to the sales department.

Large companies aren't the only beneficiaries of voice-based telemarketing. Harold Weidner, a South Dakota insurance agent, drums up sales leads with Cantus's *Solicitor I,* a telemarketing package that uses Votan's VPC 2000. Like Valor's system, *Solicitor I* dials a list of phone numbers and reads yes/no interview questions over the phone, dutifully recording responses and compiling them in reports.

Without a telemarketing system, this shotgun approach would be too time-consuming to be practical. Using *Solicitor I,* however, the rewards have been heady. According to Weidner, "I haven't had to make a cold call since I got the system. And my commissions have increased several times over."

Business Lends an Ear

A handful of business pioneers are now using voice recognition systems to operate spreadsheets, data base managers, or word processors. Sam Fillippoa, owner of the Rib Room restaurant in Fort Wayne, Indiana, uses Microphonics' Pronounce, a voice recognition board bundled with software that is designed to drive business applications. To help manage his establishment, Fillippoa employs Pronounce in conjunction with *Framework.*

Not only does Fillippoa enjoy being on the cutting edge of technology, he also finds voice recognition faster and easier than a keyboard. For his purposes, Pronounce's small, 128-command limit is not a serious concern. "I say the word *create,* and the menu pops up. I can move the cursor left or right and insert numbers onto the spreadsheet, all by voice. I never use a keyboard anymore," Fillippoa maintains.

Fillippoa's freedom from the keyboard is unusual. The few business applications that employ voice recognition do so in conjunction with a keyboard or mouse. Dave Williams, marketing manager for Microphonics, claims that voice recognition systems are not currently designed to be a PC's only input device. Williams, who uses Pronounce with

Figures of Speech

No matter who they're trained by, voice recognition systems must determine where a word begins and ends before matching it to a template. This process of isolating words is known as *parsing*. The complexity of parsing depends on the type of speech a voice recognition system is designed to recognize: *discrete, connected,* or *continuous.*

Discrete speech. If a voice recognition system requires a pause between each word, it can only recognize discrete speech. The pauses serve as red flags to the system, clearly marking the beginning and end of each word. Most voice recognition systems still rely on discrete speech.

Connected speech. More natural than discrete speech, connected speech refers to phrases spoken without unnatural pauses between words. Although this type of voice recognition system identifies separations between words, the length of phrases is usually limited to 24 words in a connected sequence.

Continuous speech. Continuous speech occurs at a normal conversational pace, without pauses or limited word use. As the user utters a complete sentence, a continuous-speech voice recognition system untangles the complex string of audio frequencies. The system parses out the component words by continually sampling and evaluating speech segments of differing lengths to identify separate words.

Once the system recognizes discrete words, it attempts to find plausible matches within its vocabulary set. Needless to say, homonyms—such as *two* and *too*—are particularly subject to misrecognition. To choose the correct word from among sound-alikes, a voice recognition system must have some notion of context.

Some programs use syntactic models known as *finite-state grammars* to predict upcoming words based on those already uttered. For example, a voice recognition system might use one grammar to drive *1-2-3* in worksheet mode, then switch to another set of guidelines in the PrintGraph portion of the program. Voice recognition firms carefully guard the details of their parsing and language-recognition algorithms, as these models are the major factor in determining which products gain a competitive edge in the marketplace.
—T. M. and I. B.

Microsoft Word to load and exit the program as well as to execute formatting commands, claims the product is 98 percent accurate. But when it comes to writing, Williams uses the keyboard; it's faster and more accurate than dictating to a computer.

To fulfill the dream of a voice-driven dictation machine, a system must be able to turn a large vocabulary into text quickly and accurately (see the sidebar "IBM, Sotto Voce"). Regardless of the technological hurdles involved, research and development along these lines is fiercely competitive, simply because the first cost-effective dictation system would garner a mother lode of corporate capital.

Voice recognition that combines continuous speech and speaker-independence is still a long way off.

Dragon Systems is one company dedicated to developing PC-based, voice-driven word processing. Running on an AT, the company's Voicescribe 1000 hardware/software package has a vocabulary of 1000 words, and can accept about 60 words per minute. Like most voice recognition systems, however, there's still a trade-off: The system can recognize only one person's voice, and it relies on discrete speech. Despite these limitations, Dragon expects the Voicescribe 1000 to find a niche in the office automation market.

Another company working on dictation is Kurzweil Applied Intelligence. Last June the firm introduced the Kurzweil Voice Terminal (KVT), a $9900 dedicated voice recognition PC that can handle 1000 discrete words or phrases uttered by a single speaker. The KVT can also function as a speaker-independent system, managing a vocabulary of over 100 words by means of 3000 "speech tokens," which decipher variations in pronunciation among multiple users.

By the end of this year Kurzweil plans to introduce the Kurzweil VoiceWriter (KVW), which will be available as a hardware/software upgrade for the KVT. According to Kurzweil the KVW, with a vocabulary of 10,000 words, will be capable of limited dictation. The company asserts that the KVW package will even be able to distinguish between homonyms by using special linguistics software and proprietary artificial intelligence techniques.

Continuous-speech voice recognition is already available for PCs; Votan's VPC 2000 is a prime example. However, voice recognition that combines continuous speech and speaker-independence is still a long way off, according to developers. "It could be 10 or even 20 years," says Bill Spain, director of voice recognition research at Probe Research Institute.

Indeed, even combining connected speech with speaker-independence is far from realization. Undaunted by the long haul, Interstate Voice Products is conducting research with this goal in mind. "Anyone who can put those two technologies together effectively and at a low cost is going to put voice recognition in every office," says Bill Brundage, marketing manager for Interstate.

Well, don't hold your breath—systems that offer speaker-independent recognition of a large connected vocabulary are still in the developmental stages for mainframes, let alone for PCs. Undoubtedly, as artificial intelligence techniques advance, so will the computer's ability to recognize words in different contexts and from various users. But until then—in situations where the applications aren't too demanding—putting voice recognition to work can be a viable PC solution.

Thais Mazur and Ives Brant are freelance writers living in Alameda, California.

Voicescribe 1000
Dragon Systems
55 Chapel St.
Newton, MA 02158
617/965-5200
List price: $995
Requirements: 256K, DOS 2.10 or later version

(continues)

IBM, Sotto Voce

Wes Nihei

Usually when IBM speaks, everybody listens. Big Blue, however, has plans to do some listening of its own.

Spurred by the growing market for voice recognition products, IBM uncharacteristically tipped its hand earlier this year, unveiling an advanced voice recognition system that Tom Murphy, spokesman for IBM's Research Division, describes as a "technology feasibility study." In IBM's lexicon, this mouthful means the project is still in the experimental stage.

Although IBM has no plans to market a product based on this new technology in the near future, the announcement may steal some thunder from companies announcing less advanced products. "We're demonstrating it now because we're proud of it," Murphy asserts. "We think it's the most advanced voice recognition technology in existence."

The system consists of an AT with 640K, two specialized speech-recognizer subsystems, and a directional microphone. IBM claims its box can recognize discrete utterances in real time from a 5000-word vocabulary and transcribe sentences with 97 percent accuracy. According to Murphy, the subsystems effectively condense the power of a mainframe and three auxiliary processors into a standard AT. "A year ago it took a roomful of equipment to accomplish this," he says. "Now we've shrunk it to desktop scale."

The two subsystems are each composed of three microprocessor-filled cards plugged into the AT's expansion slots. The cards are based on a custom-designed CMOS digital signal processor (DSP). One subsystem converts a speaker's words into a string of phonetic sounds called labels. The second subsystem matches the labels to the system's vocabulary.

The matching process is based on a statistical model built from a data base of IBM interoffice memos—about 25 million words—that determines such particulars as what words appear next to each other most frequently. From this model, IBM isolated the 5000 words most likely to be spoken in an office setting and made them the system's vocabulary. Next, IBM developed acoustic models of those words, breaking them down into approximately 200 labels in different combinations.

Reducing words into labels greatly reduces the time needed to train the system. Instead of repeating every word in the 5000-word vocabulary, you simply read aloud a 20-minute training document to familiarize the system with the way you pronounce different speech elements. The system is pseudo-independent, enabling more than one speaker to train

the system. IBM's baby can also examine words and apply artificial intelligence techniques to distinguish between homonyms such as *know* and *no*. Users add punctuation verbally, simply by saying "exclamation point" or "period."

Although the system has been used mainly by researchers, IBM Research has installed one such system in its executive offices to test reliability. "It's already clear that 5000 words isn't enough," Murphy reports, "so we're attempting to build the vocabulary up to 20,000 words. We think that should cover 99 percent of the most commonly spoken words." Ultimately, IBM hopes to add a continuous-speech capability.

Nevertheless, companies considering voice recognition systems will have to wait a while to buy IBM. "This system exists in research as opposed to development," Murphy explains. "At IBM, development works on products maybe 5 years down the line. Research works on technology that typically won't show up in products for 10 to 15 years."

Wes Nihei is the Editorial Assistant for PC World.

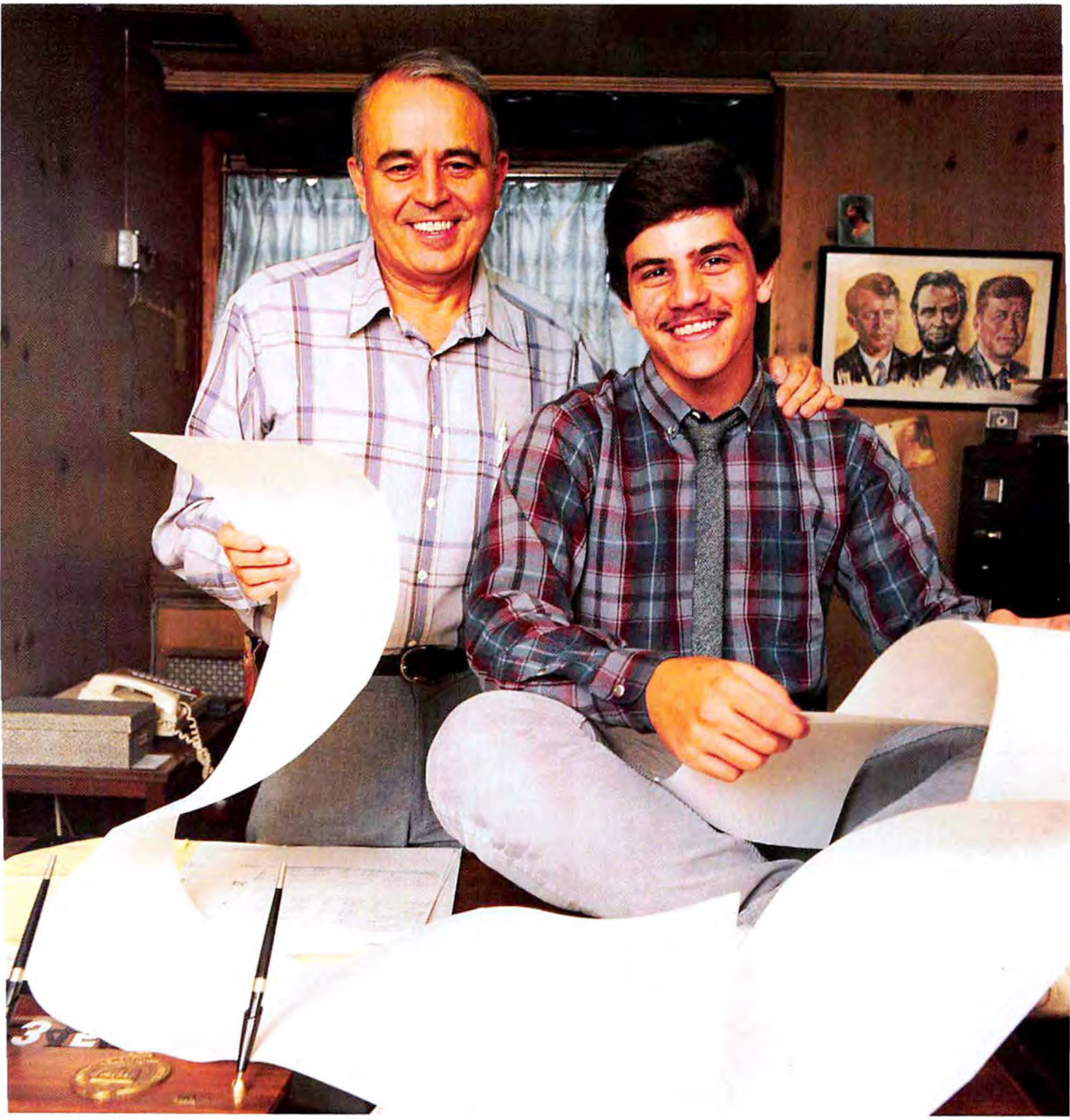
Kurzweil Voice Terminal
Kurzweil Applied Intelligence
411 Waverly Oaks Rd.
Waltham, MA 02154
617/893-5151
List price: $9900

Pronounce
Microphonics Technology Corporation
25 37 St. N.E., Ste. B
Auburn, WA 98002
206/939-2321
List price: $695
Requirements: 128K, DOS 2.00 or later version

Solicitor I
Cantus Corp.
1120 E. 80th St. #201
Minneapolis, MN 55420
612/854-0303
List price: $2995
Requirements: 512K, hard disk, DOS 2.00 or later version

VocaLink CSRB
Interstate Voice Products
1849 W. Sequoia Ave.
Orange, CA 92668
714/937-9010
List price: $1250
Requirements: 256K (when running setup utility only), DOS 2.10 or later version

VPC 2150 VoiceCard
Votan Corp.
4487 Technology Dr.
Fremont, CA 94538
415/490-7600
List price: $2700
Requirements: 256K, DOS 2.00 or later version



Intern Robert Cioffi helped Al DioDati of the Brama Development Construction Corporation by automating the company's payroll.

Junior Partners

How to harness the brain power of computer-savvy youth? New York's BELL program placed whiz kids in work environments, where they helped Yonkers businesses tackle common computing problems.

Jane Mintzer

George Bernard Shaw once remarked that youth is wasted on the young. But even the irascible G.B.S., had he lived to see the advent of personal computing, would have had to acknowledge that computer whiz kids learn about bits and bytes far more quickly than their plodding elders and can teach them a thing or two about hardware and software applications. Until now, high school hackers across the country have been a much-celebrated but almost entirely untapped resource. What better way to harness their computing power than to let them impart their hard-earned knowledge to technology-hungry businesses?

In an innovative pilot program called the Business and Education Learning Link (BELL), the Yonkers, New York, Chamber of Commerce and the Yonkers school system encouraged young computerphiles to teach basic computer skills to local businesspeople. This effort proved to be more than just fun and games. The ubiquitous problem of finding the time, money, and expertise to automate their businesses forced participants from the business community to seek the high schoolers' help.

The BELL program is the brainchild of Samuel S. Manello, assistant superintendent of schools in Yonkers, who was inspired to link two potentially symbiotic communities: small businesses and local schools. Businesses could draw on the computer expertise of whiz kids who were apprentices in the computer science magnet program at Gorton High School; in turn, students would gain work experience a cut above what they could learn behind fast-food counters. "Instead of going to business with an outstretched hand asking for funds," says Devorah Heller, coordinator of communications and reporting for Yonkers schools, "we're saying, Let us do something free of charge for you for a change."

Businesses in Need

Yonkers Chamber of Commerce president Tom Caramadre introduced the BELL program to members at their monthly breakfast meeting, more than just mom-and-pop shops responded to the idea; small and medium-size businesses also welcomed guidance in automating their offices. Although most of the participants viewed the PC as a surefire antidote to the monotony of time-consuming tasks, they had all reached impasses in the course of computerizing. The BELL program allowed them to renew their efforts

with the help of student interns who taught them basic computer skills and offered individually tailored advice on applications.

All the businesspeople had to do, according to Manello, was "to attend our hands-on training sessions and then purchase the necessary hardware and software if they chose to continue with the BELL program." As an additional incentive, the businesses didn't have to pay a penny above the cost of their computer equipment.

The initial training sessions proved critical to the program's success because they established the groundwork for the business participants to understand computers and make sound future purchasing decisions. Each week for 2 hours, 12 youthful tutors and their computer science teachers presented the businesspeople with a hands-on overview of such products as data base managers, spreadsheets, and word processors. They discussed the merits of specific programs like *dBASE II* and *1-2-3*. After the introductory classes ended, a preliminary battle plan for automating each business was drawn up. Students then moved out into the field, working one-on-one with program participants.

Computing in the Real World

Yonkers businessman Al DioDati had two problems: doing the payroll for his family-owned company, Brama Development Construction Corporation, and accurately estimating the cost of each construction job. Payroll required two days of grueling work, while the process of job costing was rife with pitfalls. "We would do a job and later discover that we had lost money," says DioDati. "If we had done better planning and been able to anticipate some of the costs and problems, we could have prevented this and saved money."

As an incentive, the businesses didn't have to pay a penny above the cost of their computer equipment.

After dabbling with his IBM PCjr at home, DioDati had become convinced that a more powerful computer would help streamline office tasks, but he wasn't sure how or where to begin. DioDati couldn't justify the staggering expense of intensive computer training seminars, and he didn't have the staffing to allow employees to learn PC skills on the job. Hiring a one-on-one consultant was also prohibitively expensive. But after attending the BELL training seminars, DioDati felt confident enough to take the plunge into office automation by purchasing an IBM PC AT and a payroll program from Timberline systems. After extensive research, he also bought Timberline's complex construction software package at a local IBM Product Center.

With considerable pluck, 12th-grade intern Robert Cioffi went to work learning the intricacies of Timberline's software. Rob diligently pored over voluminous user manuals and spent hours trying to work around the programs' quirks; the payroll program proved especially vexing. When the software prompted him to enter information on state tax rates, Rob found that the program wouldn't accept the necessary number of characters. After countless calls to the IBM Product Center and Timberline, Rob finally received an updated version of the software (with the payroll bug fixed), in addition to a free program for his trouble. But in the meantime, Rob had tackled problems that "even the IBM representative couldn't solve," boasts DioDati. "If it hadn't been for Rob, the computer would have become a big dust collector." Later, Rob taught Brama employees how to use the AT, with readily quantifiable results: The payroll now gets done in an hour. "I gained real business experience," says Rob, who also secured a paid, full-time summer job at Brama.

Getting Up-to-Date

To modernize office procedures, the Yonkers Typewriter Center decided to computerize its customer records. Mark Bosser, a BELL intern, suggested that a data base manager would simplify customer tracking. Store owner Gregory Keleshian and general manager Chris Bonfiglio purchased *dBASE II*, and Mark worked hard until an effective customer data base was up and running. "Our next step," says Bonfiglio, "is to use our XT to write service contracts and keep track of inventory." He already uses a telecommunications program to receive IBM newsletters, bulletins, and product announcements through an electronic mail service, which puts him one step ahead of the post office.

Neither Bonfiglio nor Keleshian dared to learn *dBASE II* on his own; they simply didn't have the time. "I wanted to let Mark do the work. Once he had things running smoothly, he sat down and showed me what to do. I would never have set up a data base if it hadn't been for Mark," Bonfiglio says.

Some of the BELL business participants already had computers. Due to lack of time or expertise, however, they had failed to unlock the PC's power. Joseph Schleimer, who owns and manages the Yonkers Medical Mall, wanted his secretary to learn *WordStar* on his new Leading Edge Model M, but he couldn't spare the time to teach her anything more than the basics. When Schleimer heard about the BELL program, he sent his secretary through the training sessions, and a student intern helped her through the more cumbersome parts of *WordStar*. The result? Schleimer is expanding his business and purchasing a new accounting program that allows him to provide patient billing services for Yonkers Medical Mall tenants.

After attending the BELL training seminars, DioDati felt confident enough to take the plunge into office automation.

On the Horns of a Dilemma

Meanwhile, at the Benevolent and Protective Order of Elks, secretary Richard T. Moore was feeling "too old" to wrestle with *1-2-3*—and too busy—because he also worked full-time as an aide to Westchester County state Senator John Flynn. As a volunteer organization with limited funds, the Elks lodge couldn't afford to pay for computer training, nor did its volunteers find the time to learn how to use its IBM PC XT to keep track of members and club activities. But Larissa Moskowitz, a BELL student intern, came to the rescue. She taught Moore the ins and outs of *1-2-3*, which he now uses to sort the 87,000 Elk members' entries by lodge, district, and state and to track the organization's charitable donations.

Now that he has gotten past his initial reluctance, Moore has mastered IBM's *Writing Assistant* and is a vocal advocate of the BELL program. "I would stand on a ladder in the middle of the town square and preach BELL's benefits to other communities," says Moore. "I'd tell them that this may be the best thing that could happen to the small businessperson."

The BELL whiz kids may be young, but as Shaw might have observed in one of his more contrary moods, gray heads don't necessarily imply gray matter. Despite their youth, BELL's interns plunged into computing and helped businesspeople avoid wasted time, costly professional training—and worse, mothballed machines. In exchange, the young consultants gained real, valuable work experience. In light of this satisfying reciprocity, the BELL program is staging an encore performance.

Jane Mintzer is a freelance writer in New York who frequently writes about computers.

"Software Support . . . Please Hold"

Tired of waiting on the phone for technical help from a vendor's guru? New software support options let you circumvent the on-hold dilemma—but you'll have to foot the bill for a service you're probably used to getting for "free."

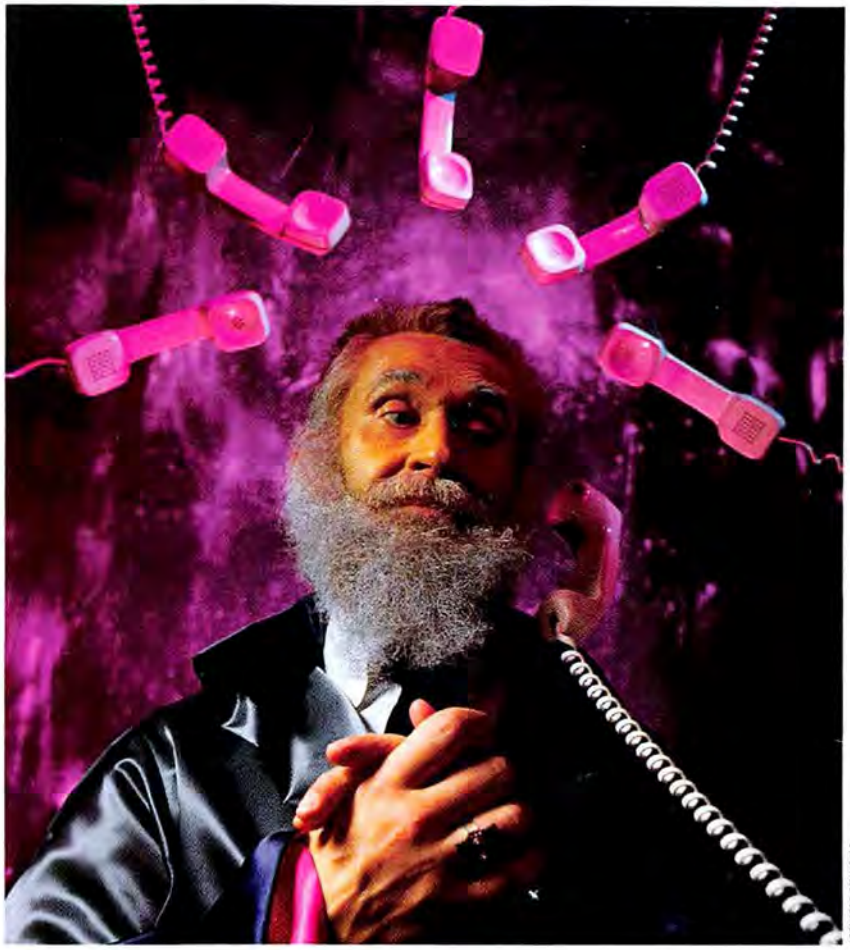
Anita Amirrezvani

If you're like most software consumers, you probably expect free support with the products you buy. In theory, you can call software vendors for help whenever you have questions about their programs. But in practice, technical support lines are frequently busy, and the knowledge that lies just beyond the busy signal doesn't help a bit. Added to this dilemma is the galling fact that support isn't really free—its cost is bundled into the price of software. So even if you don't reap any benefits from support, you pay for it.

Bundled support is an ill-defined commodity. Until recently, Ashton-Tate's offer to "provide you reasonable telephone support during our business hours on questions unaddressed by our dealer or the User Manual" was about as specific a definition as you'd find. But several vital questions remain: How often should you be able to get help? How long should you have to wait? How many minutes of help can you reasonably expect each time you call?

Software vendors are struggling with these very questions. The major companies face the spiraling costs of providing unlimited phone support and product updates to a rapidly growing user base—and many customers don't bother to read the manual before calling. At the dawn of the PC era, industry analysts speculated that users would stop phoning in for guidance after a few months, but that notion has gone the way of the dinosaurs. Now, with phone banks jammed and customers clamoring for help, vendors are promoting support alternatives to stem the rising tide. VM Personal Computing (maker of *Relay*) provides users with on-line bug fixes and program enhancements known as "zaps," which it sends via modem with appropriate documentation. Ashton-Tate, Borland International, Lotus Development, and Microsoft run on-line special interest groups over The Source or CompuServe, where software support technicians and sophisticated users post answers to program queries.

What's more, vendors are rapidly introducing pay-as-you-go support contracts to complement or even supplant "free" support services. MicroPro and Lotus, for example, offer their customers optional support contracts for $95



Thomas Heinser

and $150, respectively, which include the use of a toll-free number and the promise of rapid access to senior support technicians. Lotus's prompt contract restricts the user to eight calls annually.

Other companies, like Ashton-Tate, have radically altered their support services and are offering fee-based support plans only. After Ashton-Tate's 90-day free support period expires, you can buy an extended support package for $50 per year for 10 calls, or $80 per year for 20 calls. The professional support contracts cost $150 annually for 20 calls, but you get a quicker response from experienced support staff, as well as access to other services. An additional $75 per hour, for example, buys Ashton-Tate's remote debugging service using *Close-Up*, the Norton-Lambert utility that lets support technicians operate your software via modem.

At the low end of the support spectrum, Paperback Software charges $1 per minute (with a 5-minute minimum per call) for all support calls and has recently instituted an annual support plan that costs $50 for 10 calls totaling a maximum of 5 hours.

Filling the Void

Joining the wave of vendors offering optional support contracts are third-party companies. Micro Support Resource (MSR), for example, an organization in Atlanta founded by five veterans of Samna Corporation, supports 12 popular software packages, including *1-2-3*, *R:base 5000*, and *Crosstalk*. Support is provided with the help of a $250,000 system called MAX (Magic Answer Extractor), an IBM System/36 with custom-designed software and 200MB of diagnostic information compiled through in-house product testing.

Similarly, Prime Computer, a Fortune 500 super-minicomputer manufacturer in Natick, Massachusetts, began offering support for 14 commercial programs last February. The concept grew out of Prime's establishment of a one-stop PC center to support users of the PT200, Prime's asynchronous graphics terminal, which can be upgraded for PC compatibility. The one-stop concept quickly expanded to include non-Prime PC users. Like MSR, Prime supports its customers with the help of an

in-house product information data base that runs on a minicomputer.

To get help from either Prime or MSR, you call a toll-free number and mention your password so the support representative can call up your record, complete with system configuration. Once you've described your quandary, the representative takes you through a series of diagnostic questions aimed at rooting out the problem. If a search through the data bases fails to produce an answer, software specialists (at Prime) or consulting product experts (at MSR) tackle the problem and return your call when they've found a solution. Both companies offer an additional service to corporate clients: personalized monthly reports detailing which employees called for support and what questions they asked. Businesses can use this information to determine who needs training and what products are causing grief.

Prime and MSR are not alone: Computer Hand Holding, a consulting company in San Francisco, offers support for 40 programs that run on the PC or the Macintosh. Unlike Prime and MSR, Computer Hand Holding does not provide a toll-free number, nor does it answer customer questions via product data bases. But the company's support lines are staffed by programmers, and founder Emil Flock draws on the expertise of members of a syndicated affinity group to answer questions that stump his own staff.

Whatever their method of support, third-party organizations offer services that most software vendors won't provide: support for multiple products and hardware troubleshooting. Software vendors invariably try to determine whether their product is causing your problem; if not, they may refuse to help. Although this tactic cuts down on overhead, it certainly doesn't serve the computing needs of end users. The dilemma is more common than you might think: Karen Orton, director of marketing programs at Ashton-Tate, estimates that one out of five calls received by her company's technical support department is unrelated to Ashton-Tate software.

With phone banks jammed and customers clamoring for help, vendors are promoting support alternatives to stem the rising tide.

Despite their greater flexibility in providing help, third-party companies suffer from an inherent disadvantage: the gap, whether real or perceived, between their services and those of software vendors. Some third-party support companies such as Mayday in Avon, Massachusetts, and Micro Support in Mill Valley, California, have already tried to establish themselves as support gurus and gone under. Those companies' ambitious attempts to support hundreds of programs and computers may at least partially explain their failure. But the issue of a knowledge gap isn't entirely irrelevant. Some third-party companies say they occasionally call the support department of product vendors for technical information to answer user queries. Even though this saves end users the footwork, it seems silly to pay for a service that circles back to the original source for answers.

Moreover, some difficulties can be much more easily resolved by software vendors than by third-party support companies. Say a software shipment has gone out on defective disks, and the problem isn't discovered until after the disks leave the loading dock. When new users call in with problems, a vendor's technical support analysts can check product serial numbers to determine whether the problems are related to the defective shipment, and if so, they can send out replacement disks immediately. Third-party support companies couldn't do that without a vendor's consent.

In more common situations, however, third-party support companies with the right stuff should have no difficulty responding to user queries. Although support companies lack access to source code and proprietary product information, industry observers such as David Cannon, group manager of technical support at MicroPro, feel that answering most user questions doesn't re-

quire classified knowledge. Furthermore, even software vendors can't solve every user problem. "I have never called a technical support line and received a satisfactory answer," says a software expert who didn't want to be named. "The reps invariably know less about their product than I do. I end up informing them that the program has bugs and paying for the telephone call besides." In such a case, a third-party company with your best interests in mind might help you work around the problem, instead of simply confirming the existence of a bug.

The Cost Factor

No matter what company you buy it from, software support doesn't come cheap. MSR's contracts cost $100 annually per program per user (for 20 calls), or $300 per user (for 60 calls) for all the products the company supports. Corporate contracts are available for $24 per hour, given a yearly minimum of 250 calls. Prime bills solely on a per-hour basis: 1 hour costs $130, 4 hours cost $440 and must be used within one year. Computer Hand Holding charges $100 per month for unlimited calls with a six-month minimum, or $35 per hour. Whatever the arrangement, buying a support contract adds a significant investment to the $400 you pay for a typical business program. Is it worth it?

Perhaps the best argument for buying a third-party support contract is to avoid the sheer drop in productivity that occurs when you get stuck on thorny software problems. Another good reason is to cut down on the cost of internal support staff. MSR's Dave Tranberg, vice president of sales and marketing, figures it this way: Companies have an average of one internal support person for every 64 PCs. That employee costs about $45,000 annually in salary, benefits, overhead, and equipment. Based on those figures, companies are paying for support to the tune of $700 per PC per year.

The best argument for buying a third-party support contract is to avoid the sheer drop in productivity that occurs when you get stuck on thorny software problems.

Clifford Banner, senior office systems consultant for the PC support center at Standard Oil in Cleveland, feels that $700 per PC may actually be a low estimate. "I know of organizations where key people serve as the self-designated PC gurus for their group. They may spend a third of their time helping others. So the support figure may be even higher than $700 because you're not including related personnel costs."

Banner says his company probably wouldn't spring for a third-party support contract for every user, but one contract would certainly enable an internal support employee to answer user questions more quickly.

Oxford Industries, a Fortune 500 clothing maker in Atlanta, was able to bring two newly hired, inexperienced internal support employees up to speed by letting them call MSR whenever they had questions. Group manager Andrea Phipps didn't have to push too hard to justify the expense because she received a special introductory offer from MSR, but she says Oxford will probably renew at least one of the contracts at the regular rate.

Third-party companies may face their toughest battles in companies where sophisticated software users are the norm. James Bird, director of information services at General Mills in Minneapolis, says he wouldn't consider buying an outside support contract because his company's software problems are solved internally by PC gurus, and new users are brought into the know through in-house training sessions.

Vending to the Vendors

Third-party support companies cater primarily to corporate users, but that emphasis will change if software vendors can be convinced to hire support specialists, just as they sometimes hire wordsmiths to write their documentation. For Diane Dulla, president of Finder Information Tools in Atlanta, MSR offers a compel-

ling alternative to developing a full-blown support staff. Dulla publishes *Finder*, a data base manager that enables users to perform rapid key-word searches like Dialog's. "In our research, we've found that lack of adequate support is the biggest obstacle to a new software company's growth," says Dulla. "Because we're small now, it's very easy to customize our support, but we recognize that as we grow, we won't be able to do as good a job. We want to turn it over to an organization that makes support its first priority."

MSR can provide support "for a substantial savings," says Dulla, and can do so more efficiently than her own company. *Finder* will be sold with 30 days of bundled support; users will then be encouraged to buy an annual service contract from MSR for about $125.

The View From the Top

Although at press time large software publishers had not given their stamp of approval to the third-party companies described in this article, most are receptive to the idea of third-party support. After all, they stand to save time and money by handling fewer calls and to win the good faith of customers who won't have to wait so long for help. Frank Slovenec, vice president of sales at Microrim, echoes others in the industry when he says he approves of the concept "as long as the customer is getting good service for the dollar." Ashton-Tate's Orton says her company would consider authorizing third-party companies to support its software—an idea already implemented for software training.

But feathers are bound to fly when and if third-party companies begin competing directly with software publishers for user allegiance. Claude Kazanski, manager of customer service marketing at Prime, describes the potential competition as "healthy" for all parties concerned. "It helps software vendors stay sharp in terms of the kind of service they provide to end users, and it helps end users because it gives them more options."

The Last Gasp

Bundled support is nearing its final hours. As customers demand better follow-up service, software companies are responding with annual contracts, toll-free numbers, and glowing promises. If vendors fulfill these promises, they may reduce the number of potential clients for budding third-party services.

Unbundled support is a relatively new phenomenon, however, and plenty of disgruntled users are eager for such alternatives. Until the day when software is self-explanatory and compatibility problems are a thing of the past, third-party support companies will probably find a following among users who need new ways to spell relief.

Anita Amirrezvani is the Assistant Editor for PC World.

Computer Hand Holding Co.
1800 Market St. #91
San Francisco, CA 94102
415/864-2343
Supports: 1-2-3, AutoCAD, BASIC, C, dBASE II, dBASE III Plus, FORTRAN, Framework, MicroCAD, Microsoft Word, MultiMate, Paradox, Paul Whitehead's Chess, PC-File, PC-Talk, PC-Write, Qmodem, Smartcom, SuperCalc 3, SuperProject Plus, Symphony, ThinkTank, VisiCalc, and WordStar

Micro Support Resource
3355 Northeast Expy. #150
Atlanta, GA 30341
404/452-7676
Supports: 1-2-3, Crosstalk, dBASE III, DisplayWrite 3, Enable, MultiMate, MultiMate Advantage, R:base 5000, Samna Word III, Symphony, WordPerfect, and WordStar 2000

Prime Computer
Prime Park
Natick, MA 01760
800/722-3687
Supports: 1-2-3, dBASE II, dBASE III, FinalWord, Framework, Lattice C, MultiMate, pfs:file, pfs:write, RM/COBOL, RM/FORTRAN, Symphony, and WordStar

Borland bargain bonanza.

And ten free disks to boot!

Buy two Borlands.
Get TEN Verbatims FREE.

Fine print: Manufacturer's suggested retail value of 10 Verbatim Disks is $28. Your choice of standard DataLife disks or DataLife disks with free demo software. Any Borland products for IBM micros can be used for this special. Combo packs count as one. New releases also are included— we're always one of the first to get them. ***Finer print:*** Supplies are limited on free disks. We've got a lot—but when they're gone, they're gone. So order soon.

What's the big deal?

Here's the big deal: PC Connection, that marvelous master of micro mail order, is having a special on products from Borland International, that reigning regent of resident RAM. This is an offer that you can not, will not, must not, and even should not refuse.

Buy any two Borland products (combo packs = one product) from PC Connection and get a box of 10 Verbatim DataLife (DS, DD) disks absolutely, unconditionally positively *free!*

Remember, no one has a larger stock of Borland products than PC Connection. *(Note: we only carry the most current versions).* And no one else is offering this special.

Your #1 Borland connection.

- ☐ **Sidekick 1.5** (non-protected) The classic memory-resident life organizer **$51**
- ☐ **Traveling Sidekick** (req. Sidekick) Don't leave home without it **$43**
- ☐ **Superkey 1.1** Macro heaven and more **$41**
- ☐ **Reflex Workshop 1.0** Analytical tools for Reflex **$41**
- ☐ **Reflex 1.1** The award-winning database ..... (limited time!) **$59**
- ☐ **Turbo Tutor 2.0** Do-it-yourself Pascal kit **$21**
- ☐ **Turbo Pascal 3.0** (now comes with BCD and 8087 support) the complete Pascal package **$59**
- ☐ **Turbo Prolog 1.0** The artificial intelligence programming language **$59**
- ☐ **Word Wizard 1.1** Five word games including crossword puzzle solver **$41**
- ☐ **Turbo Editor Toolbox 1.0** Write your own word processor **$41**
- ☐ **Turbo Lightning 1.0** On-line spell checker and thesaurus **$59**

PC Connection 6 Mill St., Marlow, NH 03456

800/243-8088

603/446-3383

PC CONNECTION®

© COPYRIGHT MICRO CONNECTION, INC., 1988. MICRO CONNECTION AND THE RACCOON CHARACTER(S) ARE TRADEMARKS OF MICRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK OF MICRO CONNECTION, INC., MARLOW, NH

I had an old micro named Mitch,

Who was prone to the occasional glitch.
I finally deep-sized him,
'Cause there was no way to fix him.
That incorrigible son of a bit.

✓ denotes IBM-AT compatibility.
*** denotes IBM-PCjr compatibility.**
(call for specific requirements)

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software *(not copy-protected)*
*✓Keyworks 2.0 . . . . . $49.
*✓Alpha/three 1.0 . . . . . 223.
Application Techniques
✓Pizazz 1.0 *(not copy-protected; see what your printer's been missing)* . . . . . 35.
Ashton-Tate *(not copy-protected)*
✓dBase III Plus 1.1 . . . . . call
✓Framework II 1.1 . . . . . call
✓dBase III Plus LANpak . . . . . call
Best Programs *(not copy-protected)*
✓PC/Fixed Asset System 3.1 . . . . . 359.
✓Personal Investor 1.0 . . . . . 129.
Bible Research *(not copy-protected)*
*✓THE WORD 3.1 *(KJV Bible)* . . . . . 159.
*✓THE WORD 3.1 *(NIV Bible)* . . . . . 159.
Borland International *(not copy-protected)*
*✓Turbo Tutor 2.0 . . . . . 24.
*✓Turbo Database Toolbox 1.2 . . . . . 41.
*✓Turbo Graphix Toolbox 1.0 . . . . . 41.
*✓Turbo Editor Toolbox 1.0 . . . . . 41.
*✓Turbo Gameworks 1.0 . . . . . 41.
*✓Turbo Newpak *(Gameworks and Editor)* . . . 52.
*✓Turbo Lightning 1.0 . . . . . 59.
*✓Word Wizard 1.1 . . . . . 41.
*✓Turbo Pascal 3.0 w/BCD & 8087 support . . 59.
*✓Turbo Prolog 1.0 . . . . . 59.
*✓Turbo Family Jumbo Pack . . . . . call
*✓Sidekick 1.5 . . . . . 51.
*✓Traveling Sidekick 1.0 . . . . . 43.
*✓Traveling Sidekick w/Sidekick . . . . . 73.
*✓Reflex 1.1 *(Limited time at this price)* . . . . . 59.
*✓Reflex Workshop 1.1 . . . . . 41.
*✓Superkey 1.1 . . . . . 41.
*✓Superkey/Sidekick Package . . . . . 69.
BPI Accounting *(not copy-protected)*
ENTRY SERIES
✓General Accounting C.13 . . . . . 299.
✓Accounts Receivable . . . . . 299.
✓Accounts Payable . . . . . 299.
✓Business Builder C.13 . . . . . 399.
ENTERPRISE SERIES (networkable version)
✓General Accounting 1.0 . . . . . 399.
✓Accounts Receivable 1.0 . . . . . 399.
✓Accounts Payable 1.0 . . . . . 399.
Breakthrough *(not copy-protected)*
✓Timeline 2.0 . . . . . 239.

PC Connection Software Special

through November 30, 1986

MICRO EDUCATION (MECA)
***✓Managing Your Money 3.0**

Remember Andrew Tobias? He wrote some great books on how to make money without really trying. Also, he wrote a best-selling home financial program, which is now into it's third version! If you have any trouble managing your money (pardon the pun), then you might do well to give this one a try.

Includes all the features and sections from previous versions, plus:

- Instantly accessible notepad
- Store multiple rental properties
- Print reports to screen or printer
- More flexible with increased report generation
- Access to DOS from main menu
- Supports home banking (if your bank does, too)
- Larger User's Guide, faster operation

For the IBM-PC, XT, AT & PCjr . . . . . $107.

***✓Managing The Market**

Lets you communicate directly with the Dow Jones News/Retrieval network for instant updating of all securities information. If you also own Managing Your Money, it will automatically provide the updated information directly into your portfolio.

- Build "hot lists" of securities
- Lets you see open, high, low, close, percent change, and volume
- Store information in file, then print the file at your leisure
- Gives access to all Dow Jones News/Retrieval features
- includes subscription to Dow Jones News/Retrieval with free on-line time

For the IBM PC, XT, AT, and PCjr *(requires modem)* . . . . . $77.

SPECIAL!! Buy both Managing Your Money and Managing the Market for only . . $179.

Broderbund *(copy-protected)*
*✓Bank Street Writer Plus *(w/60,000 word dictionary)* . . . . . $59.
*✓Print Shop . . . . . 35.
*✓Graphics Library 1 . . . . . 22.
*✓Graphics Library 2 . . . . . 22.
Computer Associates *(not copy-protected)*
✓SuperCalc 4 1.0 . . . . . call
Dac Software *(not copy-protected)*
✓Dac Accounting Tutor . . . . . 15.
✓Dac Payroll Tutor . . . . . 15.
✓Dac Port . . . . . 19.
✓Dac Mate . . . . . 26.
✓Dac Easy Word . . . . . 32.
✓Dac Easy Payroll . . . . . 32.
*✓Dac Easy Accounting . . . . . 45.
Decision Resources *(copy-protected)*
*✓Sign-Master 5.1 . . . . . 157.
✓Diagram-Master 5.0 . . . . . 207.
*✓Chart-Master 6.1 . . . . . 237.
*✓Map-Master 1.0 . . . . . 245.
Digital Research *(not copy-protected)*
✓GEM Desktop 1.2 . . . . . 30.
✓GEM Collection 1.0 *(includes GEM Write, GEM Paint, GEM Desktop)* . . . . . 119.
✓GEM Draw 1.0 *(includes GEM Desktop)* . . 149.

Dow Jones *(copy-protected)*
Market Manager Plus 2.0 . . . . . $159.
✓Spreadsheet Link 1.2 . . . . . 159.
Executive Systems *(not copy-protected)*
✓XTREE 2.0 . . . . . 37.
✓Hot 1.0 *(DOS utility)* . . . . . 41.
5th Generation *(not copy-protected)*
✓Fastback 5.13 . . . . . 97.
Friendlysoft *(not copy-protected)*
*✓Friendlywriter 3.2 *(w/70,000 word speller)* 55.
Funk Software *(not copy-protected)*
*✓Sideways 3.11 . . . . . 39.
Graphic Communications
✓Freelance 1.0 *(not copy-protected)* . . . . . 199.
Harvard Associates *(not copy-protected)*
*✓PC LOGO 2.0 . . . . . 89.
Infocom *(not copy-protected)*
*✓Cornerstone 5.2 . . . . . 59.
Lifetree *(not copy-protected)*
*✓Volkswriter Deluxe Plus 1.0 *(with 100,000 word speller)* . . . . . 69.
*✓Volkswriter 3 1.0 . . . . . 147.
*✓Volkswriter Scientific 1.0 . . . . . 289.
Living Videotext *(not copy-protected)*
✓ThinkTank 2.1 . . . . . 105.
*✓Ready 1.0 . . . . . 49.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION®

Then I switched to a real PC.

Great joy now descended on me.
It did more than Mitch,
With never a hitch,
And even came with more memory.

Micro Education (MECA) *(copy-protected)*
Running Program *(fitness and training program)* . . . . . $45.
★ Managing Your Money 3.0 . . . . . special
★ Managing the Market . . . . . special
Micropro *(not copy-protected)*
Easy *(with 67,000 word speller)* . . . . . 59.
Easy Extra *(Easy with Easy Mail)* . . . . . 89.
★ WordStar 3.31 . . . . . 179.
WordStar Propak 3.31 . . . . . 259.
WordStar 2000 Plus Release 2. . . . . 285.
Microrim *(not copy-protected)*
Clout 2.0 . . . . . 135.
R:base 5000 1.01 . . . . . call
R:base System V 1.0 . . . . . 359.
Microsoft *(not copy-protected)*
Windows 1.03 . . . . . 65.
Multiplan 2.01 . . . . . 119.
Microsoft Access 1.01 . . . . . 163.
Microsoft Word 3.0. . . . . 247.
★ Microsoft Project 2.01 . . . . . 239.
★ Microsoft Chart 2.0 . . . . . 197.
LANGUAGES
★ Quick Basic 2.0 . . . . . 59.
★ Macro Assembler 4.0 . . . . . 97.
★ Fortran Compiler 3.31 . . . . . 229.
★ C Compiler 4.0 . . . . . 279.
Microstuf *(not copy-protected)*
Infoscope 1.03 . . . . . 45.
★ Crosstalk XVI 3.61 . . . . . 95.
Remote 1.3 . . . . . 95.
Transporter 1.4 . . . . . 149.
Migent Software *(not copy-protected)*
Ability 1.0A . . . . . 65.
Monogram *(copy-protected)*
★ Dollars & Sense 2.0. . . . . call
MultiMate International *(not copy-protected)*
★ MultiMate 3.31 . . . . . call
MultiMate Advantage 3.6. . . . . call
Nantucket Software *(copy-protected)*
Clipper *(Winter '85 version)* . . . . . 349.
Paperback Software *(copy-protected)*
★ VP-Planner . . . . . 57.
★ VP-Info 1.0 . . . . . 57.
Personics *(not copy-protected)*
SmartNotes 1.0 . . . . . 49.
Peter Norton *(not copy-protected)*
★ Norton Commander 1.0 . . . . . 36.
★ Norton Utilities 3.1 . . . . . 59.
Powerbase *(not copy-protected)*
Powerbase 2.2. . . . . 189.
Quarterdeck *(not copy-protected)*
DESQView 1.21 . . . . . 65.
Rosesoft *(not copy-protected)*
★ Prokey 4.0 . . . . . 84.
Simon & Schuster *(not copy-protected)*
★ Webster's New World Speller 1.2 . . . . . 39.
★ Webster's New World Thesaurus 1.0 . . . . $43.
★ Webster's New World Writer 1.01 *(includes Thesaurus & Speller)* . . . . . 109.
Softlogic Solutions *(copy-protected)*
★ Disk Optimizer vers. V . . . . . 33.
Software Group *(not copy-protected)*
Enable 1.1. . . . . 369.
Software Publishing *(copy-protected)*
★ PFS:Report B:01 . . . . . 77.
★ PFS:File B:01. . . . . 84.
★ PFS:Graph B:01 . . . . . 84.
★ PFS:Write C:01 . . . . . 84.
★ PFS First Choice 1.0 *(includes word processor, spreadsheet, database, communications)* . 89.
Professional Write 1.0 *(not copy-protected)* 119.
Personal Publisher 1.0 *(not copy-protected, formerly ClickArt)* . . . . . 109.
Professional File. . . . . 149.
Harvard Presentation Graphics A:01 *(not copy-protected)*. . . . . 245.
Harvard Total Project Manager 1.12 *(not copy-protected)*. . . . . 289.
Softstyle *(not copy-protected)*
★ Printworks Dot Matrix 1.05. . . . . 39.
Printworks Laser 2.12 . . . . . 69.
Springboard *(copy-protected)*
★ Certificate Maker . . . . . 34.
★ Newsroom. . . . . 35.
★ Clip Art Volume 1 *(for Newsroom)*. . . . . 19.
★ Clip Art Volume 2 *(for Newsroom)* . . . . . 25.
Symantec *(not copy-protected)*
Q & A 1.1 . . . . . call
True BASIC, Inc. *(not copy-protected)*
Runtime 1.0. . . . . 89.
★ True BASIC 1.0 . . . . . 109.
True BASIC Fireworks *(includes 3 libraries — 3D Graphics, PCBasic Converter, Sorting & Searching)*. . . . . 159.
Single Libraries. . . . . *each* 32.
Unison *(copy-protected)*
★ Printmaster . . . . . 37.
★ Art Gallery 1 . . . . . 22.
★ Art Gallery 2. . . . . 18.
WordPerfect Corp. *(not copy-protected)*
★ WordPerfect 4.1 *(one of the highest rated word processors)* . . . . . 239.
★ WordPerfect Library. . . . . 59.

TRAINING

ATI *(copy-protected)*

★ *SKILL BUILDER PROGRAMS*
Intro and How to Use:
PC-DOS MS-DOS
Compaq Typing Tutor
IBM-PC BASIC . . . . *each* $33.
★ *TRAINING POWER PROGRAMS*
How to Use:
Lotus 1-2-3 Wordperfect dBase III Plus
WordStar Displaywrite 3 R:base 5000
MultiMate Advantage
Symphony . . . . . *each* 43.
Individual Software *(copy-protected)*
★ The Instructor II . . . . . 26.
★ Professor DOS . . . . . 33.
★ Tutorial Set *(both items above)* . . . . . 49.
★ Typing Instructor II . . . . . 26.
★ Training for Lotus 1-2-3 *(for vers. 1A & 2)* . . . . 37.
★ Training for dBase III . . . . . 37.
★ Training for Project Management. . . . . 37.
Microsoft *(not copy-protected)*
★ Learning DOS *(for any version)*. . . . . 33.
Scarborough *(copy-protected)*
★ Mastertype. . . . . 26.
Simon & Schuster *(not copy-protected)*
★ Typing Tutor III 1.5. . . . . 33.

EDUCATIONAL

All educational programs listed are copy-protected.

Barron's
★ Computer SAT . . . . . 35.
Designware *(reqs. graphics brd.)*
★ Spellicopter *(ages 6 to adult)* . . . . . 22.
★ European Nations and Locations *(ages 9 and up)*. . . . . 25.
★ States and Traits *(ages 9 and up)* . . . . . 25.
Eduware *(reqs. graphics brd.)*
★ Algebra 1,2,3, or 4 . . . . . 22.
Harcourt Brace Jovanovich
★ Computer SAT . . . . . 49.
Scarborough *(reqs. graphics brd.)*
★ Build-A-Book About Me *(create personalized adventure stories)* . . . . . 19.
Springboard *(reqs. graphics brd.)*
★ Early Games for Young Children . . . . . 22.
★ Piece of Cake Math . . . . . 22.
★ Easy as ABC . . . . . 24.
Stone *(reqs. graphics brd.)*
★ Memory Master *(ages 2 to 6)*. . . . . 27.
★ My Letters,Numbers,Words *(ages 1 to 5)* . . . 27.
★ Kids Stuff *(ages 3 to 8)*. . . . . 27.

1-800/243-8088

PC Connection
6 Mill Street
Marlow, NH 03456
603/446-3383

300W

Circle 136 on reader service card

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION®

©COPYRIGHT MICRO CONNECTION, INC. 1986 ALL ITEMS SUBJECT TO AVAILABILITY PRICES SUBJECT TO CHANGE WITHOUT NOTICE

But, lo! I grew unfulfilled.

I wanted power, performance, and frills!
Software galore,
Mice, modems and more,
(And some program to take care of the bills.)

The Learning Company *(reqs. graphics brd.)*
★✓Magic Spells *(ages 6-12)* . . . . . $23.
★✓Word Spinner *(ages 6-10)* . . . . . 23.
★✓Moptown Hotel *(ages 8-12)* . . . . . 26.
★✓Moptown Parade *(ages 6-10)* . . . . . 26.
★✓Reader Rabbit *(ages 5 to 7)* . . . . . 26.
★✓Rocky's Boots *(ages 9 and up)* . . . . . 32.
True Basic, Inc. *(not copy-protected)*
★✓Calculus . . . . . 32.
★✓PreCalculus . . . . . 32.
★✓Probability . . . . . 32.
★✓Trigonometry . . . . . 32.
★✓Algebra . . . . . 32.

RECREATIONAL

All recreational programs listed are copy-protected except where noted.

Blue Chip
Realistic financial simulations.
★✓American Dream . . . . . 36.
★✓Baron . . . . . 36.
★✓Millionaire . . . . . 36.
★✓Squire . . . . . 36.
★✓Tycoon . . . . . 36.
Broderbund *(reqs. graphics brd.)*
★Lode Runner . . . . . 22.
★Championship Lode Runner . . . . . 22.
★✓Ancient Art of War . . . . . 27.
Electronic Arts *(reqs. graphics brd.)*
★Pinball Construction Set . . . . . 17.
★Music Construction Set . . . . . 17.
★Dr J/Larry Bird One-on-One . . . . . 17.
Friendlysoft *(not copy-protected)*
★✓PC Arcade *(10 games)* . . . . . 35.
Funtastic *(reqs. graphics brd.)*
Great arcade style games
★✓Big Top . . . . . 27.
★✓Cosmic Crusader . . . . . 27.
★✓Master Miner . . . . . 27.
★✓Snack Attack II . . . . . 27.
Hayden Software *(reqs. graphics brd.)*
★✓Sargon III *(highest rated Chess program)* . . . 32.
Infocom *(not copy-protected)*
Sophisticated interactive fiction
Difficulty levels shown in italics
✓*STANDARD*
★Enchanter ★the Witness ★Planetfall
★Cutthroat ★Wishbringer ★Zork I
★Ballyhoo Fooblitzky
★Hitchhiker's Guide . . . . . *each* 24.
★✓*ADVANCED*
Zork II Zork III Sorcerer
A Mind Forever Voyaging . . . . . *each* 27.
★✓*EXPERT*
Spellbreaker . . . . . 29.
Invisiclues (hint booklets). Specify game . . . . $6.
Microleague Sports *(reqs. graphics brd.)*
★✓Microleague Baseball . . . . . 25.
Microprose *(reqs. graphics brd.)*
★✓F-15 Srike Eagle . . . . . 22.
★✓Silent Service *(WWII submarine in the South Pacific)* . . . . . 22.
Microsoft *(reqs. graphics brd.)*
★✓Flight Simulator 2.12 . . . . . 32.
Mindscape *(reqs. graphics brd.)*
✓Balance of Power *(avoid nuclear war)* . . . . . 30.
1Step Software *(reqs. graphics brd.)*
★✓Golf's Best *(Pinehurst or St. Andrew's)* . . . . . 19.
Origin Systems *(reqs. graphics brd.)*
★✓Ultima 3 . . . . . 39.
Parlor Software *(not copy-protected)*
★✓Bridge Parlor *(best Bridge simulation)* . . . . . 49.
PCSoftware *(not copy-protected)*
★✓Championship Blackjack . . . . . 25.
★✓Armchair Quarterback . . . . . 25.
★✓Chess 2001 . . . . . 25.
★✓Championship Backgammon . . . . . 26.
Sierra On-Line *(reqs. graphics brd.)*
★✓Championship Boxing . . . . . $24.
Black Cauldron . . . . . 25.
✓King's Quest . . . . . 33.
★✓King's Quest II . . . . . 33.
Simon & Schuster
★✓Star Trek/Kobayashi . . . . . 27.
Sir-Tech
★Wizardry . . . . . 36.
Spectrum Holobyte *(reqs. graphics brd.)*
★✓Orbiter *(Shuttle simulation)* . . . . . 27.
★✓GATO . . . . . 27.
★✓Tellstar 2 *(search the skies)* . . . . . 45.
Sublogic *(reqs. graphics brd.)*
★✓Night Mission Pinball . . . . . 29.
★✓Jet . . . . . 33.
★✓Scenery *(airport)* disks for Jet . . . . . *each* 15.
★✓Japan Scenery Disk . . . . . 15.
★✓Star Scenery Disk—San Francisco . . . . . 15.
★✓Package of all 6 Western Airports . . . . . 69.
XOR *(not copy-protected)*
✓NFL Challenge *(be the coach)* . . . . . 79.

PC Connection Hardware Special

through November 30, 1986

KRAFT
✓Kraft Joystick

Okay, okay, joysticks are for kids. I mean, remember Pong? Well, home computers have progressed slightly since then, and so have joysticks. You never saw anything like Flight Simulator on an Atari 2600, and it can even make your life with Lotus easier to bear with Executive Cursor Control.

- Two fire buttons (one red, one black)
- Stick will self-center or float free
- Includes 8-foot cord

For the IBM PC, XT, AT *(requires game port, see below)* . . . . . $27.

✓Kraft 3-Button Joystick

If you thought a regular joystick was just the bee's knees, lcok at this one. Three fire buttons, including one up on top of the control stick. Move on over to that offending spreadsheet cell and *ZAP!* it's gone! Or, more conventionally, use it to shoot down enemy planes in the Jet World War II simulation.

For the IBM PC, XT, AT *(requires game port, see below)* . . . . . $33.

✓Kraft Executive Cursor Control Software

Software that lets your joystick think it is a mouse.

- Drivers included for 1-2-3, MultiMate, PFS:, Topview, and a variety of other applications programs
- Includes instructions for programming 1-2-3 macros in to the fire buttons

For the IBM PC, XT, AT *(requires either joystick above)* . . . . . $15.

✓Kraft Game Port Adapter

Adds a game port to a standard PC.

- Works with any brand PC-compatible joystick
- Fits in short slot of XT
- Rugged construction

For the IBM-PC, XT, AT *(rather useless without joystick)* . . . . . $29.

Super Specials!!
Buy the Kraft Joystick and the Game Control Adapter for only . . . . . $53.
OR Buy the Kraft 3-Button Joystick and the Game Control Adapter for only . . . . . $59.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION®

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE MANUFACTURERS WARRANTIES UP TO FIVE YEARS

PC Puzzle.

Putting the PC's together again.

In the enigmatic town of Marlow, NH (pop. 544), there's nothing we like better than a good fit. Fields and streams. Peaches and cream. You and your lean mean micro machine.

In the old days, putting together a PC system was child's play. But now there are thousands of programs and peripherals to choose from, and it takes experience to find a perfect match. Other companies might try to solve your PC puzzle by shoving in any old component. We always take the time to find the right pieces for your applications, your budget, and your existing system.

Get the picture?

You see, there's no point in buying a board without the bytes to boot it. Or a printer without a port to prompt it. Or a game without the graphics to grab it.

There's a solution to all these PC puzzles, but you have to see the whole picture—and we're in the perfect position to do it. Because we've helped hundreds of thousands of PC users piece their systems together.

See the Connection?

Since we spend all day helping you solve your PC puzzles, we thought you might enjoy spending some leisure time solving ours. So we're offering a free 1000 piece PC Connection jigsaw puzzle to anyone who places a $500 order between now and November 31.

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, call ahead to make sure what you want is in stock.

The PC Connection puzzle, featuring our confounding little mascots in one of their most famous poses. Suitable for beginners and advanced users. Offer not available to net accounts. Limit one per customer.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION®

COPYRIGHT MICRO CONNECTION, INC., 1986. MICRO CONNECTION AND THE RACCOON CHARACTER(S) ARE TRADEMARKS OF MICRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK OF MICRO CONNECTION, INC., MARLOW, NH.

1-800-243-8088.

The rhythm's wrong but the prices are great.
Just give us a call,
We'll take care of it all,
Our service and support are first rate.

Princeton Graphics ... 1 year
- MAX-12E Amber monochrome monitor $179.
- * HX-12 RGB monitor *(690 x 240)* . . . . . 449.
- HX-12E *(EGA compatible)* . . . . . 539.

Quadram ... 1 to 2 years
Expanded Quadboard
Øk *(upgrades to 384k)* . . . . . 99.
384k *(fully populated)* . . . . . 149.
- * Microfazer Printer buffer 64k *(parallel)* . . . . 159.
- * Microfazer II Printer buffer 64k *(expandable to 512k, selectable input/output modes)* . . . . . 249.
- QuadEGA+ *(half-card)* . . . . . 349.

SMA ... 30-day money-back guarantee
PC-Documate Keyboard Templates *available for:*

DOS/Basic 3.0-3.1	WordStar
Lotus 1-2-3	WordStar 2000
Symphony	MultiMate
Framework	WordPerfect

- dBase III . . . . . *each* 12.

Some templates also available for Key tronics keyboards.

Toshiba ... 1 year
Toshiba printers are 24 pin dot matrix.
- * P321 serial/parallel printer *(80 col.)* . . . . . 519.
- * P351 serial/parallel printer *(136 col.)* 1049

Toshiba T1100 PLUS Laptop Computer . . . call
Toshiba T3100 Laptop Computer . . . . . call

Tseng Labs ... 1 year
- EVA *(EGA card)* . . . . . 317.

Video 7 ... 2 years
- VEGA *(half-card)* . . . . . 349.

VEGA Deluxe *(half-card)* . . . . . 399.

DRIVES

I2 Interface ... 1 year
20 Meg Hard Drive Card *(85 ms)* . . . . . 459.

IOMEGA ... 90 days
- Bernoulli Box 20 Meg w/PC2 card . . . . . 1849.

10 Meg cartridge . . . . . 51.
- Bernoulli Box 40 Meg w/PC2 card . . . . . 2449.

Bernoulli Plus *(Two 20 Meg Bernoulli Drives w/80 Meg Winchester; includes PC2W card)* . . . 3799.
With PC 2BW Bootable Card . . . . . 3859.
- PC2B (Bootable) Card . . . . . 229.

20 Meg cartridge . . . . . 67.
Bernoulli Box Care Kit. . . . . 79.

Mountain Computer ... 1 year
Drive Card 20 Meg *(80 ms)* . . . . . call
Drive Card 30 Meg *(78 ms)* . . . . . call

Seagate ... 1 year
20 Meg Internal Hard Drive *(w/controller and cables, 65 ms)* . . . . . 389.
- 20 Meg Internal Hard Drive for the AT *(40 ms)* 569.

Tandon ... 1 year
New Business Card 20 Meg *(85 ms)* . . . . . 409.

PC Connection Service Center

Did you know that we are an authorized Epson and IOMEGA service center? We typically offer twenty-four hour turnaround on serviced items. Our labor charge is only $25 per hour. Call 1-800-PCC-TECH extension 138 for a free telephone diagnosis.

TEAC ... 1 year
FD-55BV Drive *(5¼" half-height)* . . . . . $109.

Toshiba ... 1 year
PC, XT 360k Drive *(5¼" half-height)* . . . . . 109.
- AT 360k Drive *(5¼" half-height)* . . . . . 117.

Western Digital ... 1 year
File Card 20 Meg *(w/XTREE)* . . . . . call

MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board or any memory board
150 nanosecond *(set of 9)* . . . . . 15.
- 128k Memory Upgrade Set for IBM-AT System Board *(9 chips piggybacked)* . . . . . 39.
- 256k Memory Upgrade Set for any IBM-AT memory board *(9 chips)* . . . . . 39.

DISKS

All disks have a lifetime warranty.

DS/DD Disks for the PC & XT (40 TPI).
- * Verbatim Datalife *(10 disks per box)* . . . . . 15.
- * Maxell MD-2 *(10 disks per box)* . . . . . 19.

DS/High Density Disks for the AT (96 TPI).
- Fuji *(10 disks per box)* . . . . . 27.
- Verbatim *(10 disks per box)* . . . . . 29.
- Maxell *(10 disks per box)* . . . . . 34.

3½" Double-sided Diskettes *(720k)*
Verbatim *(10 diskettes)* . . . . . 26.
Sony *(10 diskettes)* . . . . . 26.
MAXELL *(10 diskettes)* . . . . . 26.
3M *(10 diskettes)* . . . . . 27.
BASF *(5 diskettes)* . . . . . 14.

INFORMATION SERVICES

- * **Compuserve Information Service** *(includes subscription, manual, $25 usage credit, monthly publications)* . . . . . $24.
- * **Dow Jones** Membership Kit . . . . . 24.
- * **The Source** . . . . . 30.

MISCELLANEOUS

Automation Facilities
- * Floppiclene Disk Drive Cleaner. . . . . 18.

Environmental Software
- Nylon Computer Covers PC, XT or AT *(navy, burgundy or silver)* . . . . . 20.

Innovative Concepts
- * Flip n' File 50 *(holds 50 disks)* . . . . . 16.
- * Flip Sort *(holds 70 disks)* . . . . . 15.

Innovative Technologies
Bernoulli Pouch *(holds 2 cartridges)* . . . . . 16.

Kalmar
- * Teakwood Disk Holder *(holds 50)* . . . . . 19.
- * Teakwood Disk Holder *(holds 100)* . . . . . 29.

PC Connection
Computer Toolkit *(all the tools you need to go with your PC; great gift idea!)* . . . . . 29.95.
Clear Keyboard Cover and Copy Holder *(PC & XT)* . . . . . 16.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge 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.
- No sales tax.
- All shipments insured; no additional charge.
- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products.*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

SHIPPING

Note: Accounts on net terms pay actual shipping. **Continental US:** For monitors, printers, and drives, add 2% for UPS ground shipping. For computers, pay actual UPS charges. Call for UPS Blue or UPS Next-Day-Air. For all other items, add $2 per order to cover UPS shipping. We will 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, and drives, actual UPS Blue charge will be added. For all other items, add $2 per order. **Alaska and outside Continental US:** Call 603/446-3383 for information.

1-800/243-8088

PC Connection
6 Mill Street
Marlow, NH 03456
603/446-3383

300W

Circle 136 on reader service card

For the IBM-PC (XT&AT) exclusively.

PC CONNECTION®

*COPYRIGHT MICRO CONNECTION, INC. 1986. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

All my dreams started to pale.

When I saw the prices' retail.
Then my best friend Kate
said, "Why do you wait?
The secret's to order by mail."

HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

AST Research ... 1 to 2 years
I/O Plus II C/S ..... $119.
Second serial, parallel or game port ..... 35.
SixPakPlus 64k C/S/P *includes Sidekick vers. 1.5 not copy-protected & DESQView* ..... 169.
SixPakPlus 384k *(fully populated)* ..... 209.
SixPakPremium 512k C/S/P *upgrades to 1 Meg on board, 2 Meg w/ opt. piggyback board; EEMS compatible, includes DESQView* ..... 369.
SixPakPremium Piggyback Board 512k ... 189.
Flashpak *(accelerator board)* ..... 369.
✓Advantage 128k *upgradeable to 1.5 Meg includes Sidekick version 1.5 not copy-protected and DESQView* ..... 369.
✓Advantage Premium 512k S/P *upgrades to 1 Meg on board, 2 Meg w/ opt. piggyback board; EEMS compatible, includes DESQView* ..... 449.
✓Advantage Premium Piggyback Board 512k 298.
✓5251-11 ..... 579.
✓3780 Board ..... 579.
✓5251-11 Plus ..... 639.
RAMpage! 256k *upgrades to 2Mb* ..... call
✓RAMpage! AT 512k *upgrades to 2Mb* ..... call
Both RAMpage boards support EMS and fully support EEMS, and include DESQView.

Amdek ... 2 years
✓Video 310A mono monitor *(amber)* ..... 159.
✓Color 600 - RGB ..... 399.
✓Color 722 - EGA compatible ..... 519.

Compucable ... lifetime
Plastic Keyboard & Drive Cover Set ..... 15.
✓IBM Mono Screen Enhancement ..... 17.
✓9-to-25 Pin Serial Converter cable ..... 19.
✓AT-to-Smartmodem cable ..... 19.
✓15-foot Parallel cable ..... 27.
✓Data Transfer Switches *(switch boxes)*. Call for the configurations you want.

Cuesta ... 1 year
Uninterruptable power backup units.
✓Datasaver 200 Watt ..... call
✓Datasaver 400 Watt ..... call

Curtis ... lifetime
ACCESSORIES
✓Low Profile Tilt and Swivel Pedestal ..... 25.
✓PC Pedestal *(for IBM Mono or Color)* ..... 27.
✓Static Mat ..... 27.
Portable Pedestal *(for portable computers)* .. 36.
✓Printer Stand ..... 18.
System Stand *(for IBM-PC & XT)* ..... $19.
★✓Universal System Stand ..... 25.
★Crystal 150 Watt *(line conditioner)* ..... 123.
★✓Crystal 300 Watt *(line conditioner)* ..... 159.
CABLES
Smartmodem to IBM Cable ..... 17.
✓Keyboard Extension Cable *(3 to 9 feet)* ..... 27.
✓Extension Cables for IBM Mono Display ... 33.
✓Color and Monochrome Extension cables .. 39.
★✓Printer-to-IBM cable ..... 17.
SURGE SUPPRESSORS
★✓Safestrip *(6 outlets)* ..... 21.
★✓Diamond *(6 outlets)* ..... 29.
★✓Emerald *(6 outlets; 6 ft cord)* ..... 36.
★✓Sapphire *(3 outlets; EMI/RFI filtered)* ..... 47.
★✓Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* ... 55.
★✓Command Center .....SPECIAL ..... 79.

DCA ... 1 year
✓Smart Alec *(5251 emulation board)* ..... 639.
✓Irma *(3270 emulator)* ..... 729.
✓Irma Keyboard ..... 259.

Epson ... 1 year
★✓EX-800 *(80 column, 300 cps)* ..... call
★✓FX-85 printer *(80 column)* ..... call
★✓FX-286 printer *(136 column)* ..... call
★✓LX-86 printer *(80 column)* ..... call
★✓LQ-1000 printer *(136 column)* ..... call
★✓LQ-2500 *(136 column, 324 cps)* ..... call
★✓Printer-to-IBM cable ..... 15.

Everex ... 1 year
✓Evercom II Internal modem w/software ... 137.

5th Generation ... 6 months
✓Logical Connection Print Buffer 256k .... 269.

FTG ... 2 years
✓Light Pen ..... 195.
✓Demo Disk for Light Pen ..... 39.

Hayes ... 2 years
★✓Smartmodem 1200 ..... 389.
✓Smartmodem 1200B *(w/Smartcom II)* ..... 349.
✓Smartmodem 1200B *(no software)* ..... 319.
★✓Smartmodem 2400 ..... 589.
✓Smartmodem 2400B *(w/Smartcom II)* ..... 529.
✓Smartcom II 2.1 *(software)* ..... 89.
✓Transet 1000 ..... 279.
✓N^2 *cables for Transet 1000* ..... *each* 16.

Hercules ... 2 years
All Hercules boards come with parallel port and FREE parallel printer cable.
✓Hercules Color Card ..... $159.
✓Hercules Graphics Card ..... 189.
✓Hercules Graphics Card Plus ..... 189.
✓Graph X Software ..... 42.

Intel ... boards: 5 years; chips: 1 year
Above Board PC 64k *(upgrades to 2 Meg)* .. call
✓Above Board AT 128k *(upgrades to 2 Meg)* .. call
Above Board PS 64k C/S/P *(upgrades to 1.5 Meg)* ..... call
✓Above Board PS AT S/P *(upgrades to 1.5 Meg or higher w/piggyback)* ..... call
8087 *(for IBM-PC & XT)* ..... 129.
8087-2 *(for 8 Mhz computers)* ..... 177.
✓80287 *(for 6 or 8 MHz IBM-PC AT)* ..... 225.
✓80287-8 *(for 10 MHz & faster IBM-PC AT)* .. 269.

Kensington Microware ... 1 year
★✓Masterpiece ..... 94.
★✓Masterpiece Plus ..... 129.
★✓Printer/portable computer stand ..... 17.

key tronic ... 90 days
5150 keyboard ..... 115.
✓5151 keyboard *(deluxe)* ..... 169.
5153 keyboard with touch pad ..... 279.

Kraft ... 1 year
✓Joystick *(2 button)* ..... special
✓Joystick Adapter Card ..... special
✓*New!* 3 Button Joystick ..... special
✓Executive Cursor Control 2.0 w/joystick .... 37.
AST Game Port ..... 25.

Microsoft ... 1 year
✓Microsoft Bus Mouse with software 5.03 .. 127.
★✓Microsoft Serial Mouse with software 5.03 135.
Mach 10 *(accelerator board)* ..... 369.

Mouse Systems ... lifetime
★Junior Mouse with PC Paint 2.8 *(connects directly to PCjr serial port)* ..... 99.
★✓PC Mouse with PC Paint+ ..... 127.
★✓PC Mouse with Dr. Halo II ..... 139.
★✓PC Mouse with Ready and PC Paint+ .... 149.

NEC ... 2 years
✓Multisync monitor *(EGA compatible)* ..... 579.
Order the NEC Multisync monitor with any EGA card and get $19 off. Offer is good through 11/30.

NSI Logic ... 3 years
✓EPIC *(video adapter, EGA compatible)* .... 279.

Orchid Technologies ... 1 to 2 years
Conquest Multifunction Board 0k *upgrades to 2Mb, fully supports EMS spec.* ..... 264.
✓PC Net Adapter Card ..... 319.
✓PC Net Cluster Kit *(cabling for two PCs and software)* ..... 69.
✓Eccell Multifunction Board for the AT ..... 399.
Tiny Turbo 286 ..... 445.
✓PC Turbo 286e w/1 Meg ..... 739.
✓PC Turbo 286e Ram Daughtercard 1 Meg 269.
Turbo EGA ..... 589.
✓EGA ..... 289.

1-800/243-8088

MEMBER DIRECT MARKETING ASSOCIATION

PC Connection
6 Mill Street
Marlow, NH 03456
603/446-3383

300W

For the IBM-PC (XT & AT) *Exclusively.*

PC CONNECTION®

What's Best

Mel Lindstrom

Don't let today's "what if" become next week's "oh no!" With What's Best, you can eliminate spreadsheet guesswork—and get the best answers to your financial questions.

William Urschel

I rolled the number 2 pencil between my sweaty 12-year-old palms and moaned quietly to myself. "A grocer has a barrel of 39-cent candy and a barrel of 29-cent candy. How much candy must the grocer take from each barrel to make a barrel of 35-cent candy?" I dropped the pencil and considered my options: faking an appendicitis attack or moving to a country that didn't subject sixth graders to word-problem torture. Before my reveries turned to action, the recess bell rang and I ran out into the clean, warm spring air, my problems figuratively and literally behind me.

Unfortunately, there's no recess in the business world. The stern teacher, the sixth-grade abstractions, and the pop quizzes are gone, replaced by paying clients, *1-2-3* worksheets, and very real problems like "What schedule keeps the most staff on duty while minimizing overtime?"

If you're a *1-2-3* or *Symphony* user, you might wedge such a problem into a worksheet, write some formulas, and start playing around with the essential numbers, observing the effect on the bottom line.

: (F0) U 6.6875
ALEX'S RESTAURANT
A B C D E F
A B C D E F
A $13 $9 $12 $14 $11
$11 11 2 1 11
6 7
Dish
Profit
Quantity
Major Ingredients
Roast Beef
Steaks
Chicken
Ham
Flounder
Peas
Asparagus
Onions
Potatoes
Profit
$405.63
Used
In Sto

While this trial-and-error ritual ("what if" in spreadsheet parlance) can bear fruit, it seldom produces the best results possible.

Hence the genesis of General Optimization's *What's Best*, a memory-resident utility for *1-2-3* and *Symphony* users. Relying on classic linear programming—an advanced sort of algebra—*What's Best* calculates the optimal solution (such as the product mix yielding maximum profit) based on relationships specified in a worksheet. If you're a personnel director trying to determine cost-effective staffing, a manufacturer trying to make the most of your inventory, a farmer determining the right feed grain mixture, or a grocer selling candy, *What's Best* may be the answer to your problem.

Model Models

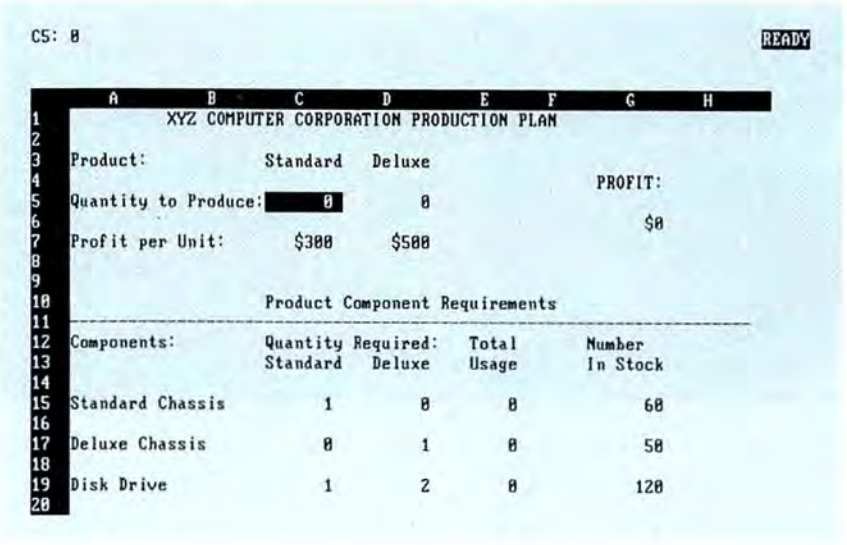
Consider the sample worksheet from the *What's Best* manual (see Screen 1). The XYZ Computer Corporation produces two computers: a standard model with one disk drive and a deluxe model with two disk drives. At the moment, XYZ has only 60 standard chassis, 50 deluxe chassis, and 120 disk drives on hand, and the company needs to assemble the most profitable combination of models. Here's your mission: Find the maximum possible profit (cell G6) by entering the number of each model to produce in cells C5 and D5. The catch, however, is that the total number of parts used (E15, E17, and E19) cannot exceed the number of parts in stock (G15, G17, and G19).

At first I didn't think this problem was terribly challenging. After a dozen tries, my last "what if" came up with 20 standard and 50 deluxe units, for a total profit of $31,000. I yawned loudly. At this point a colleague ambled over and promptly tapped in 40 standard and 40 deluxe models, for a profit of $32,000. Then the guy down the hall gave it a shot and came up with 30 and 45, for a profit of $31,500.

Next came *What's Best*. I popped up the *What's Best* menu over the worksheet, marked the key cells involved, and let the program crunch away. The worksheet disappeared, an animated bar chart showing computation status flashed on screen, and the worksheet emerged anew with the answer: 60 standard and 30 deluxe models for a total profit of $33,000—$1000 more than our best effort. My associates left the room quietly and haven't spoken to me since.

"What If": Hit or Miss

This exercise made one thing clear: the free-wheeling "what if" approach is time-consuming and does not guarantee optimal results. I had confidently assumed that my answer to this simple problem was the best, and I was rudely confronted with evidence to the contrary. How many times in the past have I been wrong using far more complicated models? I hope I never find out.


C5: 0

READY

	A	B	C	D	E	F	G	H
1			XYZ COMPUTER CORPORATION PRODUCTION PLAN					
2								
3	Product:		Standard	Deluxe				
4							PROFIT:	
5	Quantity to Produce:		0	0				
6							$0	
7	Profit per Unit:		$300	$500				
8								
9								
10			Product Component Requirements					
11								
12	Components:		Quantity Required:		Total		Number	
13			Standard	Deluxe	Usage		In Stock	
14								
15	Standard Chassis		1	0	0		60	
16								
17	Deluxe Chassis		0	1	0		50	
18								
19	Disk Drive		1	2	0		120	
20								

Screen 1: The XYZ Computer Company is long on disk drives but short on chassis. What's the most profitable mix? What's Best knows.

What's Best can adroitly handle many variables in combination and deliver the single best answer. The program, or rather, linear programming, is no help in situations such as accounting, where numbers are merely tallied. Nor is *What's Best* geared toward statistical and data base analyses or calculating distributions and probabilities. If you need to answer questions like "What is the likely profit if a disk drive will probably cost $135 but maybe $100 or $150, and a chassis will probably cost $450 but maybe $425 or $475," turn to dedicated programs like *Predict* or wrestle with *1-2-3* release 2's frequency-distribution function.

But if you're mostly working with variables of the sort described here, you can stop relying on intuition tempered by trial and error and let *What's Best* do the work. Not only will *What's Best* save you hours or days of guesswork, but you'll know the answer is on the money.

Linear Programming for the Masses

Linear programming isn't new, it's just a subject confined mostly to the musty halls of academia. If you passed tenth-grade algebra and are comfortable with *1-2-3* or *Symphony*, you can use *What's Best* in short order. You only have to learn how to lay out a worksheet so that *What's Best* can find what it needs.

Setting the table for *What's Best* means identifying three cell types or ranges: adjustable, best, and constraints (ABC). Adjustable cells are those you would normally plug data into during a manual "what if." Since these are essentially variable cells, *What's Best* changes their contents dynamically as it evaluates the limits (expressed by formulas) in the constraint cells. The result of all these machinations is funneled into a single best cell that can reflect maximum profit, minimum resources used, and so on. All three cell groups are typically interconnected with *1-2-3* or *Symphony* formulas. *What's Best* will manipulate an adjustable cell until a negative value is produced in the cell or any linked cell. This tells the program that a constraint has been exceeded—and that it's time to move on to another adjustable cell.

Sunday Night Specials Problem

If you're skeptical about the merits of linear programming as embodied by *What's Best*, pretend for a moment that you run a restaurant that's open every day except Monday. You must use up as many of your perishables as possible by Sunday night, because by Tuesday the remaining meat and vegetables won't be fresh enough to serve. Like any other restaurateur, you try to clear out your larder by creating some "specials" and, perhaps with a touch of guilt, asking your waiters and waitresses to recommend one dish over another.

B6: (F8) U 6.6875 READY

	A	B	C	D	E	F	G	H	I	J	K
1					ALEX'S RESTAURANT						
2											
3	Dish		A	B	C	D	E	F			
4	Profit		$11	$13	$9	$12	$14	$11			
5											
6	Quantity		7	6	11	2	1	11			
7											
8		Major Ingredients						Used		In Stock	After
9											
10	Roast Beef		0	0	0	0	2	4	45 <	45	0
11	Steaks		0	4	0	0	0	0	23 <	23	0
12	Chicken		0	0	4	0	0	0	45 <	45	0
13	Ham		0	0	0	4	0	0	9 <	9	0
14	Flounder		4	0	0	0	2	0	28 <	28	0
15	Peas		2	0	1	0	0	2	47 <	54	8
16	Aspargas		0	2	1	0	2	0	24 <	24	0
17	Onions		2	2	1	0	2	0	37 <	56	19
18	Potatoes		0	0	1	4	0	2	42 <	64	22
19											
20	$405.63 <------ Profit										

Screen 2: You can get anything you want at Alex's Restaurant—but can he use up all his ingredients, reduce spoilage, and make a profit? After a quick going over by What's Best, the answers are inserted—along with a "best" profit of $405.63.

The question is, how many servings of each dish must you sell by Sunday night to earn the greatest profit, while keeping spoilage to a minimum and using only the ingredients in the icebox? The worksheet shown in Screen 2 illustrates the basic relationships. The dishes, from flounder to roast beef, are labeled A through F, with the profit per dish listed directly below. The number of servings that should be sold will be filled in by *What's Best* in row 6.

The major ingredients (four units to a serving) are noted beneath each dish. Dish A, for example, uses four units of flounder, two units of peas, and two units of onions. To calculate the total number of units used, the worksheet multiplies the quantities in row 6 by the units in each ingredient row and puts the result in column H. The available ingredients are listed in column J under "In Stock." The total profit, shown in cell A20, is simply the sum of the profit for each dish multiplied by the quantity of that dish sold.

To determine the greatest possible profit, given the kinds of dishes and the ingredients on hand, you could plug numbers into the worksheet until the value in cell A20 was sufficiently high. But it's far easier to identify the ABC cells for *What's Best* and let it handle this chore.

The adjustable cells and best cell are relatively easy to pick out in the worksheet. In this example, cells B6 through G6 act as the adjustable cells; the best cell is naturally the profit cell, A20. The constraint cells K10 through K18 will hold formulas that subtract the food used (column H) from the available supplies (column J). (You can type in these formulas or have *What's Best* insert them automatically.) As long as the amount of food consumed is equal to or less than the food on hand, the values in the constraint cells remain zero or greater—and *What's Best* keeps processing.

You should keep a few rules in mind. Aside from identifying the ABC cells for *What's Best*, remember that cells linked to an adjustable cell with a formula are considered constraints. You also have to make sure the worksheet has a solution. In some cases you may set up constraints that lead to no solution or to an infinite number of solutions. In the XYZ example, if you added the constraint that 55 deluxe models have to be produced, there would be no possible solution, since there are only 50 chassis available.

Stop relying on intuition tempered by trial and error. What's Best *will save you hours or days of guesswork.*

Screen 3: All What's Best functions can be chosen from a pop-up menu.

Although simple, these rules make it difficult to use a typical worksheet unaltered. After learning *What's Best*, I examined half a dozen of my old worksheets, and none could be run through *What's Best* without some modification. But in most cases the changes were trivial—largely a matter of trimming out nonessential formulas.

What's Best in Action

Using *What's Best* with the restaurant model is a cinch. The memory-resident portion of the program sits demurely in 6K of RAM while you putter about in your worksheet. Pressing <PrtSc> invokes the program and pops up the *What's Best* menu over the worksheet (see Screen 3). Most of the menu options are selected with function keys, and nearly half identify the ABC cells. For example, to tag adjustable cells, place the cursor on the appropriate cell and press <PrtSc> and then <F3>. A prompt directs you to "point" to the range of adjustable cells, then press <Enter>. The process is similar to "unprotecting" a *1-2-3* cell. Once a menu option is executed, the *What's Best* menu disappears and the worksheet is free.

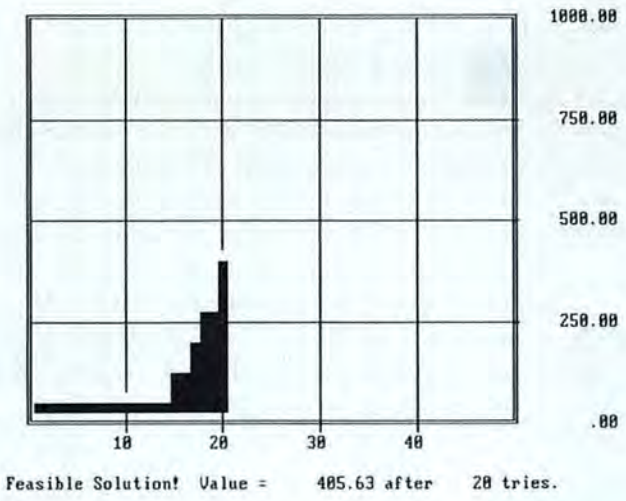
Remember that the best cell can contain either the largest or smallest possible number. Generally, you want a combination of factors to result in maximum profits or units produced, or minimum cost and inventory. To signal this choice to *What's Best*, merely place the cursor on the best cell and press <F5> (Maximize) or <F6> (Minimize).

To add the constraint cell formulas to the restaurant worksheet, place the cursor between the two columns of values to be compared (in this case, column I), press <PrtSc>, and then press <. *What's Best* inserts the less-than character in the cell, then hops over to the In Stock column and places the formula J10 – H10 in cell K10. The process can be repeated all the way down the column using standard *1-2-3* or *Symphony* copy commands. That's all you do. When the number of roast beef units used exceeds the units in the pantry, the formula in K10 returns a negative number—and *What's Best* backs up and explores other avenues. The > option, which in this case would enter the opposite formula, H10 – J10, gives you some added flexibility when arranging constraint cells in a worksheet.

Automatic Optimization

The last step is optimizing the worksheet. Select <F1> from the menu, and *What's Best* automatically saves the worksheet to disk, exits *1-2-3* or *Symphony*, then churns through the worksheet file, running repeated calculations—essentially performing a multitude of "what if"s—until it finds the best solution.

While *What's Best* is sifting through the possibilities, it displays a bar chart indicating the number of passes taken through the file and the current best value (see Screen 4). The chart can fly by pretty



Screen 4: While What's Best chews on a worksheet, it displays a graph showing the number of passes made and the current best value.

quickly; in less than 15 seconds, *What's Best* made 20 passes through the restaurant worksheet and arrived at the best answer. The program then automatically revived *1-2-3*, retrieved the worksheet, and inserted the optimum values (the number of servings per dish) in the adjustable cells.

The results are impressive. *What's Best* pushes the constraints to the limit, using up a high percentage of ingredients (and thus reducing spoilage) and arriving at a profit of $405.63—or about $27 more than my earlier tried-and-not-so-true "what if" approach. If you're running a restaurant on a tight budget, this extra cash is a welcome addition to the bottom line; if you're in charge of a corporation with numerous divisions or manage a factory manufacturing millions of dollars' worth of products a year, *What's Best* can easily pay for itself in a week.

Better What's Best

There are ways to further refine your financial model. In the restaurant example, you could change the ingredients of each dish to find more efficient combinations. Substituting potatoes for peas might allow you to prepare ten extra servings, boosting profit while reducing waste. You could simplify the substitution process by running two *What's Best* optimizations at once and using two sets of adjustable cells—one for ingredients and the other for number of dishes—with both sets feeding into the same best cell.

In fact, a worksheet can hold scores of adjustable and constraint cells, with the actual number limited only by the version of *What's Best* and the available memory. However, no matter how complex the model, the results must boil down into one best cell.

Other *What's Best* options can play roles as well. The Fixed Cell command <F4> can protect a cell from *What's Best*'s machinations—a handy feature when you want to test the effects of some variables but not others. The Dual Values command can derive the cost (or penalty) of changing constraints or producing a unit that *What's Best* wouldn't recommend producing.

For example, *What's Best* advised that XYZ company assemble 60 standard computers and 30 deluxe computers. But what if a disk drive is defective? How much would that one bad drive really cost the company? Select the Dual Value option, and *What's Best* places a simple arithmetic formula in the worksheet that deduces that the faulty drive cuts profit by $250—far more than the cost of the drive itself—because the loss prevents you from producing and selling the computer. Therefore, $249 is the maximum you can afford to pay for a replacement drive and still make a profit—important information to have in hand.

Other Models

The XYZ and restaurant models are typical "product mix" problems that involve calculating combinations of individual items to maximize profit. But this isn't the only kind of optimization available. *What's Best*'s talent for finding the most cost-effective amalgam of ingredients in a dish means the program can also discover the least expensive and most suitable mixture of metals to form an alloy.

What's Best also handles many scheduling problems, like finding the least expensive way to staff an institution while keeping the required minimum number of personnel on duty at all times. One Chicago hospital reportedly reworked its nursing schedule with *What's Best* and discovered it could save $80,000 a month in salaries.

What's Best can also be your ally in solving routing and resource-management riddles. For example, assume you own two warehouses, five retail outlets, and three trucks capable of hauling 10,000 pounds of merchandise. What's the least expensive way to get goods from either warehouse to an outlet? By converting distance covered to time and dollar variables, *What's Best* delivers the best route.

Some Practical Limits

Is any problem too big for *What's Best?* Well, yes and no. *What's Best* will tackle the modern version of the classic puzzle: "Find the shortest distance flying to 25 major cities without landing in the same city twice." But you might not want to wait around for the answer. This particular problem presents *What's Best* with approximately 1.6×10^{25} possible itineraries. An IBM PC calculating one permutation per second would take about 4,900,000,000,000,000 centuries to sort through all the alternatives.

Fortunately, you can limit the number of passes *What's Best* makes through a file. You can also stop the program in midoptimization to view the best answer generated by that point. In many cases, this number will be good enough.

What You Get

General Optimization offers three editions of *What's Best:* the $995 Professional version, which requires 640K and is capable of handling 4000 variable cells (adjustable, constraint, and other formula cells); the $695 Commercial version, which requires 448K and handles 1500 variable cells; and the $125 Personal version, which requires only 256K and handles 250 variables. The Personal version is not copy protected, but otherwise the three versions are identical in every way except capacity. Unless you are managing General Motors or plotting astral projections, you can probably get by with the Commercial version. All versions work with *1-2-3* release 1A, 2.0, or 2.1 and *Symphony* release 1.1.

> What's Best *can handle many scheduling problems, like finding the least expensive way to staff an institution.*

The package includes a program disk, a backup program disk, a 185-page manual, and a quick-reference guide. The manual is well structured and well written, and the sample applications clearly illustrate both basic and advanced techniques. You can easily use the examples as models for your own work.

The current version of *What's Best* is reasonably compatible with other memory-resident software as long as it's loaded last. It ran uncomplainingly alongside my public domain RAM disk, *SideKick,* and a keyboard buffer I use called *Ndosedit.* In all my testing, saving, and reloading of files and programs, *What's Best* never lost a worksheet or froze up my system.

My only complaint centers on the program's key-disk copy protection scheme, which forces you to put the original *What's Best* program disk in the drive whenever you need it. Unfortunately, this is the same scheme *1-2-3* employs. If you have a hard disk and only one floppy disk drive, you are in for some elbow bending.

What's Best isn't the first PC package to incorporate linear programming, but it's one of the few that doesn't require a degree in math to use. This makes it one of those rare programs that pack real power in an elegant, easy-to-use form. If you manage people, products, or money with *1-2-3* or *Symphony,* make *What's Best* your next purchase.

William Urschel is president of Arc Tangent, a software developer in Santa Barbara, California, and writes frequently about spreadsheets and other numerical analysis packages.

What's Best version 1.1
General Optimization, Inc.
2251 N. Geneva Terrace
Chicago, IL 60614
312/248-7300
List price: Professional $995, Commercial $695, Personal $125
Requirements: 640K for Professional, 448K for Commercial, 256K for Personal; two disk drives (hard disk recommended); DOS 2.00 or later version; 1-2-3 release 1A, 2.0, or 2.1 or Symphony release 1.1
Copy protected

Predict
Unison Technology, Inc.
410 Rouser Rd.
Coraopolis, PA 15108
412/773-3428
List price: $795
Requirements: 512K (640K recommended), two disk drives or hard disk, DOS 2.00 or later version
Not copy protected

Show-Stopping Slides

For flamboyant presentations to a small audience, Concorde can turn your PC into a star attraction—if you're willing to spend the time in rehearsal.

Richard Jantz

For in-house conferences, departmental meetings, and other small presentations, a new graphics medium is emerging: the PC-based slide show.

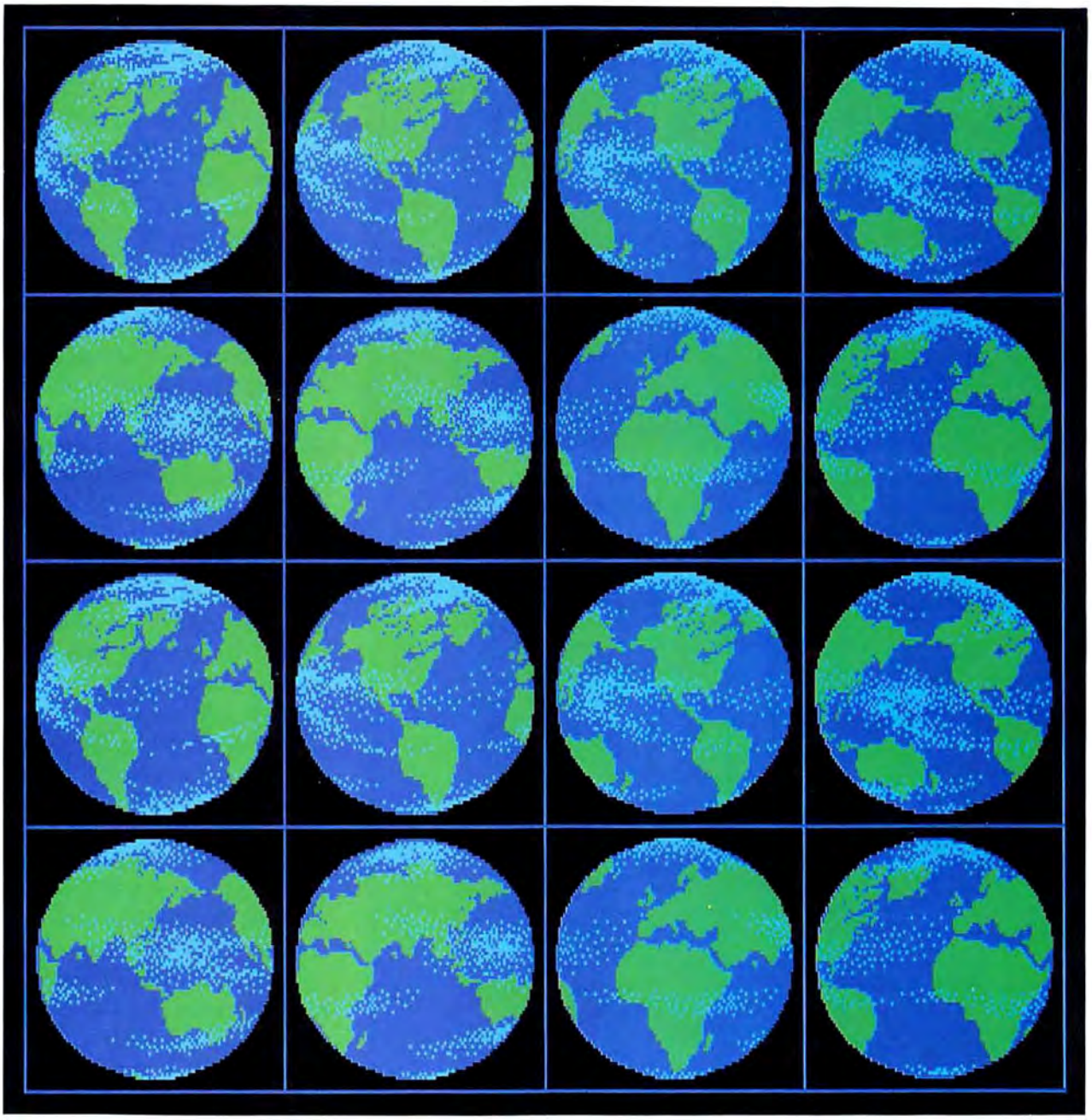
IBM's *PC Storyboard* and General Parametrics' unique VideoShow 150 have done the most to popularize presentations on the PC monitor. Before either of these products made its appearance, however, the lesser-known *ExecuVision*, a presentation graphics program from Visual Communications Network (VCN), flaunted slide shows packed with arresting visual effects. Now VCN has unleashed *VCN Concorde*, an ambitious successor to *ExecuVision* that should make quite a splash among slide-show aficionados.

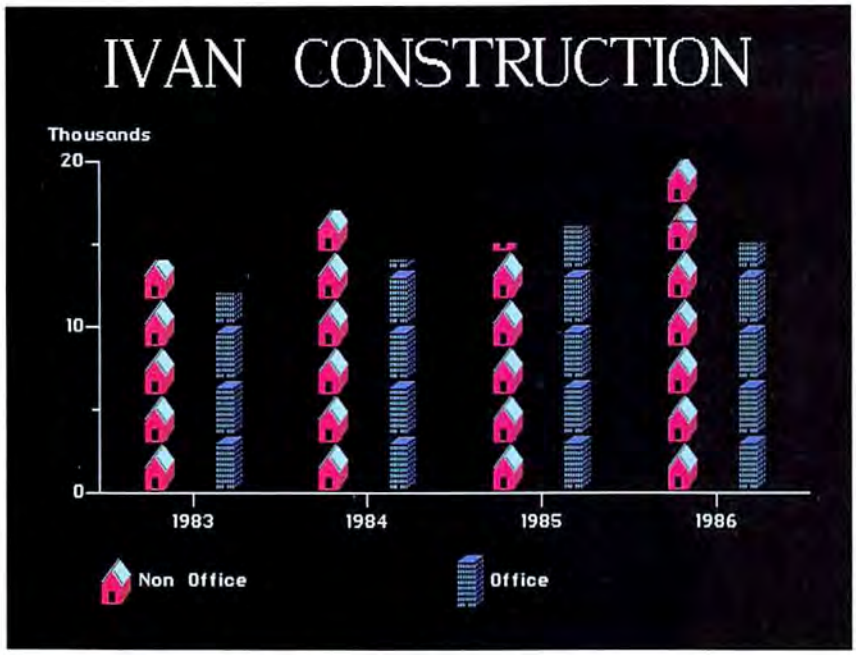
Like the supersonic transport of the same name, *Concorde* is powerful, pricey, and beautiful. It offers a voluminous image library, a built-in spreadsheet, and charting, painting, and drawing features. The image omnibus is a huge, 19-disk collection of over 2000 professionally drawn symbols and images, some of which can dash across the screen in animated sequences. *Concorde* surpasses *PC Storyboard* by offering more elaborate slide-show control and display capabilities—and by supporting the IBM's flagship color graphics board, the Enhanced Graphics Adapter (EGA).

To take maximum advantage of *Concorde*'s broad assortment of features, you'll have to invest a sizable chunk of learning and setup time. If your presentations call only for simple graphs and a fistful of text charts, using *Concorde* would be like pounding nails with a sledgehammer. But for those who like their presentations in the fast lane, *Concorde* isn't a bad way to fly.

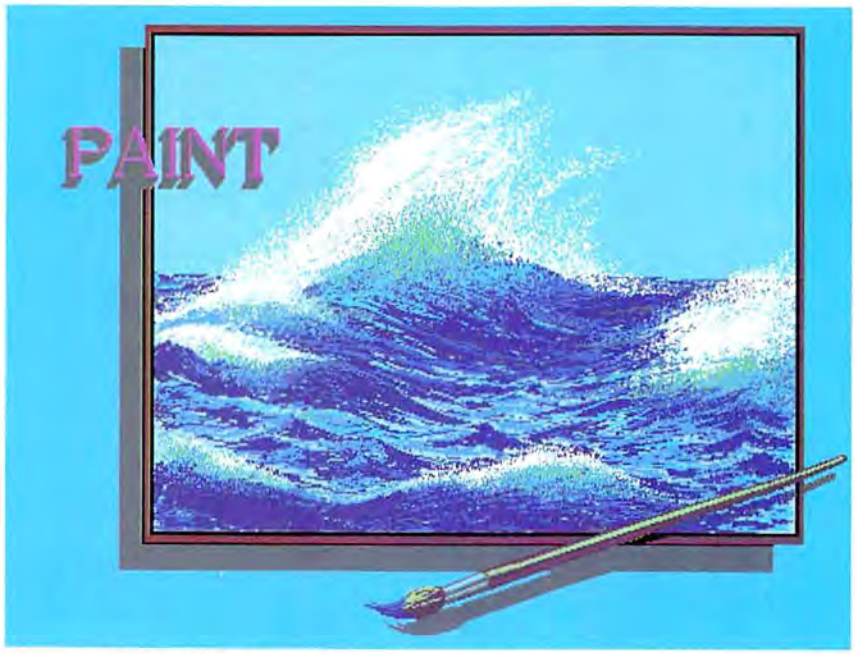
Boarding Pass, Please

Apart from its image library, *Concorde* is spread across seven floppy disks, making a hard disk a virtual requirement. Although the program is copy protected, installing or uninstalling the program on a hard drive is a simple operation. When configuring the program, you can specify that *Concorde* run with an EGA, IBM's Color/Graphics Adapter (CGA), or a Hercules Graphics Card. Your system will





Screen 1: For icon graphs, Concorde provides enough symbols and images to represent almost any data set you can imagine.



Screen 2: On an EGA monitor, it's tough to beat Concorde's arresting graphics effects.

need 640K RAM for an EGA configuration and 384K for the CGA or Hercules boards.

Concorde is divided into two primary components: Create and Produce. In Create mode, you generate graphs or text charts, embellish them with images from the library, and fine-tune them with the draw and paint functions. Produce mode is devoted almost entirely to the arranging of those charts and graphs into a slide show. In both Create and Produce, *Concorde* imitates *1-2-3*'s menu structure, providing a more convenient user interface than *ExecuVision*'s.

You can also use a mouse with *Concorde*, but oddly enough, it's hard to perform many functions without returning to the keyboard. This makes generating drawings from scratch difficult. *Concorde*'s chart enhancements center around its image library and slide-show effects; the program's painting and drawing functions are secondary.

To create a basic graph from numeric data, you enter data directly into *Concorde*'s *1-2-3*-like spreadsheet, or you can import a worksheet file from *1-2-3*, *Symphony*, or any program that exports DIF or SYLK files. You can easily insert, delete, move, or copy individual data entries or entire ranges. Once the data is entered, your choice of graphs includes *x-y* (scatter) plots; icon graphs; clustered and stacked bar charts; and pie, line, and area charts. For format selection, *Concorde* provides a fill-in-the-blanks form called a layout sheet, which also offers default settings. As with Software Clearinghouse's *GraphStation*, you can save a completed layout sheet and reuse it to graph new data.

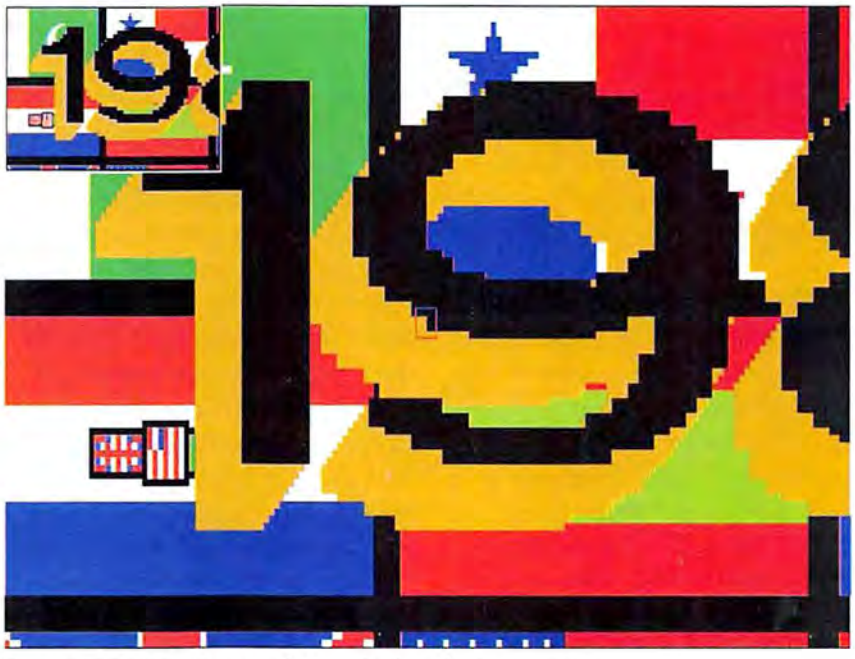
Concorde's icon graphs highlight the program's pictorial approach to business graphics. Data can be represented by buildings, cars, coins, and other symbols (see Screen 1). Up to six different icons can be piled, overlapped, or stretched within a single chart. *Freelance* and *Diagraph* offer similar icon graphs, but neither gives you *Concorde*'s ability to redraw charts from base data.

The program lets you select a horizontal or vertical orientation for any graph, and you can add one of three types of background grids. Bar graphs can show three-dimensional effects and, along with area and pie charts, display a variety of colors or patterns. With pie charts, you can explode one slice, rotate the pie, and add slice labels that show values or percentages.

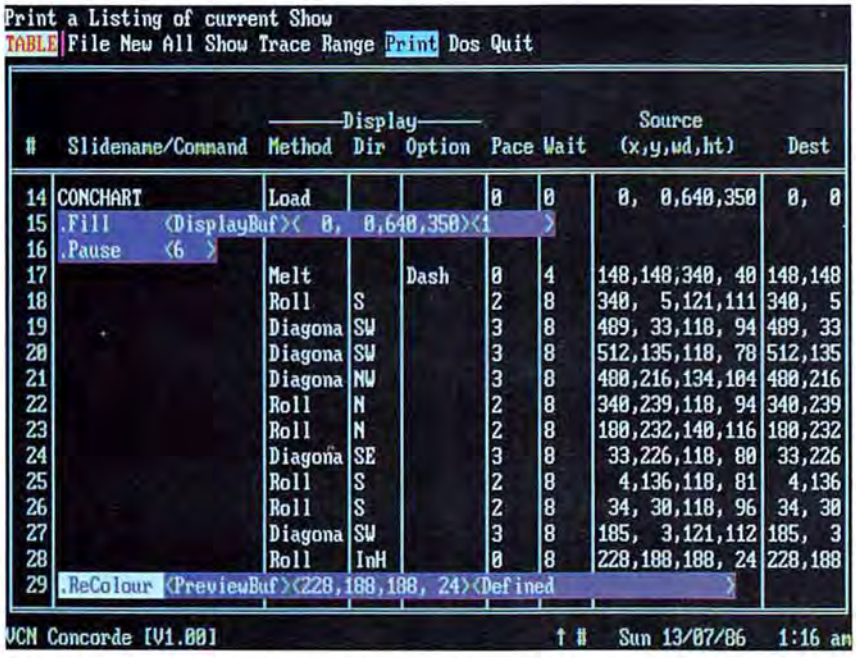
Concorde also provides flexible text functions, either for generating text charts from scratch or for modifying text on a plotted graph. The program offers 15 different fonts, each of which may be scaled, shadowed, colored, underlined, or tilted. You can choose from several fill and edge patterns; set the spacing between characters; or position text to run horizontally, vertically, up, or down. Geometric objects such as rectangles, parallelograms, circles, triangles, diamonds, grids, and lines can be combined with text charts.

Few competitors can match the radiance of a *Concorde* image rendered on an EGA (see Screen 2). Nevertheless, *Concorde* doesn't offer as many basic charting features as *Microsoft Chart*, nor does it

Screen 3: This finished slide-show entry is actually a text chart superimposed on one of Concorde's stock images.



Screen 4: With Concorde's painting features, you can magnify the screen several times to perform pixel-by-pixel editing.



Screen 5: A polished Concorde slide show starts with a fill-in-the-blanks sheet that offers fancy dissolves, animation, music, and even viewer interaction.

pack the analytical punch of programs such as *Chart-Master* or *GraphStation*. In short, *Concorde*'s forte is presentation, not analytical, graphics.

Pictures for an Exhibition

With *Concorde*, the real fun begins after you've created a basic chart. For instance, you might begin a title slide for your company's world sales presentation with a text chart titled "World Sales 1986." After selecting the appropriate font, colors, shadowing, and scaling, you'd enter *Concorde*'s painting module to gain access to the various enhancements that are the program's claim to fame.

Pressing <F10> produces a menu that enables you to load, save, delete, and browse through images in the graphics library. Say the background image you want for "World Sales 1986" is called FLAGSHR (for flags, high resolution). You simply load the picture into the work area, copy the text chart over the background, and save the combined result as a slide for presentation (see Screen 3).

For further refinements, *Concorde*'s painting function enables you to zoom in on an image for pixel-by-pixel editing (see Screen 4). Although equally easy via cursor keys or mouse, ultimately touch-ups are time-consuming work, especially with an EGA. In enhanced resolution mode, the bit-mapped images take time to repaint themselves and reflect your changes.

The extensive command set you must learn also reduces painting productivity. Sizing, moving, and copying images from one place to another require the patience of Job and quite a few keystrokes. Fortunately, an undo command enables you to rectify the inevitable mistakes you'll make when learning this part of the program.

One more note about the image library: *Concorde*'s snazzy, EGA-based images come on 3 disks, while those originally created for *ExecuVision* occupy a whopping 16 floppies. Although the *ExecuVision* library is renowned for realistically rendered business-related images, its pictures were designed for the CGA, not the EGA. Unless you touch up *ExecuVision*'s images with *Concorde*'s painting and drawing features, these medium-resolution graphics may not be appropriate for EGA-based slide shows.

Coffee, Tea, or Slide Show?

Once you've completed a series of graphs or slides, you can assemble the images as a slide show using the Produce functions or send them to a printer, plotter, or slide camera. If you choose the former, you'd better allocate some time; the range of animation effects, timing increments, fancy dissolves, intricate color schemes, and even music is mind-boggling.

The Produce function looks and operates like *Concorde*'s built-in spreadsheet (see Screen 5). To establish the order of images, you enter into the first column the file names of the slides you wish to display. Thankfully, most of the columns for controlling various display attributes have default settings, making it easy to get a basic show rolling before you've mastered the intricacies of creating a full-fledged production number.

As with *GraphStation* or Software Publishing's *Harvard Presentation Graphics*, *Concorde* enables you to run a bare-bones slide show with minimal effort.

If you take the time to learn *Concorde*'s ample options, however, the program's slide-show effects can fly rings around those of most other presentation programs. *Concorde*'s display parameters let you determine the direction from which a slide will enter the screen, the precise location where it will be unfurled, and how long it will remain on screen. For example, you could reveal a line graph from the lower left to upper right corner to depict rising profitability.

Other display tricks let you roll, push, cover, uncover, and "melt" images; the latter technique lets you specify the size of slide segments—such as specks, dashes, or small boxes—that melt in to form a completely new slide. Some of these effects are so striking they suggest network television graphics.

As further evidence of *Concorde*'s complexity, you can choose from among 22 additional special effects, some of which require yet another fill-in-the-blanks form. To use the animation function, for example, you must define a sequence of prepared images that produce a cartoonlike procession. Among the special effects *Concorde* provides are a revolving globe, people making arm gestures, and a light bulb turning on over someone's head. You can also create interactive slide shows, during which viewers respond by pressing designated keys.

Without returning to the Create portion of the program, you can overlay type on any slide, making last-minute changes a snap. This particularly useful feature allows you to create a polished, all-purpose show and plug in text for a specific application moments before the curtain rises. For instance, if you don't know who some visiting VIPs are until they walk in the door, you can quickly enter their names and unveil a personalized presentation minutes later.

Although *Concorde*'s documentation says not to be intimidated by all the commands and effects available in Produce mode, the learning curve in this part of the program is steeper than in Create mode. To supplement the program's documentation, you may want to load *Concorde*'s self-running demos into the Produce portion of the program to study some of the more intricate slide-show maneuvers.

Final Destination

When you get stuck—which may be often in several parts of the program—context-sensitive help is never more than a press of the <F1> key away. But be forewarned: The help screens are sometimes just as terse and cryptic as the manual, which tends to be too streamlined to support a program this complex. Another shortcoming is the lack of a keyboard template; a fold-out reference card is supplied, but it fails to provide what you need to know at a glance. All in all, you wish VCN had taken the time to create documentation as handsome as *Concorde* itself.

For presentation-minded businesses and graphic design services, *Concorde* provides a powerful vehicle for desktop exhibitions. Although the program supports an adequate number of output devices—including the IBM Color Inkjet Printer, the Hewlett-Packard 7475A plotter, and the Polaroid Palette—it fails to address the numerous output devices supported by seasoned performers like *Chart-Master*. Nevertheless, few programs come close to matching *Concorde*'s functionality and even fewer provide the wealth of images that this sophisticated package offers.

Concorde's greatest weakness is its complex command set coupled with laconic documentation. The program's rich advanced features are consequently difficult to learn. But if you're the type who likes to galvanize a small audience with some flash, and you have the time to make it happen, *Concorde* can turn your PC into a captivating performer.

Richard Jantz, a freelance writer and editor based in Berkeley, California, is principal author of Creating the Best Impression: All About Business Graphics Software *(Hayden Book Company, Hasbrouck Heights, New Jersey, 1986).*

VCN Concorde
Visual Communications Network, Inc.
238 Main St.
Cambridge, MA 02142
617/497-4000
List price: $695
Requirements: with CGA 384K, with EGA 640K; two disk drives (hard disk recommended); DOS 2.00 or later version
Copy protected

All the News That's Fit to Download

Need up-to-the-minute news or an occasional glance at a specialized newsletter? NewsNet is a potentially powerful, but pricey, on-line solution.

Judy Getts

Sometimes a single piece of information can mean the difference between checkmating an opponent and being played as a pawn. Independent Publications' NewsNet is an on-line collection of 310 "insider" business newsletters and several major wire services, geared for those who can truly make use of the most current news.

While NewsNet offers a broad range of sources, its price seems high. The service costs $18 to $360 per hour, depending on what you read. That's unfortunate, because otherwise NewsNet could

Paul Meisel

become indispensable to any professional whose information needs match well with what the newsletters on NewsNet provide.

The service attracts mostly business executives and "a lot of tax lawyers and accountants," according to Marcia Cheetham, marketing analyst for NewsNet. Cheetham says that NewsNet currently boasts 13,000 users and that subscribership has grown steadily since the service first went on line in 1982 with only 17 newsletters and limited search capabilities.

The on-line newsletters now span the gamut from *FTC:Watch* to *Mideast Business Digest*. There are newsletters for the aerospace industry—*Japanese Aviation News: Wing, Space Commerce Bulletin, Star Wars Intelligence Report;* energy—*Daily Petro Futures, Utility Reporter;* international business—*Asia Cable, China Express Contracts;* real estate—*Real Estate & Venture Funding Directory;* and investment—*Wellington's Letter, Wall St. Monitor, The Stanger Report*. These newsletters are joined by others on such topics as computers, electronics, insurance, government and regulatory issues, as well as a host of additional subjects. Some of these, NewsNet points out, are not available in print.

The service can help you track government surplus sales or give you tips on your next real estate investment, but don't count on coverage for a highly specialized area without checking first.

Additionally, NewsNet provides gateways to several auxiliary electronic services, including Vu/Text's Vu/Quote stock and commodity quotes, the Official Airline Guides, and TRW's business credit profiles. NewsNet also offers access to Alpha Systems' Business Research and Intelligence Network research services (B.R.A.I.N.), enabling users to contract for information searches of data bases around the world, and the Sports Network for up-to-the-minute scores, team and player statistics, and betting odds.

Entering the Service

Finding your way around NewsNet is a snap. It takes just an hour or two to explore the full system (sans gateways), familiarize yourself with the major functions, and learn the necessary commands. You may be accustomed to on-line services organized like adventure games ("You are entering a long, dark corridor. To your right is a wooden door, to your left a twisting staircase. You feel safe with your magic cudgel . . . ")—if so, NewsNet's format will be a relief.

NewsNet starts off with one main command menu and a main prompt. The menu is displayed only when you press <Enter> at the prompt, which spares you from having to watch the menu scroll over the screen again and again. All of the major NewsNet functions and the gateway services can be accessed at the main prompt (see Screen 1).

There are four primary NewsNet functions: Read, Scan, Search, and Flash. Read enables

you to read the full text of a newsletter, Scan allows you to review just the headlines, and Search lets you conduct a keyword search of any collection of newsletters when defined by such parameters as industry and date.

News in a Flash

Flash, or NewsFlash, is unique to NewsNet. An electronic clipping service, NewsFlash provides considerable flexibility in monitoring numerous subjects and publications.

You set up a keyword profile of up to ten phrases, and NewsNet informs you every day of wire stories and newsletter articles recently added to the system that contain any of the keywords or phrases in your profile. (The timeliness of the stories depends on the source. The wire services are near-instantaneous, but some newsletters seem to take days.)

To set up a NewsFlash profile, you enter Flash at the main prompt. Self-explanatory one-line prompts guide you from that point onward.

The first major step is to enter a service or industry code. On NewsNet, publications and information services are classified by industry. Each industry is assigned a 2-letter code (LA for law, for example), and each publication within that industry is designated by its code and a number (LA05 represents *Lawyers' Micro Users Group Newsletter*). The setup is simple to use, and the industry codes are easy to remember.

For each keyword or phrase you want monitored, you specify either an industry code (if you want all publications within a certain industry searched), a single publication code, or *all* if you wish to search the entire data base. If you enter an industry code or *all*, NewsFlash lets you exclude up to four publications or industries from the search.

Once you've specified the publication search range, NewsFlash will prompt you for a keyword or phrase. The phrase may be up to 70 characters long. If you want NewsFlash to search for articles that use two phrases contained within your key phrase, you connect those phrases with a plus sign. For example, CD ROM + IBM PC will give you articles on CD ROM technology *and* PCs. You can also add an asterisk wildcard character (*) at the end of the phrase so that the search picks up plural forms of the word.

You may change and fine-tune your NewsFlash profile at any time, as often as you wish, without incurring extra charges. Changes go into effect at midnight the day they're made. NewsFlash's search techniques are rudimentary, but you can still rake in more articles—or news "hits" in the network's parlance—than one person could reasonably read in a day.

NewsNet correctly suggests that if you set up a NewsFlash profile, you should log on every day to retrieve your news hits. A maximum of 500 unread hits can be stored in your account at any one time, and if you exceed the limit, the newest ones will be eliminated (the supplier acknowledges that this doesn't make much sense). Also, unread hits are stored for only 14 days.

Once you've established a NewsFlash profile, the system informs you at log-on if you have any news hits waiting to be read and automatically displays their headlines. The headlines are presented in groups of five, and after each group you're asked whether you want to read any of the articles, save them, or continue listing more headlines.

Saving Your Scroll

Several aspects of this arrangement are awkward. For one, it's too easy to inadvertently delete useful news hits. Once a group of five headlines scrolls across the screen, they're deleted automatically unless you issue the Save or Read command. If, for instance, you scroll through two different groups of five headlines, then decide you want to review the first group, there's no way to go back unless you've saved them. Similarly, once you read a hit, it too is gone unless you save it.

Another unfortunate feature of the system is that the NewsFlash Save command is intended as only a temporary holdfast. When you save a story it's shuffled back into the file of hits waiting to be read and treated as though it were a new hit. The next time you log on, its headline will appear on the screen, and you'll need to save the story again in order to preserve it.

This process becomes a nuisance if you log on repeatedly through the day for just a few moments, say to check Vu/Text market quotes, but don't want to read your news hits until later. It would be convenient if a user could maintain separate files of NewsFlash hits and other articles culled from the network. Many on-line services provide such capabilities, but NewsNet doesn't.

Except for the lack of error-checking protocols, NewsNet is

well suited for downloading because text of a hit is displayed in a continuous scroll for capturing. Should you be reading rather than downloading, you've only to press <Ctrl>-S to freeze the screen, <Ctrl>-Q to resume, and <Ctrl>-P to skip the rest of the story and return to the prompt.

You can review and read your hits, not only at sign-on but at any other time, by typing *notices* at the main prompt. This option is helpful if you've been working on line at other tasks and wish to check for any new hits before signing off.

NewsNet Search

NewsNet's Search capability is another exceptionally useful feature. Like NewsFlash, it's initiated at the main prompt. You supply from one to three service or industry codes, list the services to be excluded, type in a publication date range—or simply *latest* if you want only the most recent editions searched—and up to five keywords.

The search methods employed in this part of the system are slightly different from those in NewsFlash. Rather than performing a literal string search, which looks for exact matches of the complete target phrase, the Search function picks out articles in which your keywords show up anywhere in the text, not necessarily next to one another. Also, the word *or* can be placed between keywords to locate articles which contain just one of your keywords. Screen 2 shows a search in progress.

NewsNet searches may take minutes or hours, depending on

```
At any time, touch <RETURN> for assistance,
or type HELP for detailed instructions.


Enter command or <RETURN>
-->

*** COMMAND MENU ***

READ.....Read full text                TRW......Business credit profiles
SCAN.....Scan headlines                QUOTE....Stock and commodity quotes
SEARCH...Search for keywords           OAG......Official Airline Guides
FLASH....Update NewsFlash profile      SPORTS...The Sports Network
HELP.....Detailed instructions         CMLS.....Computer Listing Service
PAGING...Display one page at a time    BRAIN....B.R.A.I.N. research services
PROJECT..Track your online time        MAIL.....To publishers or NewsNet
LIBRARY..Low-cost browsing             ORDER....Print subscriptions
BACK.....Return to previous prompt     PRICES...Complete price list
QUIT.....Return to main prompt         INFO.....Information on services
OFF......Sign off                      LIST.....Services by subject category


Enter command or <RETURN>
```

Screen 1: NewsNet's main menu. Normally the menu is not visible, but pressing <Enter> at the main prompt displays it.

```
Enter command or <RETURN>
-->search

Enter a Service Code, BACK, QUIT, or HELP
-->IV

Enter LATEST for the latest issue, or other date options
-->7/1/86-latest

Enter Keyword(s)
-->Ginnie Mae*
.........................!.....................
.........
     4 Occurrences

Enter HEAD for headlines, TEXT for full text, ANALYZE for occurrences in each
service, BACK for new keyword(s)
-->head

  1)  7/ 1/86  FI10   AMERICAN BANKER
    Sen. Alfonse D'Amato questioned the legality of letting banks
    underwrite collateralized mortgage obligations.

  2)  7/ 2/86  FI10   AMERICAN BANK
```

Screen 2: A NewsNet search in progress. Search parameters are entered in sequence according to the prompts: IV for investment publications, the publication date range, and the keywords Ginnie Mae* (the * wild-card character has been added to include plurals). As the search progresses, strings of ellipses and exclamation points are displayed. Each ellipsis represents a completed search of a publication, and each exclamation point denotes a publication in which one or more occurrences of the keywords have been found. After the command Head is entered, a list of headlines for articles containing the keywords begins scrolling across the bottom of the screen.

the number of publications searched, the range of dates, and the length, even the arrangement, of the keywords. To save time, the search should exclude irrelevant publications and those with encyclopedia-length contents that may not be applicable.

Although it's hard to generalize about how long searches take, single keyword searches of all the latest newsletters in a particular industry usually take less than 2 minutes. Searches with a keyword that include a wild-card character take longer, as do those with multiple keywords. Searches that include all the publications in a given industry published over a six-month period or longer can take from 10 minutes to over an hour.

Once a search is completed, you can analyze the hits—have NewsNet break them down by publication (see Screen 3), sort them from newest to oldest, and list their headlines. You can preview a story's first 18 lines or display the full text (see Screen 4). There's no way to save stories, but unlike NewsFlash, the system is set up so that you may review stories and the full headline list as often as you wish without losing them. As with NewsFlash, stories are displayed by the Read command in a continuous scroll, and you're limited to 500 hits.

```
-->back

Enter HEAD for headlines, TEXT for full text, ANALYZE for occurrences in each
service, BACK for new keyword(s)
-->analyze

    *** NEWSNET SEARCH ANALYSIS  THU, 31 JUL 1986   20:32:35 ***
    ============================================================

    KEYWORDS            CATEGORIES          DATE RANGE
    ********            **********          **********
    GINNIE MAE*         IV                  7/1/86-LATEST

  CODE        NEWSLETTER NAME                    OCCURRENCES
  ====        ===============                    ===========

   FI10     AMERICAN BANKER                            4

   TOTAL    OCCURRENCES  .........................     4

Enter HEAD for headlines, TEXT for full text, ANALYZE for occurrences in each
service, BACK for new keyword(s)
```

Screen 3: An analysis of the articles located by the search in Screen 2 breaks them down by publication.

```
Enter Headline numbers to read, PREVIEW, AGAIN, BACK, STOP, QUIT, or HELP
-->preview 4

Copyright
AMERICAN BANKER
Tuesday   July 29, 1986

  4)
Lower interest rates reversed a two-month decline of debt offerings
by financial services firms.

FALLING INTEREST RATES SPUR DEBT, EQUITY ISSUES
          By KENNETH J. HICKS
    NEW YORK - Falling interest rates in June reversed a two-month decline
of debt and equity offerings by financial services firms, with the dollar
volume increasing more than 40% from May.
    Banks and thrifts, which led declines in May, led the return to the
capital markets, each increasing the dollar amount of debt and equity
issues by more than 200%.
    June debt offerings totaled $19.7 billion, compared with $13.9 billion
in May, a jump of 41.5%. The total for June exceeded the previous high for
1986 of $19.2 billion, set in March. For the first six months of this
year, financial companies
```

Screen 4: A preview of an article from American Banker showing the first few paragraphs of an article found by the search

Common Commands

One laudable feature of the system is that no matter where you are within NewsNet, the commands remain unchanged. The Read function operates the same whether you're reading hits obtained in a search or accessing individual publications at the main prompt. That's also true of the commands for navigating around the system, such as Back, which returns you to the previous prompt, and Quit, which takes you to the main prompt. That commonality and the small number of commands make NewsNet a breeze to learn and use.

The service has few bells and whistles. It does offer a paging function that allows you to read a story in 24-line "pages" and to skip backward and forward through the text. (Unfortunately, that feature doesn't work in NewsFlash.) Among other options, you can stack commands

and type ahead. You also can set up a function that tracks amounts of time spent on line for particular projects—although you don't get that information until your monthly bill arrives in the mail.

In addition, NewsNet features an on-line library that contains a sample issue of each newsletter, designed for low-cost browsing. You can examine any of the newsletters without being billed lofty surcharges. And you can send electronic mail to the publishers, obtain information on newsletters, and order subscriptions.

If you're accustomed to on-line services organized like adventure games, NewsNet's format will be a relief.

The only technical glitch I encountered was NewsNet's frequent inability to recognize the command to display a story. The problem could usually be remedied by entering the command over and over until the system finally acknowledged it. A few other minor facets could use some polishing. On-line help and information files lead this list, although the printed documentation is superb.

But NewsNet's greatest disappointment is the limited accessibility of its wire services. While the network bundles in a number of top-flight daily news services—including United Press International, Associated Press Data Stream, Reuter News Reports, and Tokyo's Jiji Press Ticker Service and Kyodo English News Service—they're available only through NewsFlash. You can't use the Search command to hunt through their contents, nor can you use the Read command at the main prompt to scroll through stories. In short, you can't indulge in "information-gathering by wandering," often the most fruitful information search method of all.

Paying the Price

Finally, NewsNet's price structure seems exorbitant compared to such full-fledged data bases as Lockheed's Dialog. The service charges a basic prime-time connect rate of $24 an hour for 300 bps. That figure doubles for 1200 bps and triples for 2400 bps. On top of that come fees for time spent reading excerpts from individual newsletters, be they obtained directly, through NewsFlash, or through a search. (If you already subscribe to a newsletter, you're billed at a lower rate than nonsubscribers.)

Some newsletters, such as the *Investext* series published by Business Research, are free for subscribers to read on line, but cost as much as $96 an hour for nonsubscribers. Like the basic connect rate, that surcharge doubles at 1200 bps and triples at 2400 bps. NewsNet also asks for a monthly subscription fee and bills you for accessing the wire services and for each NewsFlash hit.

The trick to making NewsNet affordable is to get on and off as quickly as possible and to download information rather than read on line. NewsNet is organized to let you accomplish tasks quickly if your session is planned in advance.

During one typical 11-minute session at 1200 bps, I was able to review headlines for a dozen NewsFlash hits and download five, conduct a keyword search of all newsletters in the telecommunications category, and download my one hit. Calculating the basic access charge, reading fees, NewsFlash surcharges, and so on, the cost came to $18.04. NewsNet's specialization in newsletters does indeed fill a niche in the on-line information world, but only if its cost drops will it ever gain widespread appeal.

Judy Getts is a freelance writer in Wauwatosa, Wisconsin, who specializes in telecommunications topics.

NewsNet
945 Haverford Rd.
Bryn Mawr, PA 19010
800/345-1301, 215/527-8030
Pennsylvania
Cost: No sign-up fee; subscription fee $15 a month; basic connect charge weekdays 8 a.m. to 8 p.m. EST $24/hour 300 bps, $48/hour 1200 bps, $72/hour 2400 bps; nonprime time and weekends $18/hour 300 bps, $36/hour 1200 bps, $54/hour 2400 bps; each NewsFlash hit 37 cents; other additional read rates and access fees vary; Tymnet, Telenet, and Uninet prices included

Function Follows Forms

Anthony Russo

Still searching for that perfect balance of power and simplicity in a data base? If you like your queries menu-driven and you're willing to sacrifice some high-end clout, DataEase may end your quest.

Jonathan Marshall

With a mandate to be all things to all people, relational data base programs have a tough row to hoe. You have to have high-powered query features, but you also need quick-and-dirty reports, plus an easy way to set up record entry forms. And if you tie multiple files together for a complex report, sorting a few thousand records to get the data you need shouldn't take from here to eternity.

Software Solutions' *DataEase* covers these bases with varying

success, offering acceptable speed, menu-driven reporting, a somewhat awkward query language, and one of the most congenial user interfaces around. The program recognizes up to 26 different data bases, each of which can hold 255 files, which in turn are composed of as many as 65,535 records apiece—a capacity that should satisfy most users for a long time. And with beefed-up reporting capabilities, expanded help messages, and improved performance, the $50 upgrade to version 2.5 should lure many already-satisfied users.

DataEase lives up to its name with a flurry of menus that guide you through virtually every program operation. Unlike menu structures that lose you in a maze, *DataEase*'s menus guide you to the task at hand and in some cases step out of the way of experienced users. Nevertheless, data base programmers may well find the program's query language awkward and lacking some functionality when compared with *dBASE*. *DataEase* supplies a good-sized chunk of power to lay users, but it's not designed to be a programmer's tool.

Menus for All Occasions

DataEase comes on two disks, neither of which is copy protected. To run the program on a hard disk, you just fill a new subdirectory with approximately 500K-worth of files and change the default drive specification to C:. Because the program maximizes its performance by holding as much data as possible in RAM, it thrives on 640K, although it can make do with 384K.

Like an accounting package, *DataEase* demands a name and password before you can enter the program. *DataEase* has one of the most extensive gatekeeping features around, with seven separate levels of security. Through a menu-driven procedure, the system administrator designates the menus, data bases, files, records, and fields accessible on each security tier. Because the program lacks local area network support, however, few users are likely to exploit the entire range of security options.

One particularly engaging feature is *DataEase*'s menu-driven procedure for creating custom-made menus. Unlike with *dBASE III Plus*, you don't have to get down to the command level to set up new menus for specific users. Instead, you fill in a form that offers all the fields necessary for menu setup, including the security level required for access (see Screen 1). Menus can have as many as nine options, and descriptions for each option can be up to 44 characters long.

After you sign on to *DataEase*, the master menu appears—unless a special menu has been defined for your security level. All of *DataEase*'s own menus appear either as full screens or as a line of prompts just above the work area. Above the prompt line, a status line supplies a brief description of the task at hand. A line showing function key assigments—which occasionally change from menu to menu—appears at the bottom of the screen. On the master menu, you'll also see the data base name, the date and time, and the designation of the disk drives holding the program and data.

Seven options make up *DataEase*'s master menu, the last four of which contain auxiliary and customizing features (see Screen 2). Once *DataEase* is set up, few users will need to go beyond options 2 and 3, which enable you to enter and view data as well as to access most of the program's reporting features. Before you hand *DataEase* over to data entry personnel, however, you need to roll up your sleeves, select option 1, and begin designing the forms that define file and record structures.

The form is the program's linchpin, in the same way that the table represents Paradox's *fundamental data structure.*

Forms Beget Forms

When you create a *DataEase* record entry form, you're arranging fields like building blocks, constructing the basic pattern that all records in a file must match. The form is the program's linchpin, in the same way that the table represents *Paradox*'s fundamental data structure (see "A Most Ingenious Paradox," *PCW*, March 1986). *Paradox*, however, ties record entry forms to its underlying tables; in *DataEase*, the person who sets up the data base and runs reports is dealing with the same metaphor as data entry personnel.

Creating a record entry form is a simple but rather time-consuming task. After you name a new form, you face a blank work area headed by a cursor row/column indicator. At the location of your choice, you type in a field name and press <F10> to call up a menu prompting you for that field's characteristics. This list of questions is extensive, although you can bypass some prompts and accept default values from others to expedite the definition process.

For all fields, you must specify a maximum field length that can be up to 255 characters. *DataEase* also makes selecting a field type mandatory, offering choices that include text, numbers, numeric strings (such as part numbers), the date, the time, a dollar figure, and a phone or social security number. You can set up a field to allow just yes or no answers, have the field accept only one of several options that you define, or make filling out certain fields compulsory.

DataEase automatically configures fields to accommodate data conforming to the field type and to reject entries that violate the field definition. If you fail to put data into a field where an entry is required, enter data outside a specified numeric range, or put duplicate data into a "unique" field (such as an employee ID number), the program politely but firmly calls attention to the error.

An unbroken line of data may actually hold two or more fields. Thus the first 2 digits of an invoice number might correspond to the state, the second 2 to the store number, and the remaining 6 digits to the invoice series. In addition, some fields accept no data at all, instead taking on a default value, the next value of a series, or a calculated value based on data in other fields. These derived fields can also be designated as lookup fields, which automatically pull data from another file into a form.

Lookup fields are the backbone of *DataEase*'s relational capabilities. When you create a form, identifying a lookup field requires entering a simple formula comprising the names of the form and the source field from which you want to extract data, and any calculations you want performed on the imported data. However, the relationship between these fields is cemented in a separate procedure using a Relationships Form (see Screen 3). This input screen enables you to tie as many as three fields in a form to the same number of fields in another form.

Unlike defining lookup fields, establishing indexed fields takes place entirely within the form creation process. This is a convenient approach—until you want to alter your indexing scheme. Then you have to go back and change the form with yet another menu-driven routine, which is ultimately more time-consuming than the separate indexing procedure offered by the *dBASE* family. In keeping with the program's form-centered structure, any form modifications are immediately reflected on all existing records.

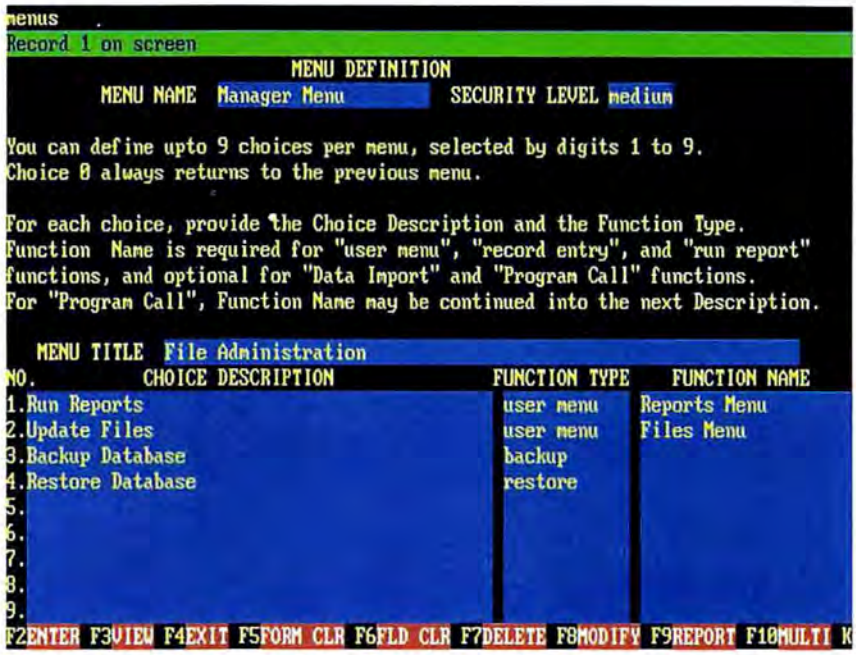
Theoretically, *DataEase* lets you specify an unlimited number

of indexed fields within each form. This would seemingly place the program head and shoulders above many of its peers, enabling *DataEase* to sort and retrieve records at lightning speed. But when you exceed about five indexed fields, index files begin to eat up large chunks of disk space, data entry slows noticeably, and the time it takes to open and close files also increases. To help you weigh the trade-offs involved, Software Solutions provides a sensible guide to indexing limitations in the manual.

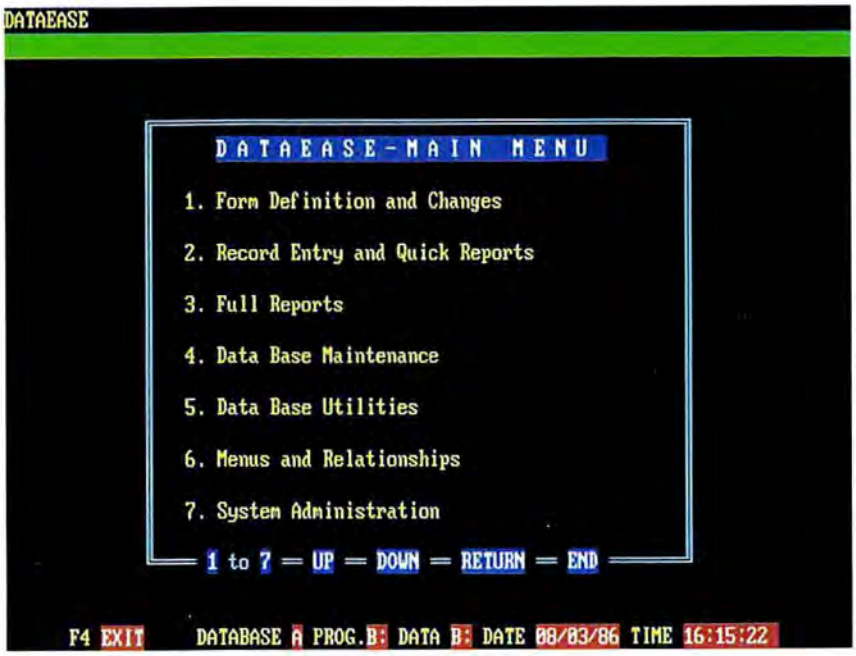
Breaking Into Reporting

Once you've poured information into *DataEase*'s forms, you can tap into the data base through either the data entry or the reporting function. If you're immersed in a data entry session, you can flip through records without returning to the main menu to select another option. And if you want to search for the next record containing a specific entry, you just type the entry into the appropriate field on a blank form (*DataEase* accepts wild cards) and press <F3>.

For anything beyond viewing or searching for a few records, you need the program's reporting functions. In *DataEase*, reports come in two flavors: quick reports and full reports. Quick reports use blank record entry forms for setting up relatively simple listings. Full reports give you access to the program's high-level reporting functions, enabling you to use the DataEase Query Language (DQL) for such weighty tasks as batch posting or transaction processing.

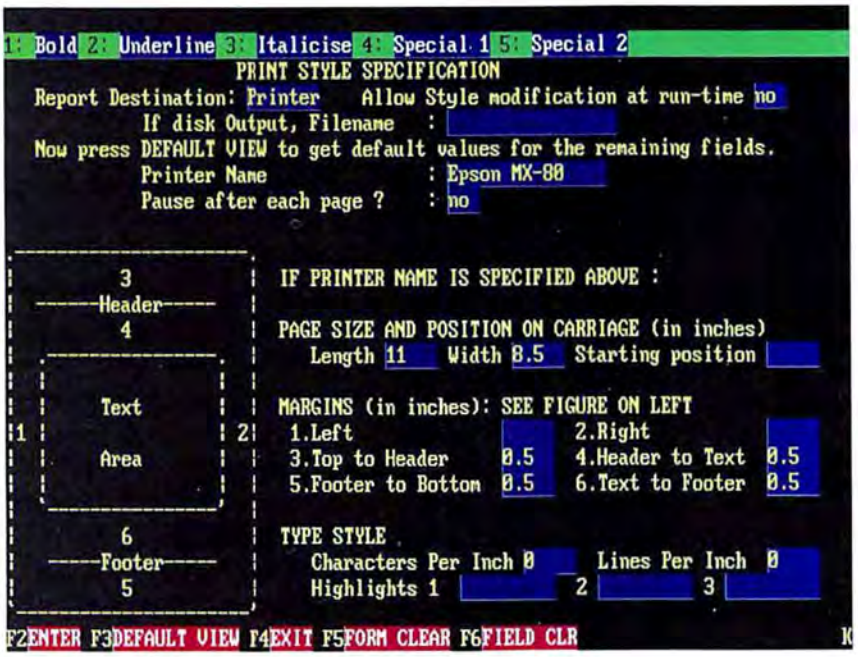


Screen 1: Unlike many other data base packages, DataEase makes setting up custom menus almost as easy as creating record entry forms.



Screen 2: Of the items on DataEase's main menu, the record entry and reporting options are most often exercised.

Screen 3: Relationships between files are established outside the pivotal form definition procedure.



Screen 4: The closest DataEase gets to a graphics display is the Print Style Form, used for final formatting before sending a report to the printer.

Quick reports go through four stages. On an extra line at the top of the basic record entry form, you begin by specifying any record selection criteria. At this point you tell *DataEase* if you want to include all records matching a value or range for a given field. You can also specify constants, calculations, functions, or field names within the current file or in related files.

Next you define the order in which you want field data and which (if any) statistical operators you want to include. *DataEase* lets you pull in data from other files, provided a predefined relationship has been established between form fields using the Relationships Form. If you want procedural capabilities or multiple selection criteria, however, you'll need to run a full report.

The third and fourth stages of quick reporting are for determining the way data will appear on screen or in print. Both quick reports and full reports employ the same procedures, beginning with a choice of basic report formats. The default formats are basic columnar or field-per-line affairs, but you'll want to go beyond these options for anything more than a simple query. The basic formatting options and printout refinements give you a wide range of custom-reporting capabilities, including variable margins, headers, footers, italics, underlining, and lines and characters per inch.

Powerful they may be, but *DataEase*'s formatting and printing functions can snare you in a web of *WordStar*-like dot com-

mands. Even with those ever-present menus to guide you along, you'll need to learn a number of formatting commands if you want to do any extensive customizing, and report layouts often need a fair amount of editing to achieve an attractive presentation. Unless your report is a one-shot deal, you'll want to save the format for later use.

Because they are taken from query statements, column headings tend to be particularly unwieldy. In other words, you need to edit such mouthfuls as "Amount-(any Employees Commission Rate*Amount)" to read "Margin after Commission." Columns don't always line up correctly, and cleaning up such inaccuracies requires quite a few interim steps. At the final phase of printing a report, the program provides a screen to help you lay out the page (see Screen 4).

Even if you choose a default format, *DataEase*'s addiction to forms and menus can sometimes get in the way of obtaining basic information. For example, if you want a basic list of records in tabular form with the field names listed at the top of the screen, you must go through the step-by-step quick-report process. Although this may take only a minute or two, you'd be better off entering a couple of DQL commands to get what you want.

Heavy-Duty Reports

DataEase's full reports add high-end procedural capabilities to the program's basic reporting functions. When you define a full report, *DataEase* prompts you with a series of multiple-choice questions, the answers to which yield a program that grabs the data you want. In other words, you don't need to learn an intricate command syntax to create complex reports. For those who think of data base programming as a variation on the Spanish Inquisition, *DataEase*'s fill-in-the-blanks approach should come as a pleasant surprise.

Unlike quick-report querying, full-fledged reporting enables you to set up a form designed specifically for entering last-minute data. In a sense, this form takes the place of *dBASE*'s GET statement, which enables you to pull in data right before running a program. Defining a form, however, is considerably more time-consuming than *dBASE*'s command-driven method and ultimately reduces reporting flexibility. As with most other *DataEase* operations, you must go back and edit the form to change the type of information that you can enter.

DataEase *lives up to its name with a flurry of menus that guide you through virtually every program operation.*

Whether or not you've defined a report data entry form, you're likely to find *DataEase*'s array of query options impressive. The menus enable even neophyte users to exploit the extensive set of DQL commands, which the program divides into low and high levels. The latter group offers additional calculations, batch update functions, nested record selection, and the ability to rename data relationships. Either set of functions may be applied to any field in a form.

Among the specialized capabilities offered by the high-level mode are a full selection of arithmetic, exponential, trigonometric, and financial functions. Date and time functions, as well as functions that spell out numbers, currency, dates, and the like, are also supported. Text string functions enable you to choose any number of characters or words in a string and join strings together. *DataEase* supports both the 8087 and 80287 math coprocessors to speed up numerical operations.

The high-level query language also lets you establish relationships between fields in different files on an ad hoc basis. These links differ from those that are predefined using the Relationships Form, in that you can establish any number of relationships, opening the door to intricate field matrices for complex reports. Relationships set up during reporting are only valid for that query and have no effect on the underlying data base structure.

When setting up a query, you can use predefined relationships to flesh out a report. For example, say you want to run a report listing all male employees making

Table 1: DataEase's performance rivals that of dBASE III and dBASE III Plus.

Test[1]	dBASE III version 1.1	dBASE III Plus	DataEase
Adding records			
100	0:17	0:19	0:07
1000	3:03	3:28	1:20
10,000	48:20	52:53	14:05
Indexing			
100 (one index/two indexes)	0:03/0:03	0:02/0:02	0:04/0:04
1000 (one index/two indexes)	0:29/0:40	0:09/0:10	0:35/1:00
10,000 (one index/two indexes)	5:40/6:29	1:51/2:17	11:49/26:20
Locating the last record			
100 (one field/two fields)	0:01/0:01	0:01/0:01	0:01/0:02
1000 (one field/two fields)	0:07/0:12	0:07/0:09	0:12/0:13
10,000 (one field/two fields)	1:07/2:03	1:06/1:38	2:00/2:03
Counting			
1000 variables: x	0:15	0:17	0:07
1000 variables: counter	0:18	0:20	0:08
Substring search			
1000	0:06	0:07	0:18
10,000	1:08	1:14	2:58
Replace all			
100	0:04	0:01	0:03
1000	0:21	0:21	0:39
10,000	6:08	6:08	6:48

[1]Tests were performed on the PC's Limited AT with a 6-MHz 80286 microprocessor, 1MB of RAM, and 40MB Seagate voice-coil drives. Note that no comparative sorting figures are given. dBASE III automatically creates indexes as part of its sorting procedure, while DataEase relies on already established index fields, rendering a point-for-point comparison invalid.

over $20,000 a year, in alphabetical order and grouped by marital status. You've already used the Relationships Form to specify a relationship between two department code fields: one in the employee file and one in the department file. In addition, when you first created the employee form, you made the department code and the name of the manager related fields. If you decide you want to add the name of the department manager to your report, you simply add the "any" operator as follows:

```
for Employees with Sex = Male and
   Salary > =20000 ;
list records
   Married in groups ;
   Name in order ;
   any Department Manager
```

Beginning users will likely rely on *DataEase*'s relentless prompting to guide them through DQL programming. Veterans can turn off these menus—a blessing, since you're presented with dozens of options for almost every report. A simple "list records" statement, for example, is far more convenient than even a quick report, let alone an unabridged round of full-report prompts.

For more complex freehand programming, however, even the most zealous user may find the idea of learning a new query language daunting. DQL is just as complicated as *dBASE* and reveals a number of quirks. For instance, it demands a space before periods and semicolons at the end of some programming lines, and the documentation is short on basic syntactic rules. Moreover, you'll find DQL lacking the equivalent of certain *dBASE* commands, notably macro substitution. Unless learning a data base language is your idea of a good time, you might as well stick with the menus for anything over a few lines of code.

The Workaday Performer

Thanks to unlimited indexing and the program's penchant for using all available RAM, *DataEase* runs at a respectable clip, especially when counting or adding records (see Table 1). *DataEase* augments its performance by setting aside memory as a cache buffer, which automatically expands or contracts depending on your needs. Although it uses RAM whenever possible, *DataEase* routinely swaps data back to disk, reducing risk to your hard-earned data. And so you won't be cut off from the rest of the software world, *DataEase* exports data in DIF, *MultiMate*, and *1-2-3* formats.

In some cases, *DataEase* promises more than it delivers: The documentation's claim that report formatting is one of the easiest aspects of the program is particularly specious. Moreover, the manual asserts that you can call up other programs from within *DataEase;* this works fine with a DOS command, but actual applications run only intermittently.

All of *DataEase*'s capabilities are explained in a well-illustrated 300-page reference manual, a 32-page quick reference guide, and a lengthy tutorial that includes both a disk and a manual. The tutorial does an admirable job of covering the program's highlights, using sensible examples in a generally lively presentation. The reference manual, however, is sometimes annoyingly vague and suffers from both obscure terminology and a preponderance of conventional data base jargon.

At $600 list, *DataEase* isn't a cheap remedy for anyone's data base problems, and it would be the wrong solution if all you needed was a simple electronic file. The best environment for *DataEase* is one in which several people will use the program (although the lack of network support makes this a bit paradoxical). Far from needing an application generator, *DataEase is* an application generator, backed up by an eminently accessible group of functions. *DataEase* may not have the most powerful querying features on the block, but it carries more than enough weight for all but the most ambitious reporting needs.

Jonathan Marshall is a freelance writer and editor of the Oakland Tribune*'s Editorial Page. Benchmarks were performed by The Lambda Group, a San Francisco consulting firm specializing in the integration of PCs in business.*

DataEase
Software Solutions, Inc.
12 Cambridge Dr.
Trumbull, CT 06611
203/374-2825
List price: $600
Requirements: 384K, hard disk, DOS 2.00 or later version

Accelerate!

Compared to the brisk beat of the AT, computing at the PC's torpid tempo is sheer frustration. But don't deep-six your machine just yet—with an 80286-based accelerator board, you can snatch your PC from the clutches of its mid-life crisis.

Robert Nusbaum

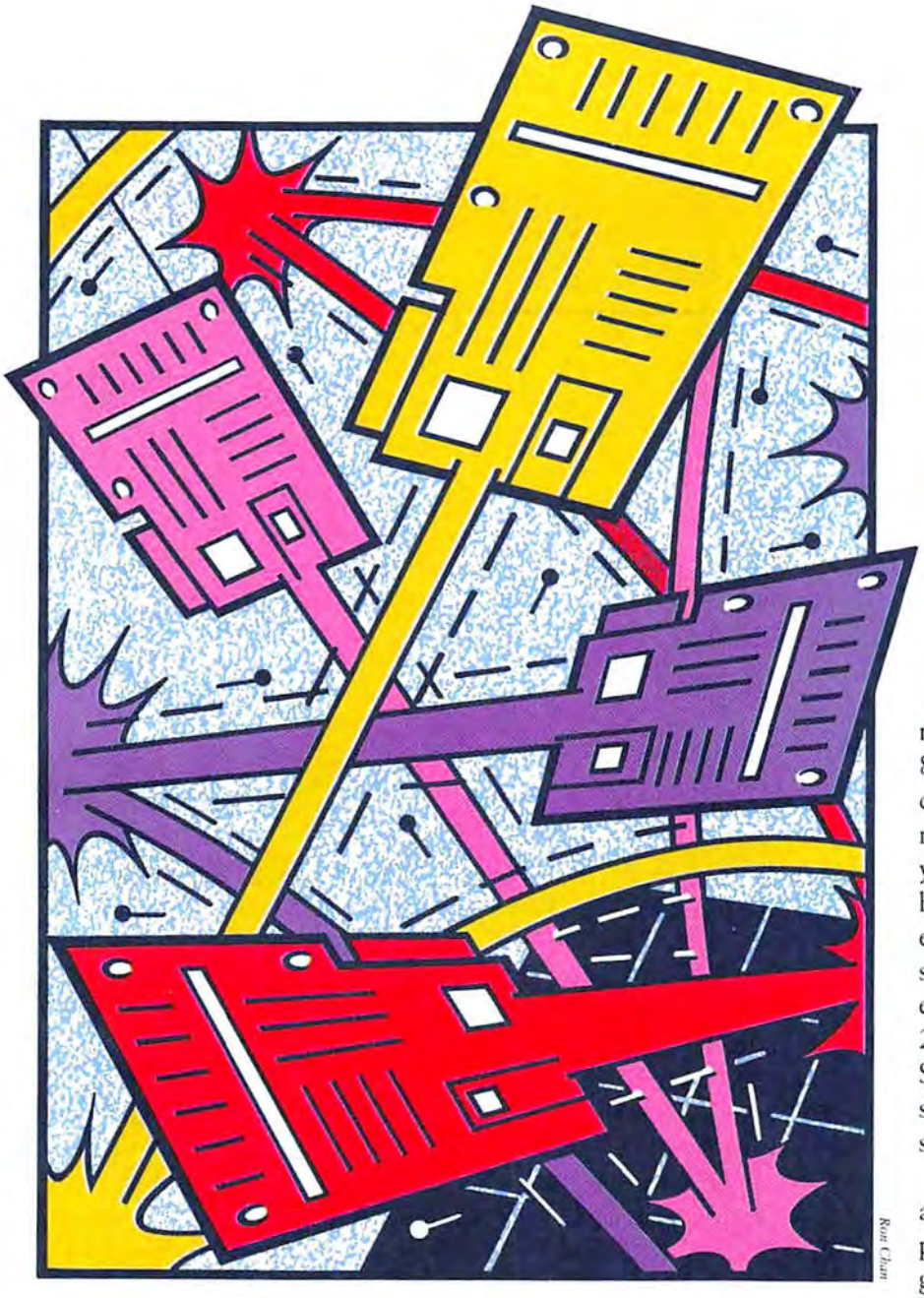
After using an AT, returning to a PC—even with a hard disk—is like sprinting under water. Ever since IBM popped the cork off the 8-bit bottleneck two years ago with the release of its 80286-based AT, speed lust has infected PC users. The cure has arrived in the form of "accelerator" boards built around the same 16-bit 80286 microprocessor used in the AT. Four representative units are reviewed here: Orchid Technology's PCturbo 286e and Tiny Turbo, PC Technologies' 286 Express Card, and Classic Technology's 286 Speed Pak.

When you slap one of these boards into a PC, concerns about cost-effectiveness and increased productivity take a backseat to the sheer exhilaration of cranking up the venerable PC to breakneck speed. Your tired applications are rejuvenated, and the more-megahertz-than-thou power-user down the hall is for once at a loss for words. Your pokey word processor's scrolling zips, and spreadsheet recalculations are done in what seems like nanoseconds. Besides having fun, you just might get more work done.

But can you justify the price of admission to AT-like processing? The boards reviewed here are priced from $500 to $1200. An accelerator board won't boost your hunt-and-peck typing or necessarily speed up disk-intensive programs. If you only recalculate that monster worksheet once a month, the price may be too high for the convenience gained. However, if you spend more than a couple of hours per day in front of the screen, a speed fix may be in order.

Fast Chips

In keeping with the dictum that faster is better, all of the reviewed boards sport a speedier 8-MHz version of the PC AT's 80286 (see Table 1). However, most of the boards run the chip at 7.2 MHz—a clock rate that more easily synchronizes with the PC's slower 8088 microprocessor. This apparent design compromise is no compromise at all for the manufacturers, because it saves money on expensive support circuitry.



Ron Chan

And it's one reason why Orchid Technology's PCturbo 286e, which runs the chip full-tilt, is the priciest board of the bunch.

Another reason is that the PCturbo 286e can work in the AT or compatible systems, while the others are limited to boosting the processing fortunes of the PC, XT, and compatibles. Don't expect to use the 286 Express Card, Tiny Turbo, or the 286 Speed Pak in either a Compaq Deskpro or an AT&T 6300, both of which rely on the 8086, the 8088's faster sibling. Some PC compatibles that feature a faster 8088 (known as the 8088-2) may also have difficulties with an accelerator board.

Like the AT, all four boards include a socket for an 80287 math coprocessor chip, which greases the processing skids for *Framework*, *1-2-3* release 2, *Symphony*, and a host of other programs. If you set a jumper, a board can accept either a 5-MHz 80287 or the more expensive 8-MHz version.

However, the 8087 coprocessor normally paired with the PC's 8088 cannot be used with an accelerator board and must be removed—a point to consider if you've already invested several hundred dollars in the chip. An empty 8087 socket can also emit signals that interfere with an accelerator board's operation. Only the 286 Express Card and the 286 Speed Pak come with the necessary noise-suppression plugs that slip into the socket.

Accelerator boards, of course, are designed to put your PC in the processing fast lane. But how they get it there varies. When you install the 286 Express Card, you must pluck out the PC's 8088 and pack it away for posterity. (See the sidebar "Brain Surgery" for more information on the 8088.) The board essentially becomes your system's primary processor, performing all processing and controlling input and output tasks for disk drives, printers, the keyboard, the display, and other peripherals.

Table 1: Accelerator board features compared to the PC and the AT

Computer	Processor clock rate	Power use (watts)	On-Board RAM	Replaces 8088	80287 socket	Memory cache	Software supplied	Retail price
IBM PC (8088)	4.77 MHz	N/A	256K	N/A	no	no	no	$1995
IBM PC AT (80286)	6 MHz	N/A	256K	N/A	yes	no	no	$3295
PCturbo 286e	8 MHz	13-17.5	1MB	no	yes	no	yes	$1195
286 Express Card	7.2 MHz	7.5	no	yes	yes	yes	no	$595
Tiny Turbo	7.2 MHz	7.0	no	relocated	yes	yes	no	$695
286 Speed Pak	7.2 MHz	15	1MB	relocated	yes	no	yes	$995

The other accelerator boards more or less take on the role of coprocessors; the PC's 8088 (which stays in its socket or is relocated to the accelerator board) continues to perform I/O operations, but all processing tasks fall to the 80286.

RAM Overboard?

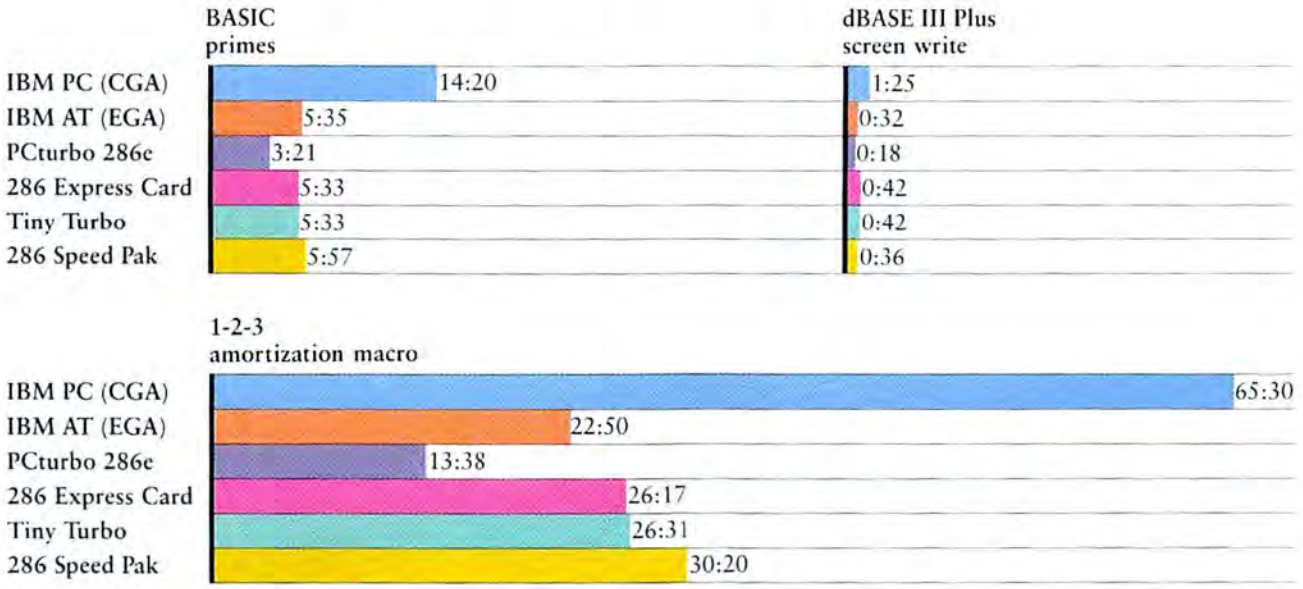
An 80286 feels right at home in an AT because both are 16-bit devices—they deal with data in 2-byte chunks. But when you put an 80286-based accelerator board in a PC, its potential performance is hampered because the PC's memory chips, disk drives, and other components transport data 1 byte at a time. How each board overcomes this limitation not only affects performance but determines the fate of your existing investment in RAM.

There are two approaches to tackling the problem. The 286 Express Card and the Tiny Turbo replace the 8088 with a special plug connected to the accelerator board, permitting more direct access to system circuitry. Both use the PC's installed RAM, but because feeding data to an 80286 a byte at a time defeats the chip's purpose, both boards come with 8K of high-speed RAM, which acts like a memory cache.

In this caching scheme, data is read from the PC's slower memory into the 8K, where the 80286 works on it 2 bytes at a time. This procedure effectively doubles the amount of data fed through the CPU and allows the 80286 to perform at nearly full speed. Of course, continually fetching data, putting it into the 8K cache, and pausing while the PC's memory is accessed slows things down a bit, but disable the cache and performance slumps noticeably.

The 286 Speed Pak and the PCturbo 286e take the high road (read: expensive) by carrying 1MB of their own high-speed RAM. The 286 Speed Pak replaces the 8088 and moves it to a special socket on the board. More important, the 286 Speed Pak ignores memory already installed in the machine, except for the first 256K on a PC or 64K on an XT, which are used in part by the board for data transfer, loading programs, and other operations. If you've filled out your system memory to 640K or, worse still, paid a premium for an enhanced expanded memory specification (EEMS) board such as RAMpage, your investment is useless. When you own a 286 Speed Pak, breaking the 640K barrier means buying an EMS board such as Intel's AboveBoard or Classic's $995, 2.5MB Shadowboard. The PCturbo 286e, on the other hand, doesn't make existing RAM obsolete or compel you to remove the PC's 8088. In turbo mode, the

Figure 1: Results of the accelerator board benchmark tests (in minutes and seconds)



board runs DOS and applications in its faster complement of memory, while the 8088 handles system I/O for disk drives, the keyboard, and other peripherals. The board can access any device (including RAM disks), and you can use the PC's standard memory for RAM disks, caching, or print spooling. (You can also slap a 1MB memory module onto the board and dedicate all space above 640K—nearly 1.4MB—to expanded memory.) Toggle the turbo mode off, and the 8088 and its faithful but slower RAM come to the fore. In some ways, the PCturbo 286e acts like an independent computer that's dropped by and borrowed a slot. One advantage to this setup, as we shall see, is that the 8088 and the PCturbo 286e can work side by side, enabling the PC to run two programs at the same time.

Time Trials

Three benchmark tests compare the performance of a 512K PC and a 512K PC AT versus each board installed in a 512K PC (see Figure 1). These tests measure typical microprocessor activity, exclusive of disk accesses.

The first test is an interpreted BASIC program that computes and displays all the prime numbers from 1 to 1000. This test is processor-intensive and requires each board to use the PC's built-in BASIC routines in ROM—a fair test of a board's ability to interact with the PC's I/O channels.

The second benchmark gauges screen writing speed by incrementing and displaying 1000 iterations of a *dBASE III Plus* macro expression. This test reveals how quickly each accelerator can slap information onto the screen.

The third benchmark measures the time it takes a 28-line *1-2-3* macro to generate a 30-year amortization table (adapted from "/X Marks the Macro," *PCW,* Vol. 2, No. 3). The macro accepts input for principal, interest, and term; calculates monthly payments, balances, and other totals; and, finally, generates a formatted amortization schedule by period. It then creates a range, tests it against the total number of payments, and deletes it before looping back to the cell positioning routine.

Speed, of course, is the name of the game. But there are other features and foibles to consider before parting with your greenbacks.

PCturbo 286e

Orchid Technology's PCturbo 286e is a full-length board with 1MB of high-speed RAM and room for an 80287. You plug the board into the back of a PC like any other expansion

board—you don't have to lobotomize your machine by removing its 8088 microprocessor. You do, however, have to set up the system with an Orchid-supplied menu-driven installation program. The program creates PCturbo 286e versions of the AUTOEXEC.BAT and CONFIG.SYS files (called TURBEXEC.BAT and TURBO-.SYS), and modifies the system's existing AUTOEXEC.BAT file so that you can switch from 8088 to 80286 mode (even in the middle of a program) with a few keystrokes. When the PC is restarted, it asks if you want to "Turbocharge." Answer no and the system remains in 8088 mode. Answer yes and DOS is copied into the board's RAM and the processing reins are handed over to the 80286. Anytime you want to switch back to PC mode, exit to DOS and type UNTURBO. To return to high-speed computing, merely type TURBO, and the PCturbo 286e is off and running. You can also install the system to run in 80286 mode automatically. A new utility supplied by the company, *Turbo* 1.22 (unavailable for review), reportedly runs applications simultaneously in the PC's standard memory and the PCturbo 286e's RAM and can switch between modes when you press a hot-key combination such as <Alt>-<GrayPlus>.

Having copies of DOS in both the PC's standard memory and the PCturbo 286e's high-speed RAM presents some interesting opportunities for parallel processing—and some possible dangers. For example, you could load *WordPerfect* and several memory-resident programs into the PC's standard memory while *1-2-3* thrashed through a massive recalculation in the PCturbo 286e's memory. The risk, of course, is that both programs will try to do the same thing simultaneously—write to the same disk sector, display data, print a file, and so on—and mangle your data. The way to avoid such conflicts, according to Orchid, is to run programs from separate disks (say, *WordPerfect* from a hard disk and *1-2-3* from a RAM disk) and keep programs that write directly to the screen under the governance of the PCturbo 286e, which can suppress ill behavior. Such flexibility will undoubtedly appeal to programmers, but less experienced users should beware.

You could load WordPerfect *and several memory resident programs into the PC's standard memory while* 1-2-3 *thrashed through a massive recalculation in the PCturbo 286e's memory.*

Whenever you introduce a non-IBM device into the PC, compatibility problems surface. According to Orchid, one such difficulty arises when you use a high-speed modem to download data at rates exceeding 1200 bps. Incoming data can be lost because the PCturbo 286e's routine for trapping a communications program's I/O instructions slows the PC down to a crawl. The only way to guarantee safe data reception is to run the modem at 1200 bps or conduct the communications session under the aegis of the PC's 8088. This caveat applies only to incoming data; 9600-bps output to a laser printer, for example, is not affected. The PCturbo 286e is also compatible with internal modems and memory expansion boards but doesn't support IBM's Enhanced Graphics Adapter (EGA)—a situation Orchid claims to be correcting.

One problem still up for grabs is the board's 13- to 17-watt power requirement. This demand may rightly give you pause if you own an older Compaq portable or if your PC holds an internal modem, a hard disk, or a similar power hog. When in doubt, upgrade your system properly and buy a power supply that can take the strain.

286 Express Card

Installing the 5-inch 286 Express Card is no picnic for the hardwarephobe. Not only must you set jumpers on the board indicating the presence of an 80287, cache status, and available memory (a process required with every accelerator board reviewed here), but you must remove the PC's 8088 and shove it in a drawer,

connect the board to the socket with a plug, and push the board into a slot. As noted earlier, if an 8087 is already installed on the motherboard, you must replace it with a noise-suppression plug. In sum, installation might be a job for your dealer. But if you're willing to meet the challenge, the steps are clearly explained and illustrated in the user manual.

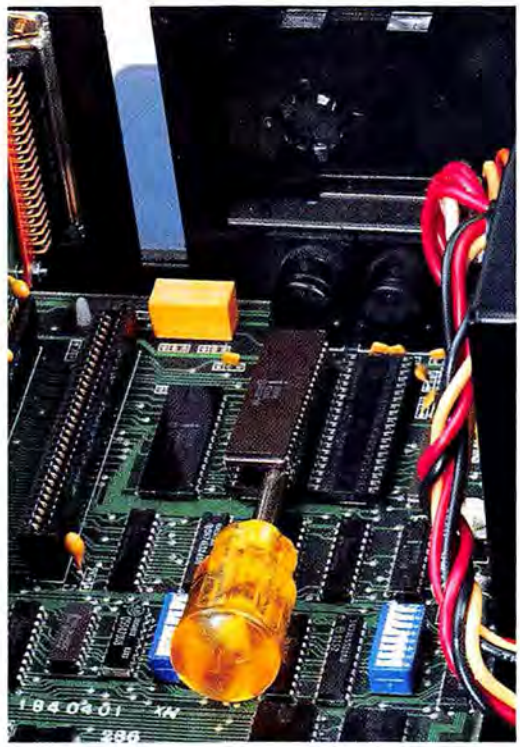
The 286 Express Card is EGA compatible; runs such applications as *WordPerfect, 1-2-3* release 2.0, and *dBASE III Plus* flawlessly; and takes *SideKick, FANSI-Console, Mirror,* RAM disks, and print spoolers in stride. The company is quick to acknowledge, however, that *dBASE III* version 1.1 and a few older copy-protected programs cannot be installed on a hard disk when the 286 Express Card's 8K cache is active. The cache also makes it impossible to low-level-format a hard disk. Although PC Technologies considers the 286 Express Card an "aftermarket product," keep this limitation in mind if you buy this board and plan to add a hard disk to your system.

Comparison shoppers note: PC Technologies has licensed the 286 Express Card to both Victor and Mountain Computer. Victor's SpeedPac 286 and Mountain's Racecard-286 sell for $595 each—but competition and mail-order distribution may lower the price.

Tiny Turbo

Like the 286 Express Card, Orchid Technology's Tiny Turbo is a 5-inch board featuring an 8K memory cache and an 80287 socket. The similarities end there.

For starters, you don't put your PC's 8088 on a shelf, but instead park it in a socket on the Tiny



Accelerating your PC often involves more than popping a board into the back of your machine. In the case of the Tiny Turbo, you must first remove the PC's 8088 microprocessor, either with a chip puller or with a screwdriver as pictured here. Remember to work the chip gently out of its socket—it must be related to the Tiny Turbo and 286 Speed Pak.

Fred Simpson

Once the 8088 is out of the way, you must firmly seat the board's plug into the socket. The plug allows the accelerator board to more fully tap the PC's I/O channels. As with chips, make sure you don't force the plug—a broken pin will grind your turbocharged PC to a halt.

Brain Surgery

Removing an 8088 is not an exercise in machismo. Might isn't right; finesse and grace under pressure are everything. Three of the reviewed accelerator boards compel you to remove (and in two cases, transplant) your PC's 8088 microprocessor. You can do this job if you carefully follow the instructions in the user manual that accompanies each board. Those owning clones take note: The motherboard diagrams in these manuals are for the IBM PC and XT only. The location and orientation of the 8088 socket in a compatible may be radically different. Remember, too, that if you accidentally put the accelerator board plug in backward, you may damage the board, the PC, or both. If later you reinstall the 8088 and put the chip in reversed, the same danger applies.

When handling integrated circuits, static electricity is the enemy. Avoid wearing synthetic clothing, but make sure you have rubber-soled shoes on. Don't pick up anything plastic, vinyl, or Styrofoam while toting the 8088 or, for that matter, the accelerator board. Make sure the PC is turned off but plugged in to a grounded outlet. When you ground yourself by touching the PC's metal shell, any charge will be carried down the cord.

All the accelerator board vendors supply chip pullers for extracting the 8088. These tools require some patience and skill, and they are generally not equal to the task. (The best chip puller comes with the Tiny Turbo.) I find that a small sewing machine screwdriver with a thin flat blade works best. Carefully insert the screwdriver between the chip and the socket and give it a little twist to loosen the end pins. Loosen the pins at the other end in the same fashion. Each time you trade ends, insert the screwdriver a little farther underneath the chip and gently pry up. Don't yank, or you will bend or break some pins, rendering the chip useless.

Such care is extremely important when you consider that if the accelerator board doesn't work properly, you will have to plug the 8088 back in. In the case of the Tiny Turbo and the 286 Speed Pak, you must relocate the 8088 onto the accelerator board. There are 40 pins to work out of the socket, so be patient. If the entire process seems too imposing, pay a qualified dealer to sweat it out. *–R. N.*

Turbo. And unlike with the Tiny Turbo's bigger (and more expensive) brother, a blessedly simple switch on the back of the board lets you toggle the PC between 8088 and 80286 processing. The switch works like a reset button—flip it and the computer restarts in the selected mode.

Given the 286 Speed Pak's performance, its $995 price tag seems a bit inflated. A serious price cut and speed increase are in order if Classic Technology expects this board to win converts.

The Tiny Turbo demonstrated no software-compatibility problems in either mode, running memory-resident programs and both copy-protected and unprotected applications with ease. The Tiny Turbo is also compatible with the EGA. Apparently, the Tiny Turbo came off the drawing board after the PCturbo 286e. Unfortunately, the engineers flunked one simple but important test: The Tiny Turbo's 8088 plug is attached to a 3-inch cable that can't reach the socket unless the board is located in the nearest slot. This design flaw makes installation difficult, because this slot is filled in most PCs by a disk drive controller. (Orchid offers a 15-inch cable for $15.)

286 Speed Pak

Classic Technology's 286 Speed Pak is a full-length board featuring 1MB of high-speed RAM, an 80287 socket, and a small collection of utilities, including a RAM disk and a print spooler. As with the Tiny Turbo, you must relocate the 8088 chip to a socket on the board, but switching the system to 8088 mode means shutting off the computer, flipping a switch on the back of the board, then turning the system back on. The 286 Speed Pak is EGA compatible and, thankfully, comes with a sufficiently long ribbon cable for its 8088 plug.

Like the PCturbo 286e, the Speed Pak is something of a watt hog. Because the 286 Speed Pak can't use most of the RAM installed on the PC's motherboard, the user manual suggests removing the unused chips above 256K on a PC (64K on an XT) to reduce the drain on the power supply.

The Scoreboard

When push comes to shoving data through the PC, the PCturbo 286e is the clear winner. Priced at $1195, it should be. The board's unfettered 8-MHz 80286 stole the show, increasing the PC's processing power by an average 460 percent. As Figure 1 clearly shows, all the accelerator boards easily doubled the PC's performance and more or less managed to keep pace with the AT. The comparatively poor showing by the 286 Speed Pak is due to the board's use of the PC's standard memory. According to the manufacturer, a new version of the board (based on a 10-MHz version of the 80286) eschews the PC's slower RAM altogether and purportedly matches the PCturbo 286e in any speed contest.

If cost is more important than raw processing power, the pint-size Tiny Turbo, the 286 Express Card, or the latter's licensed variants can still kick your system into overdrive without taking a *Jaws*-size bite out of your bank account. Consider the trade-offs before you leap. The Tiny Turbo has the simplest switching method of all the boards reviewed, but its ridiculously short cable may hamstring its usefulness. The Victor board comes in two versions: one that works with monochrome monitors only and another that's restricted to EGA and CGA setups. (The company claims that a recent release works with all three display configurations.) On the other hand, the 286 Express Card works with monochrome, Hercules, CGA, and EGA video adapters.

Given the 286 Speed Pak's performance, its $995 price tag seems a bit inflated. A serious price cut and speed increase are in order if Classic Technology expects this board to win converts. And what of the PCturbo 286e? It cooks, offers dual processing, and lets you leave the PC's 8088 where God

intended. But the software installation and switching between processing modes is complicated. PC novices need not apply here; experienced users should seriously consider this board but shop around for mail-order prices.

Other Ways and Means

Will the accelerator board you buy today support all (or any) of the future enhancements designed for the AT? Each manufacturer supports the expanded memory specification, but if DOS 5.0 (expected sometime in 1987) finally breaks through the 640K barrier, support for the EMS could be an expensive interim premise on which to base a purchase decision. And in the final analysis, does it make sense to lay out $1195 for a PCturbo 286e when you can buy an AT clone for $1395?

Another innovation that may hinder accelerator board sales is the development of graphics coprocessor chips by Texas Instruments and Intel (see "Power Chips Paint Pictures," *PCW*, September 1986). These chips lift this processing burden from the CPU, so it's conceivable the old reliable 8088 could be good for one more spin around the block.

New technology has always been a thorn in the side of current design, rendering perfectly useful products obsolete before they're even released. The 80286 itself is threatened by Intel's shiny new 80386 microprocessor. While the cost of this powerhouse is initially high (Intel has yet to license manufacturing rights to other sources), you could make a case for waiting for accelerator boards featuring the 80386.

The bottom line, of course, is how much you are willing to invest to keep your PC alive. If you need to crunch graphics data on a regular basis for CAD/CAM or desktop publishing applications, you might as well purchase an AT. But if you're a budget-minded businessperson, a spreadsheet jockey with a hand-me-down PC, or a *Framework* user who is tired of the PC's chugging processing, an accelerator board may be the ticket. The time and ulcer you save may be your own. But remember this: An accelerator board is an immediately gratifying speed fix—not a hedge against the future.

Robert Nusbaum is a lecturer in computer science, a microcomputer consultant, and a freelance writer.

286 Express Card
PC Technologies, Inc.
704 Airport Blvd.
Ann Arbor, MI 48106
800/821-3086, 313/996-9690
List price: $595
Requirements: 64K; DOS 2.00 or later version; IBM PC, XT, or 100 percent compatible

PCturbo 286e
Orchid Technology
47790 Westinghouse Dr.
Fremont, CA 94539
415/490-8586
List price: $1195, 1MB memory module $395
Requirements: IBM PC, XT, or 100 percent compatible

Racecard-286
Mountain Computer, Inc.
360 El Pueblo Rd.
Scotts Valley, CA 95066
800/458-0300, 408/438-6650
List price: $595
Requirements: 64K; DOS 2.00 or later version; IBM PC, XT, or 100 percent compatible

286 Speed Pak
Classic Technology Corp.
2090 Concourse Dr.
San Jose, CA 95131
408/434-9333
List price: $995, 2.5MB Shadowboard $995
Requirements: 64K (XT), 256K (PC); DOS 2.00 or later version; IBM PC, XT, or 100 percent compatible

SpeedPac 286
Victor Technologies
380 El Pueblo Rd.
Scotts Valley, CA 95066
408/438-6680
List price: $595
Requirements: 64K; DOS 2.00 or later version; IBM PC, XT, or 100 percent compatible

Tiny Turbo
Orchid Technology
List price: $695
Requirements: 64K; DOS 2.00 or later version; IBM PC, XT, or 100 percent compatible

Turn your PC into a Personal Publisher

ClickArt Personal Publisher brings desktop publishing to your PC.

Now you can move from first thoughts to finished copy easily and directly. ClickArt Personal Publisher lets you mix a variety of text and graphics directly on-screen, prepare page layouts and print the results. You can publish just about anything, from newsletters to new business proposals.

Personal Publisher's graphical what-you-see-is-what-you-get approach to text entry and page layout lets you see everything on the screen right as you're doing it! On-screen menus make learning and using Personal Publisher a snap.

You can enter and edit text directly on-screen in a variety of sizes and typefaces or read it in from a word processing file. Text can be justified, centered or flush right or left. With Personal Publisher you can choose from 1, 2, 3 or 4 column layouts; even the column widths are variable. In addition, each line in a column can be individually sized and positioned.

Personal Publisher also lets you create and insert graphics and line rules anywhere on the page. There's even a unique "PictureWrap" feature which automatically flows text around images — even when the image spans more than one column.

ClickArt Personal Publisher brings page layout to the PC. The newsletter shown was printed using the Apple LaserWriter.

With Personal Publisher you have access to thousands of images and hundreds of existing type fonts. As a special introductory offer, ClickArt Personal Publisher includes ClickArt Publications, an image portfolio containing over 300 pieces of clip art for newsletter and business use.

You can print your results on Epson, Okidata and other popular dot matrix printers. Or if you want the professional look of laser quality, options are available for the Hewlett-Packard LaserJet and Apple LaserWriter.

ClickArt Personal Publisher is ***$185*** for the dot matrix version. Optional laser fonts and drivers are an additional ***$150.***

ClickArt Personal Publisher requires an IBM PC, XT, AT or compatible with 512K RAM, two disk drives or a hard disk and an IBM Color Card or Hercules Monochrome Graphics Card. Mouse recommended but not required.

See your dealer or call for more information.

ClickArt®
PERSONAL PUBLISHER

Software Publishing Corp.
Mountain View, CA
(415) 962-8910

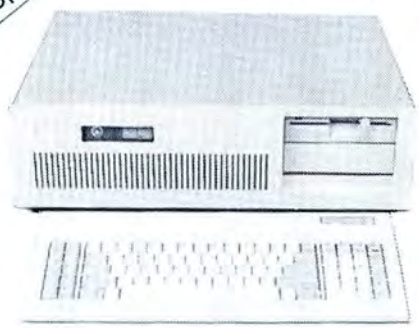
IBM is a registered trademark of International Business Machines. ClickArt is a registered trademark of T/Maker Company.

Setting The Standard For New Lower Prices...

Call Toll Free • Leasing Available • Free Shipping!

Standard-286

10 MHz Option...$29



Norton's "SI"* Test Results

SYSTEM	Clock Speed	Wait State 1	Wait State 0
IBM AT™	6 MHz	5.7	—
Standard 286	6 MHz	5.7	7.0
IBM AT™	8 MHz	7.8	—
Standard 286	8 MHz	7.8	9.2
IBM AT™	10 MHz	—	—
Standard 286	10 MHz	10.1	—

* Norton System Information Version 3.00

- 512K RAM expandable to 1 MB
- Dual floppy & hard drive controller
- 1.2 MB floppy drive
- Clock/calendar w/battery back-up
- Intel 80286 processor
- 6 or 8 MHz hardware switchable
- 0 or 1 wait state hardware selectable
- Phoenix BIOS

Only...

$1249

Lease for $53 A Month

TURBO-88

- 256K RAM expandable to 1 megabyte on motherboard
- 8 expansion slots
- Clock/calendar with battery back-up
- Game port
- Intel 8088-2 (4.77 or 8 MHz)
- Keyboard selectable clock speed
- Up to 70% faster processing speed
- AT style keyboard
- 1-360K half-height drive

8 MHz! **$589**

"CAREER STARTER KIT"

Everything You Need To Begin Serious Computing Immediately!!

Lease For Only $38 A Month

New Price!

$895

Monographics Capability Add $20

Computer
IBM compatible Turbo-88 system with Intel 8088-2 (4.77-8MHz) processor, 256K RAM expandable to 1 MB on main board. Clock/calendar, game port and 8 expansion slots on main board. Half-height, double sided diskette drive, diskette drive controller, monochrome adapter card with parallel port, 135 watt power supply and AT tm style keyboard.

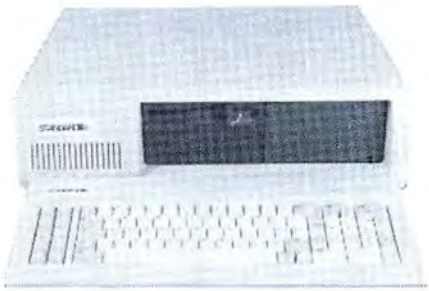
Monitor
High resolution (750 X 350) amber monochrome monitor with 12" display screen.

Printer
100 CPS dot matrix 80 column printer with friction and tractor feed and all points addressable graphics capability.

Software
MicroSoft MS DOS 3.2, MicroSoft GW Basic, ZEN Word (word processing & spell checker), ZEN Calc (spread sheet) and ZEN Link (communication package).

Accessories
200 sheets continuous forms paper, printer cable and box of 10 blank diskettes.

Standard-88



- 1-half-height floppy drive
- 135 watt power supply
- 8 expansion slots
- Intel 8088-3 (4.77 MHz)
- 5160 keyboard
- 256K RAM

Phoenix BIOS **$469**

IBM & AT are registered trademarks of International Business Machines Corp.

Leasing based on 36 monthly payments & approved credit.

Call Toll Free: 800-626-4029

Tech Support 800-527-3125 | In Texas Call: 512-250-1489

12303-G Technology Austin, TX 78727

CompuAdd

"Personal Computer Products"

VISA | master charge

Circle 393 on reader service card

One Year Anniversary
over 12,000 networks installed
Anniversary Sale!
10% discount on all orders thru 12/31/86
Credit card or COD only

EasyLAN—Networking For Less Than $100 Per PC

STOP buying expensive duplicate PC peripherals. Usually your peripherals just sit idle. If your office owns two or more PCs can you justify costly laser printers for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disks are used infrequently.

The obvious solution to avoid expensive duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of $1,000 per PC.

THE *EasyLAN*™ OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. *EasyLAN* can save you $1,000 or more per PC by eliminating duplicate equipment purchases.

EasyLAN HIGHLIGHTS

- ***EasyLAN* shares printers, plotters, data, and disk storage**
- **PC to PC file transfer**
- **Print spooling**
- **New PBX support**
- **Easy to install**
- **Easy to operate**
- **Modem support**
- **Performs in the background**

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than $100 per PC including cables and software for a 2-PC or 3-PC network.

EasyLAN performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ WordStar,™ and dBASE.™

NEW PBX SUPPORT

New PBX support allows *EasyLAN* to transfer data files and share peripherals between PCs using PBX circuit-switched connections and twisted pair wiring. *EasyLAN* has already been installed on a number of different PBX systems and has been certified by Northern Telecom on the Meridian SL-1.

EasyLAN's performance meets your small office or department requirements to move word processing documents and spread sheets between PCs. For example, *EasyLAN* can transfer a 10-page document between PCs as a background operation, in less than one minute.

EasyLAN loads automatically at boot time. It manages the PC's serial and parallel ports for communications and printing.

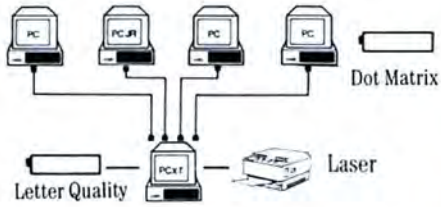
"The value is high. 🖳🖳🖳🖳*"*
—InfoWorld Report Card

Printer sharing operates transparently with existing programs. Print files are automatically spooled to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks.

"I bought access to a laser jet printer for $80."
—CONOCO Oil User

Disk sharing uses *EasyLAN*'s EZCOPY command to move files to and from PCs. ASCII or binary files can be transferred in the foreground, or in the background while other DOS programs run.

All communication operations are protected by a unique password assigned to each PC so security is maintained.



***EasyLAN* Office Network**

EasyLAN SPECIFICATIONS

Each PC in the network requires an individual licensed copy of the *EasyLAN* program and takes 20k of memory on each satellite PC, a serial port, and DOS 2.0 or above. *EasyLAN* disks are not copy protected. *EasyLAN* runs on all IBM PC models and Compatibles. The HUB PC requires a serial port for each satellite PC. The COM2 and COM6 boards are serial port expansion boards which permit you to add serial ports to the HUB PC.

EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. The *EasyLAN* Network Configuration Program provides a menu driven installation program that will guide you step-by-step through the software installation process.

EASY TO ORDER

EasyLAN is a proven product with over 12,000 installations. To order just call toll free **800/835-1515.** Start with a two PC network and expand as your needs demand.

"If it does all you need why spend more? It is the ultimate example of practicality in a local area network."
—PC Magazine

PRODUCT SUPPORT

We take pride in our quality product support. *EasyLAN* support is provided over the telephone by the same people who installed over 12,000 networks last year.

"I look for products that make my job easier and save my company money. EasyLAN does both."
—Mini Micro Magazine

EasyLAN

ORDER TODAY 1-800/835-1515 in CA 408/738-8377 VISA MasterCard

EasyLAN Order Form

To Order by Phone—Call **800/835-1515**
In CA **408/738-8377**
For Configuration Assistance & Technical Questions
Call 408/738-8377

Place your Order Immediately
Dealer Inquiries Invited

Name _____
Address _____
_____
_____
City _____
State _____ Zip _____
Telephone (_____) _____
Payment: Visa, MasterCard, Check, COD, Bank Draft
Name on Credit Card _____
Cr. Card No. _____ Exp Date ___/___

Server Technology, Inc., 1095 East Duane Ave. #103
Sunnyvale, CA 94086 Telex 5106003481

Item	Description	Price	Qty	Amount
EL 01	*EasyLAN* Kit—for 2-PCs 30′ cable, two disks & manuals	$179.95	____	$ ____
EL 02	*EasyLAN* Expansion Kit—for 1-PC 30′ cable, one disk & manual	$109.95	____	$ ____
EL 11	*EasyLAN* disk & manual (3½" disk $89.95)	$ 79.95	____	$ ____
EL 12	*EasyLAN* 30′ cable	$ 49.95	____	$ ____
EL 13	COM2-serial port expansion board, two ports	$219.95	____	$ ____
EL 14	COM6-serial port expansion board, six ports	$489.95	____	$ ____
EL 15	Custom length cables, call for quote			
	CA res add applicable sales tax			$ ____
	Shipping charge USA $10.00, other $20.00			$ ____
			TOTAL ORDER	$ ____

Circle 457 on reader service card

Attention Microsoft Word Users

Stunning Microsoft Word Processing

FancyWORD™

If you are a Microsoft Word user, using a dot matrix or laser printer, you now can print your letters, reports and presentation materials in **near typeset quality** with FancyWord.

You simply use Microsoft Word like you always have, including the paragraph and character format commands. The difference is **superior quality and font variety!** In fact, the copy and sample page in this ad were printed on an Epson FX80 printer using FancyWord.

Standard FancyWord font styles include Roman, Sans Serif, **Bold**, *Italic*, Script, Old English and many more in 10 to 24 point sizes. SoftCraft offers hundreds of optional fonts in sizes from 6 to 72 points. There is also an option that enables you to create your own **special characters and logos**.

Impact Your Laser

Combine the high quality of the HP LaserJet printer with the font styles and sizes of FancyWord for the ultimate in visual impact.

Cost Effective

FancyWord is available from your local dealer or direct from SoftCraft for only $140.

You get near typeset quality at a small fraction of the time and cost of using art or typesetting services.

FancyWord runs on PCDOS and MSDOS systems with Epson, Toshiba, LaserJet and compatible printers.

Call **TOLL FREE** today to order FancyWord. We'll also be happy to answer any questions or send you additional information including actual samples and independent reviews.

CALL TODAY 1-800-351-0500

MasterCharge and Visa accepted

*Soft*Craft, Inc.

222 State Street, Madison, WI 53703 (608) 257-330

For Fancy letters, take our "WORD" for it.

*Soft*Craft, Inc. 8

Fancy WORD, from the developers of the highly-acclaimed Fancy Font personal typesetting system, brings Microsoft Word users the amazing print quality and variety of Fancy Font and the ease-of-use of Word. Use the Word "Format Character" command to select **bold** or *italic* for emphasis, Old English for formality, a clean Sans Serif font or *script for a hand-written look*. Print with superscript, subscript or fine print or use a large, bold font to produce headlines with impact, such as:

Printed on an Epson Printer

All of Word's powerful formatting and on-screen editing features can be used with Fancy WORD, including justification, multiple columns and footnotes. This entire page was prepared with Word and printed with Fancy WORD.

In addition to the fonts that come with Fancy WORD hundreds of fonts in sizes from 6 points to 72 points are available, at a nominal charge, from SoftCraft's font library. You can also purchase the Fancy Font font editing utilities to create your own characters or logos, up to 1 inch by 1 inch in size.

The special math and symbol fonts available from the font library can be used in many special applications, such as printing equations:

$$\pi(n) = \sum_{k=2}^{n} \left\lfloor \frac{\phi(k)}{k-1} \right\rfloor$$

Circle 648 on reader service card

Princeton Graphic Systems wins World Class competition three years running.

Sharp resolution, full compatibility, and rugged reliability. That's what you get in every Princeton Graphic Systems monitor. That's why Princeton Graphic Systems is number one in the minds of more and more personal computer owners every year.

Only Princeton Graphic Systems offers a complete family of quality personal computer displays. Our color and monochrome monitors outperform the competition every time. That's why, for the third year in a row, our HX-12 high resolution color monitor has been voted best in the world.*

So for the very best in personal computer monitors, pick the company that's number one. Princeton Graphic Systems.

*PC WORLD Magazine's 1986 World Class Survey.

PRINCETON®

GRAPHIC SYSTEMS

AN INTELLIGENT SYSTEMS COMPANY

601 Ewing Street, Bldg. A, Princeton, NJ 08540, (609) 683-1660, Telex: 821402 PGSPRIN, (800)221-1490, ext. 1706

Circle 306 on reader service card

CALL TOLL FREE 1-800-382-2242

NORTHEASTERN Software

7 Trap Falls Rd. Shelton, Connecticut 06484 (See Below) **WE WILL BEAT**

TURBO PC™

- RUNS ALL MAJOR SOFTWARE WRITTEN FOR THE IBM PC,™ XT,™ AND COMPATIBLES.
- DUAL SPEED SYSTEM UNIT. (RUNS AT 4.77 OR 7.4 MHZ. KEYBOARD SELECTIBLE)
- 640 KB MOTHER BOARD INSTALLED AND TESTED.
- 360 KB FLOPPY DISK DRIVE. (PRODUCED BY MAJOR INDUSTRY MANUFACTURERS)
- AT STYLE KEYBOARD.
- 135 WATT POWER SUPPLY, UL APPROVED.
- 8 EXPANSION SLOTS (FLIP TOP COVER PROVIDES EASY ACCESS TO EXPANSION SLOTS).
- MS DOS 3.1,™ USERS MANUAL, AND 2 YEAR LIMITED WARRANTY INCLUDED.
- ADDITIONAL CONFIGURATIONS AVAILABLE.

OVER 60% FASTER THAN THE IBM PC-XT™

$775.00

TURBO 286™

- RUNS ALL MAJOR SOFTWARE WRITTEN FOR THE IBM PC,™ AT,™ AND COMPATIBLES.
- 8 MHZ SYSTEM UNIT (6 MHZ SYSTEM UNIT ALSO AVAILABLE)
- 640 KB MOTHER BOARD INSTALLED AND TESTED.
- 1.2 MB AND 360 KB FLOPPY DISK DRIVE. (PRODUCED BY MAJOR INDUSTRY MANUFACTURERS)
- AT STYLE KEYBOARD.
- 200 WATT POWER SUPPLY.
- 8 EXPANSION SLOTS
- MS DOS 3.1,™ USERS MANUAL, AND 2 YEAR LIMITED WARRANTY INCLUDED.
- TWO SERIALS AND ONE PARALLEL PORT
- CLOCK/CALENDAR WITH BATTERY BACKUP
- COMBINED FLOPPY/HARD DRIVE CONTROLLER CARD

OVER 30% FASTER THAN THE IBM PC-AT™

$1945.00

WITH PURCHASE RECEIVE AN ADDITIONAL 2% DISCOUNT ON ANYTHING ELSE WE SELL FOR A FULL YEAR

Send coupon and list of items desired to
DISCOUNT BY MAIL DEPARTMENT
Northeastern Software, 88 Ryders Lane, Stratford, CT 06497

To be eligible for the $1.50 per item discount you must:
1. Fill out all items. 2. Send in our ad with the items you desire circled

Name _____

Address _____
(Include Company Name)

City _____ State _____ Zip _____

Phone No. at above address _____

Check form of payment
Visa MasterCard C.O.D. Personal Check
Certified Check Money Order

Card No. _____ Exp. Date _____

Computer Model _____

Personal and company checks allow 3 weeks to clear. For faster delivery, send cashier's check, certified check, or money order. Shipping—Software ($3.00 minimum) Shipping—Hardware (please call 203-375-3860). COD—Add an addition $2.00. Alaska, Hawaii, Canada, PO, APO, and FPO $5.00 minimum. Foreign orders—$15.00 minimum and 15% of all orders over $100. Mastercard and Visa (please include card no. and expiration date). Connecticut residents add 7.5% sales tax. Prices subject to change without notice. All returns must have a return authorization number. Call 203-375-3860 to obtain one before returning goods for replacement. Defective merchandise replaced with same item only. We do not guarantee compatibility. All sales are final. "Comparable advertised price" does not include typographical errors on the part of other vendors or prices that do not reflect higher shipping costs, credit card charges, or membership fees. The $1 off offer only applies to items where Northeastern's price is not already the lowest. Final judgment remains with the manager on duty.

BACK-UP / COPY SOFTWARE

CENTRAL POINT
Copy II PC 18.50
Copy II PC Option Board 77.00
QUAID
Copywrite 37.00
FIFTH GENERATION SOFTWARE
Fastback 94.00
TRANSEC
Transec Module A, B, C or D 35.00

CHIPS

INTEL
Intel 8087 Math Co-Processor 114.00
Intel 8087-2 Math Co-Processor 160.00
Intel 80287 Math Co-Processor AT 184.00
MAJOR BRAND CHIPS
Set of 64k 150NS 10.95
Set of 256k 150NS 28.50

DESKTOP / UTILITY SOFTWARE

ALPHA
Keyworks 47.00
BOURBAKI
1 DIR 49.00
BORLAND
Sidekick 28.00
Sidekick Non-Protected 44.00
Superkey 40.00
Traveling Sidekick 41.00
Traveling Sidekick w/sidekick 73.00
CENTRAL POINT
PC Tools 18.00
DIGITAL RESEARCH
Gem Collection 117.00
Gem Graph 142.00
Gem Wordchart 88.00
Gem Desktop 28.50
Gem Draw w/Desktop 79.00
EXECUTIVE SYSTEMS
X Tree 27.00
MICROSOFT
Windows 61.00
PETER NORTON
Norton Utilities 3.1 ..... 51.00
Norton Commander ..... CALL
QUARTERDECK SOFTWARE
Desqview 58.00
ROSE SOFT
Pro Key 74.00
SOFT LOGIC
Disk Optimizer ..... CALL
Software Carousel ..... CALL
Double Dos ..... CALL

ACCOUNTING PACKAGES

BPI
General Acc./AR/AP or Payroll 283.00
Job Costing or Inventory 399.00
CHANG LABS
Rags to Riches Series 63.50
EVERGREEN SOFTWARE
One-Write Plus 141.00
OPEN SYSTEMS
Accounting Software ..... CALL
PEACHTREE
Back to Basics 184.00
Peachtree GL/AP/AR 243.00
SORCIM
AR/AP/GL 283.00
STATE OF THE ART
AR/AP/GL/INV 323.00
UNITED SOFTWARE
In House Accountant 105.00

DATABASE SOFTWARE

ALPHA
Alpha 3 ..... CALL
ASHTON TATE
DBase II 275.00
D Base III Plus 399.00
DBase III + Lan Pak 639.00
BORLAND
Reflex 86.00
FOX & GELLER
Quick Code III 138.00
Quick Index III (Protected) 78.00
Quick Report III 138.00
DGraph III 138.00
Dutil III Plus 76.00
INFOCOM
Cornerstone 77.00
INNOVATIVE SOFTWARE
Smart Software System 409.00
Smart Spelling Checker 78.00
MICRO DATA BASE SYSTEMS
Knowledgeman II/2 ..... 265.00
K Mouse 45.25
K Com 94.00
K Graph 100.50
K Report 100.50
K Paint 45.25
MICRORIM
Clout 2.0 ..... 124.00
Extended Report Writer 77.00
RBase 5000 ..... 308.00
RBase System V ..... CALL
NANTUCKET
Clipper 345.00
POWERBASE SYSTEMS
Powerbase 188.00
SOFTWARE PUBLISHING
PFS: File 76.00
PFS: Report 67.00

GRAPHICS PACKAGES

APPLIED SOFTWARE TECHNOLOGY
Versaform XL 51.00
BPS
Business Graphs 212.00
Overhead Express 102.00
BRIGHTBILL ROBERTS
Graphics Partner 51.00
BRODERBUND
Print Shop 35.00
Graphics Library I 20.00
CONNECTICUT SOFTWARE
Printer Boss 89.00
Sideline 39.00
DATA TRANSFORMS
Fontrix 78.00
Fontpacks 1-11 ..... 14.50
DECISION RESOURCES
Chartmaster 218.00
Diagrammaster 192.00
Signmaster 139.00
Map Master 228.00
DIGITAL RESEARCH
DR Logo 82.00
ENERTRONICS
Energraphics 158.00
Energraphics w/ Plotter Option 203.00
Enercharts 165.00
GCI
Graphwriter Combo Pack 277.00
Free Lance 193.00
HARVARD SOFTWARE
Presentation Graphics 235.00
MICROGRAPHX
PC Draw 214.00
MICROSOFT
Chart 175.00
PC SOFTWARE
Executive Picture Show 145.00
SOFTSTYLE
Printworks 35.00
Set FX 39.00
SOFTWARE PUBLISHING
PFS: Graph 76.00
SPECTRUM HOLOBYTE
Art Studio 25.00
SPRINGBOARD
Newsroom 33.00
Clip Art Vol 1 ..... 16.00
Clip Art Vol 2 ..... 23.50
T MAKER
Clickart Publisher 105.00
Click Art Effects ..... CALL
Click Art Letters 31.50
UNISON WORLD INC.
Print Master 31.00
Art Gallery I 20.00

GRAPHICS TABLETS AND MICE

KOALA
Executive Presentation Kit 86.00
Koala Pad 86.00
MEDIA CYBERNETICS
DR Halo II ..... CALL
MICROSOFT
Mouse (Bus) 1
Mouse (Serial) 1
MOUSE SYSTEMS
PC Mouse W/Paint & Ready 1
HAYES, CH
Mach II Joystick 1
Mach III Joystick 1
Game Port Card for Men 1
KRAFT
Two Button Joystick 1
Three Button Joystick 1
SUMMAGRAPHICS
Summa Sketech 12 x 12 3

HOME FINANCE PACKAGES

CBS
Stockpak II 1
CONTINENTAL SOFTWARE
Home Accountant Plus 1
DOW JONES
Market Manager 1
Spreadsheet Link 1
HOWARDSOFT
Real Estate Analyzer III 2
MECA
Managing Your Money 1
Managing the Market 1
MONOGRAM
Dollars & Sense w/Forecast 1
SCARBOROUGH
Net Worth 1
SIMON AND SCHUSTER
JK Lassers Money Manager 1
TIMEWORKS
Sylvia Porters Fin Planner 1
TURNING POINT
Time is Money 1

INTEGRATED SOFTWARE

ASHTON TATE
Framework II 3
Frame Lock 2
LOTUS DEVELOPMENT
123 3
Symphony 4
SOFTWARE GROUP
Enable 3
SOFTWARE PRODUCTS
Open Access 2
MIGENT
Ability 1

PROGRAMMING LANGUAGES

TRUE BASIC
True Basic 9
BORDERLAND
Turbo Pascal w/8087 Dr. w/BCD 5
Turbo Pascal w/8087 + BCD 5
Turbo Pascal 4
Turbo Gameworks 3
Turbo Lightning 5
Turbo Graphics Toolbox 3
Turbo Database Toolbox 3
Turbo Editor Toolbox 3
Turbo Tutor 2
Turbo New Pack 5
Turbo Prolog 5
Turbo Jumbo Pack 13
DIGITAL RESEARCH
C Basic Compiler 32
CPM/86 5
LIFEBOAT
Lattice C Compiler 23
Run C Interpreter 7
Lattice Windows 14
MICROSOFT
Quick Basic Compiler 6
Basic Compiler 22
Basic Interpreter 19
C Compiler 28
Cobol Compiler 39
Fortran Compiler 19
Macro Assembler 9
Pascal Compiler 19
SUMMIT SOFTWARE
Better Basic 118

Northeastern Software Turbo PC is a trademark of Northeastern Software. IBM PC, XT IBM PC, AT are trademarks of IBM Corporation.

Connecticut Orders Call (203) 929-8522 IN CANADA 1-800-843-0074

ASTERN

ANY COMPARABLE ADVERTISED PRICE BY $1

JECT MANAGEMENT SOFTWARE

THROUGH SOFTWARE
- ... 235.00

RD SOFTWARE
- oject Manager ... CALL
- VIDEOTEXT ... 50.75
- nk 2.0 ... 93.00

SOFT
- ... 238.00

A
- oject Plus ... 201.00

SPREADSHEET SOFTWARE

IMER SOFTWARE
- sheet Auditor ... 86.00

SOFTWARE
- ys ... 36.00

DEVELOPMENT
- ... 327.00
- + ... 24.50

SOFT
- on ... 111.00

BACK SOFTWARE
- nner ... 52.00
- a ... CALL

IIN
- Calc ... 56.00

WARE PUBLISHING
- Plan ... 76.00

M
- alc III ... 277.00

WORKS
- Calc w/Sideways ... 98.00

WORD PROCESSING SOFTWARE

AND
- Wizard ... 37.00
- Wizard & Turbo Lightning ... 87.50

ERBUND SOFTWARE
- Street Writer ... 46.00

NG EDGE
- ll ... 58.00
- Processor ... 51.00
- Processor w/Mail Merge & SPE ... 100.00

REE SOFTWARE
- riter Deluxe III ... 144.00

OPRO
- ... 94.00
- tar ... 178.00
- tar 2000 ... 234.00
- tar 2000+ ... 277.00
- tar Professional ... 234.00

OSOFT
- ... CALL

MATE INTERNATIONAL
- e ... 64.00
- Write ... 79.00
- ate ... 207.00
- ate Advantage ... 257.00
- ate Executive ... CALL

A
- III ... 272.00

LITE SOFTWARE
- Perfect ... 219.95

N AND SCHUSTER
- ers Spelling Checker ... 34.50
- er's Thesaurus ... 34.50
- er's New World Writer ... 79.95

WARE PUBLISHING
- Proof ... 51.00
- Write ... 81.00

M
- riter II ... 187.00

EDUCATIONAL SOFTWARE

- uilder Programs ... 30.00
- g Power Programs ... 42.00

ONS
- ter SAT ... 55.00

RESEARCH
- ord 1.0 (KJV or NIV) ... 149.00

OFTWARE
- s Bridge ... 41.00
- ring the SAT ... 53.00

CDEX
- All Programs ... 39.00

DLM
- Alien Add or Minus Mission ... 17.50
- Demolition Division ... 17.50
- Meteor Multiplication ... 17.50
- Spelling Wiz or Verb Viper ... 17.50

DAVIDSON AND ASSOCIATES
- Math Blaster or Alge Blaster ... 25.50
- Speed Reader II ... 35.50
- Spell It or Word Attack ... 25.50

DESIGNWARE
- Remember ... 49.00
- Body Transparent ... 23.00
- European Nations and Locations ... 23.00
- Grammar Examiner ... 23.00
- Math Maze or Spellograph ... 20.50

DIGITAL RESEARCH
- Dr. Logo ... 87.00

EDUWARE
- Algebra I, II or III ... 21.00

HARCOURT BRACE JOVANOVICH
- Computer SAT ... 47.00

HUMAN EDGE
- Mind Prober ... 25.00

INDIVIDUAL SOFTWARE
- Professor DOS or Prof. Pixil ... 35.00
- Project Management ... CALL
- The Instructor II ... 29.00
- Tutorial Set ... 65.00
- Typing Instructor ... 33.00

LEARNING COMPANY
- Magic Spells or Word Spinner ... 23.00
- Number Stumper or Reader Rabbit ... 24.00

MECA
- Jim Fixx ... 41.00

SCARBOROUGH
- Build A Book About You ... 14.50
- Mastertype ... 23.00

SCHOLASTIC
- Agent USA or Turtle Tracks ... 21.00

SIMON AND SCHUSTER
- Typing Tutor III ... 31.00

SPINNAKER
- Alphabet Zoo ... 16.00
- Kinderkomp or Face Maker ... 15.00
- Delta Drawing or In Search Of ... 22.00
- Amazon or Dragon World ... 25.00
- Kidwriter or Story Machine ... 17.00
- Snooper Troops 1 or 2 ... 20.00
- Trains ... 19.00

SPRINGBOARD
- Music Maestro or Piece of Cake ... 19.00
- Easy as ABC ... 21.50

GAMES

ACCOLADE
- Mean 18 ... 30.00

BLUECHIP
- Baron, Millionaire, Squire, or Tycoon ... 35.00

BRODERBUND
- Ancient Art of War ... 25.50
- Lode Runner ... 20.00

CBS SOFTWARE
- Murder by the Dozen or Felony ... 15.00

DATASOFT
- Bruce Lee ... 21.00

ELECTRONIC ARTS
- Music Construction Set ... 26.00
- One on One ... 26.00
- Pinball Construction Set ... 22.00

HAYDEN
- Sargon III or Holy Grail ... 29.00

INFOCOM
- Deadline or Starcross ... 28.00
- Spellbrecker or Suspended ... 28.00
- Witness or Plantertall ... 23.00
- Enchanter or Wishbringer ... 23.00
- Cutthroats or Seastalker ... 23.00
- Enchanter, Wishbringer, or Witness ... 23.00
- Hitchhiker's Guide ... 23.00
- Sorcerer or Infidel ... 25.00
- Trinity ... 28.00
- Fooblitzsky ... 28.00
- A Mind Forever Voyaging ... 25.00
- Suspect ... 25.00
- Zork I ... 23.00
- Zork II or III ... 25.00

MICRO LEAGUE SPORTS
- Micro League Baseball ... 23.00
- General Managers Disk ... 23.00
- Micro League 1985 Team Disk ... 15.00

MICROPROSE
- F-15 Strike Eagle ... 20.00
- Hellcat Ace or Silent Service ... 20.00
- Solo Flight or Spitfire Ace ... 20.00

MICROSOFT
- Flight Simulator (New Version) ... 28.50
- Flight Sim Scenery Disks ... 14.00

MINDSCAPE
- Rambo or Racter ... 27.00
- Stephen Kings the Mist ... 26.00
- James Bond: View to a Kill ... 26.00
- Balance of Power ... 29.00

ODESTA
- Backgammon ... 29.00
- Chess 7.0 ... 40.00

ORIGIN SYSTEMS
- Ultima III ... 35.50

PC SOFTWARE
- Armchair Quarterback ... 23.00
- Championship Blackjack ... 23.00

SEGA
- Tapper or Spy Hunter ... 26.00

SIERRA-ON-LINE
- King's Quest I or II ... 27.50

SIMON AND SCHUSTER
- N.Y. Times Crosswords ... 13.00
- Star Trek ... 24.00

SIR-TECH
- Wizardry I ... 37.00

SPECTRUM HOLOBYTE
- Gato ... 21.00

STRATEGIC SIMULATIONS
- Battle for Normandy ... 25.00
- Tigers in the Snow ... 25.00

SUBLOGIC
- Night Mission Pinball ... 25.50
- Jet ... 31.50

ACCESSORIES

CURTIS
- PC Pedestal II ... 25.50
- Flip N File 50 ... 13.00

KENSINGTON
- Universal Printer Stand ... 16.00

KEYTRONICS
- KB-5151 PC Jr. ... 164.00
- KB 5151 Deluxe Keyboard ... 164.00
- KB-5153 Keyboard w/Touch Tablet ... CALL

BLANK MEDIA

- Basf DS/DD ... 11.50
- Elephant DS/DD ... 14.00
- Fuji DS/HD ... 27.00
- Maxell DS/DD ... 16.50
- Maxell DS/QD (For AT) ... 28.00
- Verbatim DS/DD ... 17.00
- Verbatim DS/HD ... 43.00
- Sony DS/DD ... 13.00
- Sony DS/QD ... 43.00

SURGE PROTECTORS

CURTIS
- Diamond Surge Suppressor ... 29.00
- Ruby Surge Suppressor ... 53.00
- Emerald Surge Suppressor ... 35.00
- Sapphire Surge Suppressor ... 46.00

DATASHIELD
- PC-200 Power Backup ... 227.00
- XT-300 Power Backup ... 369.00
- AT-500 Power Backup ... 527.00
- AT-800 Power Backup ... 625.00

KENSINGTON
- Masterpiece ... 84.00
- Masterpiece Plus ... 113.00

PRINTERS

BROTHER
- DM 40 Par ... 930.00
- DM 40 Par ... CALL
- HR 15 Tractor ... 95.00
- HR 25 ... 485.00
- HR 25 or HR 35 Tractor ... 114.00
- HR 35 ... 725.00

CITIZENS
- 120D ... 199.00
- MSP-10 (160 CPS) ... CALL
- MSP-15 (160 CPS) ... CALL
- MSP-20 (200 CPS) ... 327.00
- MPS-25 (200 CPS) ... 485.00
- Premiere 35 ... 470.00

DYNAX/FORTIS
- D4-45 Dual Head Printer ... 835.00
- DX-15 ... 375.00

EPSON
- All Epsons ... CALL

MANNESMAN TALLY
- MT-85 ... CALL
- MT-86 ... CALL

JUKI
- 6000 (10 CPS) ... 177.00
- 6100 (15 CPS) ... 337.00
- 6200 (30 CPS) ... 507.00
- 6300 (40 CPS) ... 647.00

NEC
- Spinwriter ELF 350 ... 377.00
- Spinwriter 2030 or 2050 (20 CPS) ... 667.00
- Spinwriter 3530 or 3550 (35 CPS) ... 777.00
- Spinwriter 8850 (55 CPS) ... 1135.00
- 2000/3500/8800 Tractor ... 190.00
- P 560 ... 989.00
- P 560 XL ... 1125.00
- P 660 ... 470.00
- P 760 ... 650.00

OKIDATA
- All Okidata ... CALL

PANASONIC
- KXP-1091 ... 235.00
- KXP-1092 ... Call
- KXP-3151 ... 395.00

SILVER REED
- EXP 550P ... 317.00
- EXP 800P ... 657.00

STAR MICRONICS
- NX-10 (120 CPS) ... 255.00
- SG-15 (120 CPS) ... 377.00
- SD-10 (160 CPS) ... 337.00
- SD-15 (160 CPS) ... 447.00
- SR-10 (200 CPS) ... 487.00
- SR-15 (200 CPS) ... 583.00
- NB-15 ... 990.00

TOSHIBA
- 321 PAR ... 480.00
- 341 PAR, Only ... 755.00
- 341 PAR, or SER ... 785.00
- 351 PAR Only ... 1045.00

MULTIFUNCTION BOARDS

AST
- Six Pack Plus 64K w/Sidekick ... 169.00
- Six Pack Plus 384K w/Sidekick ... 199.00
- Six Pack Premium 512K ... 350.00
- AST-Advantage Board 128K ... 369.00
- AST-Advantage Pack 0K ... 125.00

AST OPTION BOARDS
- AST-Rampage for PC/XT ... Call
- AST-I/O Plus II ... 120.00
- AST-Fast Pack ... Call

EVEREX
- Mini Magic 0-640K ½ Card ... 68.00

INTEL
- Above Board PC w/64K ... Call
- Above Board AT w/128k ... Call
- Above Board Piggyback AT ... Call

ORCHARD TECHNOLOGIES
- Conquest Multifunction w/0K ... 270.00
- Excell Multifunction AT w/0K ... 410.00

PARADISE SYSTEMS
- S-Pack Multifunction Card w/0K ... 97.00

PERSYST
- Short Slot Memory Board w/384K ... 185.00
- Mega Memory Board w/0K ... 237.00
- PC/Monochrome Board ... 143.00
- PC/Color Graphics Board ... 143.00
- Bob Board ... 279.00
- Mono Combo Board ... 285.00

QUADRAM
- Expanded Quadboard w/0K ... 187.00
- Expanded Quadboard w/384K ... 243.00
- Silver Quadboard w/0K ... 193.00
- Gold Quadboard w/0K ... 357.00
- Quadmeg-AT w/128K ... 293.00
- Quadport-AT Starter Kit ... 125.00

STB
- Grande Byte-AT w/128K ... 187.00
- Quarter Byte w/256K ... 154.00
- Big Byte Memory Board w/64K ... 114.00
- Rio Plus II w/64K ... 175.00
- Super Rio II w/64 ... 253.00

TECMAR
- Captain Multifunction w/0K ... 139.00
- Maestro Multifunction w/0K ... 320.00
- Wave 64K ... 173.00

SIGMA DESIGNS
- Maximizer w/64K ... 167.00
- Maximizer w/0K ... 147.00
- Sigma Expansions Chasis (9 Slots) ... 750.00

ACCELERATOR BOARDS

ORCHID TECHNOLOGIES
- Turbo 286E W/1MB ... CALL
- Tiny Turbo 286 ... CALL

TITAN
- Accelereator PC w/128K ... 477.00

MCT
- Speed Demon PC ... 377.00

QUADRAM
- Quadsprint ... 427.00

VIDEO CONTROLLER CARDS

AST RESEARCH
- AST-Preview ... 350.00

HERCULES
- Color Graphics Card ... 147.00
- Graphic Card Plus ... 188.00

PARADISE SYSTEMS
- Modular Graphics Card ... 233.00
- Color Card ... 84.00
- Monochrome Card ... 88.00
- Multi Display Card ... 168.00
- Color/Mono Card ... 124.00

PERSYST
- Mini Monochrone Board ... 117.00

QUADRAM
- EGA+ ... 359.00

SIGMA
- Color 400 Card ... 417.00

STB
- The Chauffeur ... 219.00
- EGA Plus ... 295.00

TECMAR
- Graphics Master ... 279.00

VIDEO 7
- Monochrome Graphics Adaptor ... 123.00
- Monochrome Graphics Adaptor+ ... 165.00
- Vega Board ... CALL

MONITORS

AMDEK
- Video 310A Amber ... 143.00
- Color 300 Composite ... 207.00
- Color 600 Hi-Res RGB ... 383.00
- Color 722 RGB Enhanced Graphic ... 477.00

NEC
- Multisync ... 525.00

PRINCETON
- All Princeton ... CALL

TAXAN
- 121 12" Green ... 133.00
- 630 RGB Color 640 x 400 Res ... 433.00
- 640 RGB Color 720 x 400 Res ... 495.00

COMMUNICATION BOARDS

AST RESEARCH
- AST-3270 ... 729.00
- AST-3780 ... 570.00
- AST-5251/11 ... 575.00
- AST-5251/12 ... 370.00

DCA
- IRMA Board ... 795.00

QUADRAM
- Quadlink ... 309.00

COMMUNICATION SOFTWARE

COMPUSERVE
- Compuserve Starter Kit ... 19.50

DELTA TECHNOLOGIES
- Direct Access ... 57.00

MICROSOFT
- Access ... 155.00

MICROSTUF
- Crosstalk ... 93.00
- Remote ... 93.00
- Transporter ... 137.00

SOFTWARE PUBLISHING
- PFS: Access ... 50.00

MODEMS

ANCHOR AUTOMATION
- Signalman Express 1200 ... 227.00
- Signalman Lightning 2400 ... 347.00
- Volksmodem 1200 ... 183.00

AST
- AST Reach Internal 1200 ... 345.00

HAYES
- Smartcom II ... 82.50
- SmartModem 300 (External) ... 133.00
- SmartModem 1200 (External) ... 355.00
- SmartModem 1200B (Internal) ... 313.00
- SmartModem 1200B (Internal w/Software) ... 333.00
- SmartModem 2400 (External) ... 567.00
- SmartModem 2400B w/Software ... 529.00
- Hayes Transet 1000 ... 263.00

NOVATION
- 2400 Standalone Modem w/Software ... 569.00
- 2400 Standalone Modem ... 470.00
- Half-Card 2400 w/Software ... 470.00
- Half-Card 2400 Hardware Only ... 417.00

PROMETHEUS
- Promodem 1200 ... 267.00
- Promodem 1200B Hardware Only ... 199.00
- Promodem 1200B w/Software ... 207.00

US ROBOTICS
- Password 1200 Baud ... 197.00
- Courier 2400 Baud ... 387.00

VENTEL
- 2400 Half-Card w/Crossstalk XVI ... 447.00
- 1200 Plus External 300/1200 ... 313.00
- PC Model 1200 w/Crosstalk XVI ... 313.00
- PC Modem ½ Card w/Xtalk ... 337.00

200M TELEPHONICS
- PC 1200 w/Software ... 257.00
- PC 1200 Hardware Only ... 227.00

DRIVES

ARCHIVE
- 60MB Cartridge Backup (Internal) ... 695.00
- 60MB Cartridge Backup (External) ... 750.00

EVEREX
- 20MB Cassette Backup (Internal-MEMTEK) ... 575.00
- 20MB Cassette Backup (Internal-TEAC) ... 625.00
- 60MB Cartridge Backup (Internal) ... 835.00
- 60MB Cartridge Backup (External) ... 975.00
- 100MB Cartridge Backup (External) ... 995.00

IOMEGA
- Bernoulli Box 10MB Plus W/Cntr ... 1825.00
- Bernoulli Box 2—10MB w/Cntrl ... 2199.00
- Bernoulli Box 2—10MB Plus w/Cn ... 2249.00
- Bernoulli Box 2—20MB w/Centrl ... 2899.00
- Bernoulli Box 2-20MB Plus w/Cntrl ... 2949.00

PRIAM
- 40MB for XT (Internal) ... 1395.00
- 60MB for XT (Internal) ... 1450.00
- 40MB for AT (Internal) ... 1175.00
- 60MB for AT (Internal) ... 1350.00

RACORE
- Drive Two for PC Jr. ... 355.00
- Expansion Board for JR W/128K ... 155.00

SEAGATE
- 20MB Half Height for XT Int ... 395.00
- 20MB Full Height for XT Ext ... 550.00
- 30MB Full Height for AT Int ... 695.00
- 40MB Full Height for AT Ext ... 795.00

MPI
- 360KB Full Height ... 90.00

TALLGRASS
- 60MB Cartridge Backup (External) ... 1335.00

THESIS
- Fast File (5MB RAM Disk) ... 1895.00

NETWORK CARDS

ORCHID
- PCNET Blossom 64K ... 527.00
- PCNET Starter Kit ... 735.00

SPECIALS

AST
- Six Pack Plus 384K w/Side ... 197.00
- Six Pack Premium 512K ... CALL
- Copy II PC ... 18.00
- Fastback ... 94.00
- Nec Multisync ... 525.00
- True Basic w/ 3-D Graphics ... 89.00
- Seagate 20 MEG ½HT XT INT ... 395.00

Northeastern Software Turbo 286 is a trademark of Northeastern Software. MS DOS 3.1 is a trademark of the Microsoft Corporation.

Circle 381 on reader service card

Link Up With Light

As long-distance vendors race to install the first nationwide fiber optic networks, other companies are bringing the technology down to the local area network level. Fiber optic LANs are fast, secure, unobtrusive, and immune to electromagnetic interference.

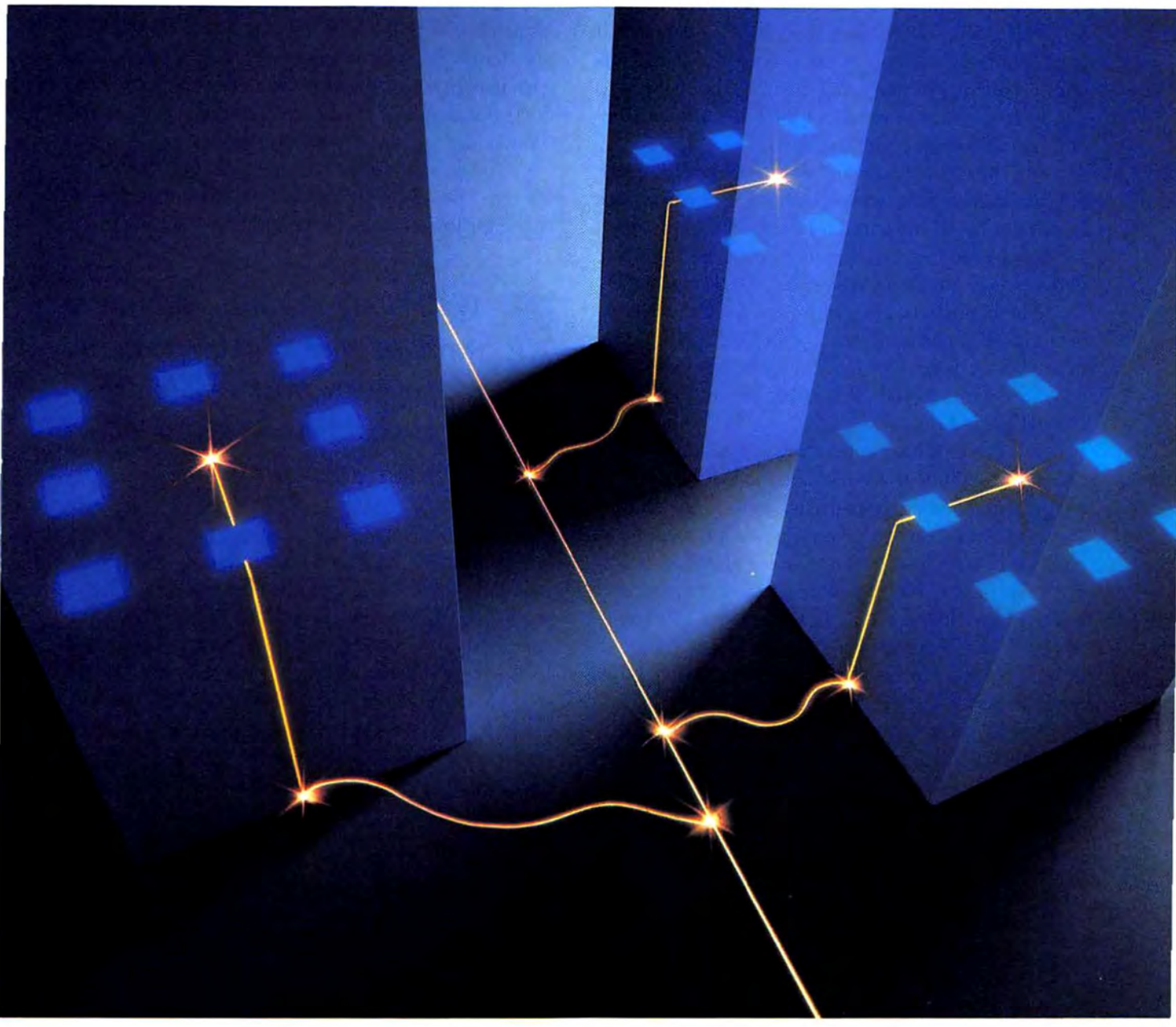
Judy Getts

TV commercials sing their praises, and you can hardly open a phone bill these days without reading about their latest exploits. Fiber optic cables—hair-fine glass fibers that carry voices and data at near the speed of light—are being threaded across the country, under the Atlantic, below streets, and through office electrical conduits. Everyone, it seems, is installing fiber, from the major long-distance carriers to the regional Bells to corporate telecommunications planners.

Fiber's qualifications are as clear as glass. Besides being fast, it's lightweight and has an information-carrying capacity that's mind-reeling—AT&T's fiber cables can handle 6000 phone calls simultaneously on a single fiber pair, a capacity that will increase to 24,000 calls within two years.

More important for PC users, the technology has recently been touted as a solution for the problems of local area networks (LANs). Nearly all LAN vendors, including AT&T and IBM, include fiber optic options for segments, if not the entirety, of their networks, and a few companies peddle fiber LANs that bring the optic connection right up to a port on the back of a PC.

David Bishop



A Flash of History

While the notion of transmitting information via light has been around since physicists' early research on waveguides in the 1920s, it wasn't until 1970, when Corning Glass was able to fabricate the first low-loss silica fibers, that the light age was officially heralded. Throughout the seventies, research in optical fiber focused on its use in long-distance trunk lines. The fruits of that research are being realized today, as long-distance vendors hasten to complete the first nationwide fiber optic network.

In the eighties, research has emphasized using fiber in smaller-scale networks. In 1983 the first backbone fiber LANs appeared on the market, and they are now becoming increasingly popular in industrial parks, universities, and businesses. (Backbone LANs act as umbrella networks, often spanning the distance between floors or buildings and linking mainframes, PCs, PBXs, and smaller LANs.) Quite frequently they mix fiber with coaxial cable—fiber for outdoors, coaxial for indoors.

At present, fiber constitutes only about 1 percent of the cabling used in backbone LANs, but sales are growing, and analysts predict that boom times are just ahead. "Anybody who puts in a backbone today that doesn't have a provision for fiber is going to be in serious trouble," maintains Ernest Raasch, executive vice president of operations for fiber LAN vendor Codenoll Technology of Yonkers, New York. Although none of the networks currently on the market take full advantage of fiber's wide bandwidth and high speed, the equipment to do so isn't far off. And when that advance in the technology comes, copper-based networks may be left far behind.

A Light Primer

An optical fiber consists of an inner glass or plastic filament (core) and an outer glass cladding of lower refraction. Light pulses generated by either laser or light emitting diode (LED) are beamed into the core, travel the length of the fiber, and are registered at the other end by a photodetector receiver. Along the fiber's route, optical repeaters amplify the signal so that it arrives full strength at its destination.

The difference in refraction between the core and the cladding is the key to keeping light within the fiber. As light is propelled through the core, it reflects off the cladding walls, ricocheting back and forth along its path. Inner refraction enables light to seemingly sidestep the laws of physics by negotiating turns.

Optical fiber falls into two main genres: single mode and multimode. The core of a single-mode fiber is tiny (2 to 8 microns) and can pass only one wavelength of light—or 1 mode—at a time. A mode is analogous to a sound wave in a harmonic structure. Just as a tuning fork propagates sound waves in a single frequency, a single-mode fiber sends light waves in one frequency. A multimode fiber, on the other hand, with its much wider core of 50 to 125 microns, conducts thousands of frequencies, so that a typical multimode fiber carries about 2000 modes.

Single-mode fiber has the wider bandwidth of the two (3 to 6 gigahertz, or GHz), making it the favorite for long-distance telephony. Its cladding is usually quartz, and its silicon core is doped with germanium dioxide. The main problems with single-mode fiber are the high cost of the laser-signaling source (ten times more expensive than an LED), and its tiny core that makes splicing troublesome.

While long-distance endurance, ultrafast speed, and high data capacity are fiber's hallmarks, these qualities are less significant for LANs.

Multimode, in contrast, is both cheaper and easier to handle and thus more applicable to a LAN environment. Often, multimode fiber is manufactured entirely of plastic or quartz, and sometimes it's a combination of the two. It can be either laser- or LED-powered, although the low-priced LED is the customary choice in short-haul transmission lines. Multimode's bandwidth is considerably lower than that of single mode (20 to 400 MHz) due to the greater dispersion of light pulses within the multimode core. (Bandwidth is inversely related to dispersion; the greater the spread of a light pulse, the lower the bandwidth.) But the lower bandwidth is not a problem with most networking applications.

For use in LANs, fiber generally comes packaged in cables of 2 to 4 fibers, but bundles of up to 24 strands are sometimes used. The simplest approach is

to assign 1 strand to transmission and another to receiving. The fibers might be coated in plastic, buffered in yarn, or packed in a tube of flame-retardant polyurethane. For use in harsh environments, cables may also be "ruggedized" with an armoring of steel.

Quick and Clean

While long-distance endurance, ultrafast speed, and high data capacity are fiber's hallmarks, these qualities are less significant for LANs. The average speed of a fiber LAN is only 10 megabits per second, which is the speed at which some coaxial LANs run. Fiber LANs that operate at up to 200 megabits per second exist, but vendors say that equipment to drive a network faster than 10 megabits per second is not yet cost-effective. "Speeds of up to 100 megabits per second or more require a long-wavelength LED, which is about five times more expensive," says Jay Cunningham, product line manager for fiber vendor Siecor Corporation of Research Triangle Park, North Carolina.

Siecor's Fiber Optic Ethernet LAN acts as a backbone that connects PCs, terminals, PC-based LANs, and mainframe coaxial networks. The Siecor Star Wiring Center's passive transmissive coupler serves as traffic cop, connecting nodes via optical transceivers that change light signals into electric digital pulses and vice versa (see Figure 1).

Some high-speed LANs, such as the 80-megabits-per-second token ring ProNET from Proteon of Natick, Massachusetts, appear to be selling well to organizations that require a high-throughput backbone for host-to-host connections or transmission of graphics and medical imaging. Says Ronald Kopeck, president of San Francisco consulting firm Edgetech Associates, "Fiber really comes into play when you're moving a lot of data out of a central hub." A high-bandwidth fiber network allows mainframes to pass data to other computers at speeds rivaling those of the mainframe internal processors, and with much

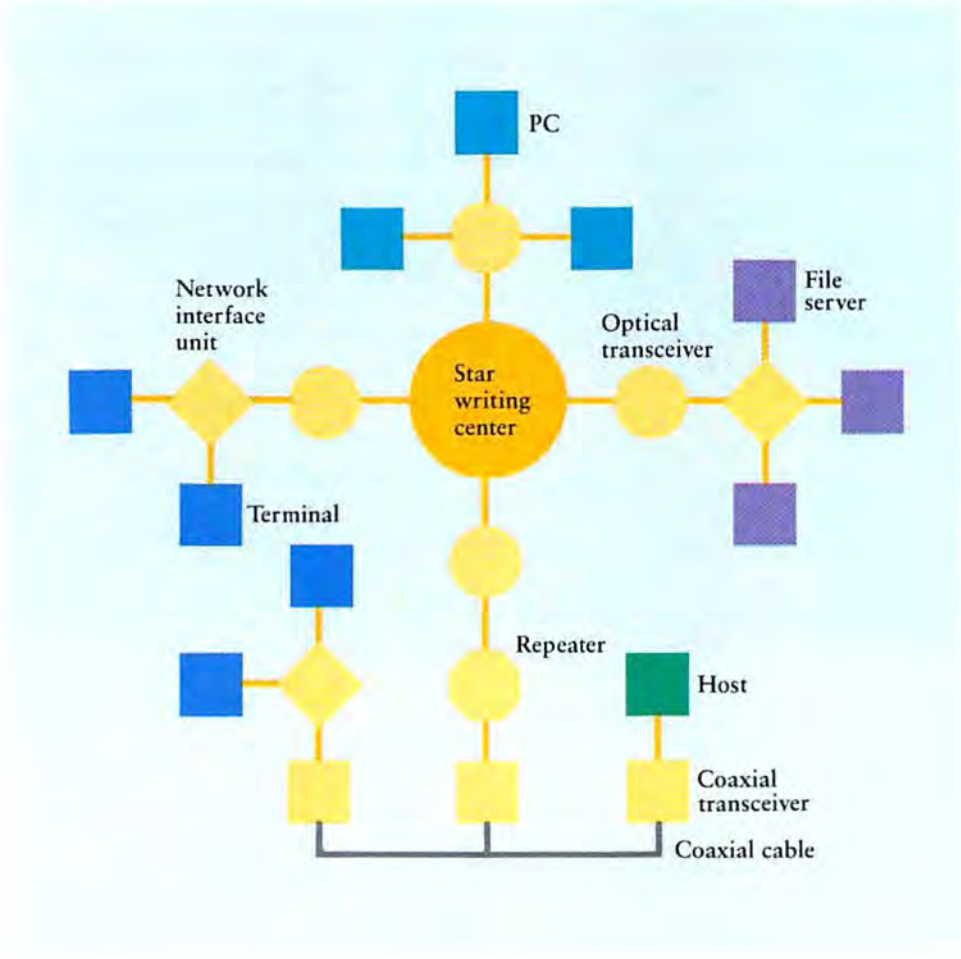


Figure 1: Siecor's Fiber Optic Ethernet LAN, representative of many of the fiber optic backbone LANs that are connecting businesses, universities, and industrial parks, offers fast, highly secure communications. The network uses a passive transmissive star coupler to route communications between mainframe networks, PCs, and smaller LANs. Optical transceivers are required for all connections, and coaxial transceivers are used to connect to coaxial networks.

Fiber at Clarkson Refinery

Clarkson Refinery is a typical case where environmental problems compounded with networking needs made optical fiber the only feasible choice. The Petro-Canada refinery, located in Mississauga, Ontario, sprawls over several square miles. Scattered among its factory floors and office buildings are 30 terminals and four DEC minicomputers (one for management applications and three dedicated to process control), plus seven PC ATs in the product quality lab.

Previously, the refinery used a data communications system based entirely on telephone lines and modems. If employees needed access to all four minicomputers, they required four modems and four separate telephone lines. Not only was this setup clumsy and inflexible, but, according to Terry Tomney, coordinator of computer services at Clarkson, it was also nerve-wracking. Whenever transmission problems developed, Clarkson was forced to wrangle with the phone company over who was at fault. Wearying of these feuds, Clarkson decided to establish its own data network.

Yet obstacles loomed, most immediately in the form of two large radio station transmitters located near the refinery's property line. In the past when Clarkson had run coaxial cable through the grounds for tank-gauging systems, the cabling had been stormed by RF interference. Also, installation of electrical cable in the midst of an oil refinery requires safety procedures that put ordinary building codes to shame.

In the face of these restrictions, fiber was the logical choice. Clarkson decided to use it only for the vulnerable outdoor lines between office buildings. Coaxial cable would be used indoors because it would be easier to tap into for network connections. For the outdoor backbone, the company chose an Ungermann-Bass Optical Fiber Net/One, a 10-megabits-per-second Ethernet LAN. The fiber radiates out from the network's hub like octopus arms, each connecting to one of the company's ten buildings. An optical transceiver in each building converts the fiber connection to coaxial cable, which loops through each building, connecting terminals, PCs, printers, and minicomputers in a star configuration.

Clarkson began installing the network in August 1985 and had it up and running by January 1986. Derek

Brunt, an electrical technologist at Clarkson who was responsible for installing Net/One, says he found fiber surprisingly easy to work with. "It was the first time I'd ever dealt with fiber optics," he says, "but it was quite easy to install."

Brunt says that in the past when he installed coaxial cable, he'd had to enclose the cable in explosion-proof conduits and seal every seam: "If any gases leaked into those closures, it would cause an explosion." But with optical cable, not only could he forgo fiddling with sealer and conduits, he could run the fiber around pipe racks of crude. Fiber's light weight was an added plus, especially since the cable's route was one of roller-coasterish dips and rises. "I could just hang it on the guideways," says Brunt. "Coax has to be clipped about every 6 feet."

Clarkson has yet to experience problems with Net/One, according to Brunt and Tomney. Presently, Clarkson has less than 50 devices on the network, but the company is planning at least 50 more. While glitches may yet appear, for Petro-Canada fiber has thus far been the most refined answer. *–J. G.*

Safe and Secure

Speed may not be of the essence in most LAN setups, but security often is. Because fiber, unlike coaxial, gives off no radio frequency emissions, eavesdroppers cannot tune in to its signals from afar with electronic surveillance equipment. Furthermore, it's extremely difficult to physically tap a fiber cable without destroying its signals.

Not surprisingly, the military-industrial complex is a prime customer for fiber optic networks. Recently the Pentagon installed a massive fiber network, and fiber optic Ethernet LANs are being set up at Martin Marietta, McDonnell Douglas, U.S. Marine Corps headquarters, and other sites.

For other fiber LAN users, the medium's immunity to electromagnetic interference is a strong selling point. Because fiber relies on light-wave signaling, it's unaffected by copper's direst enemies. Lightning, differences in voltage between buildings, even stray emissions from copy machines and fluorescent lights can, if not render a length of copper useless, at least pollute its signal. Under heavy electromagnetic bombardment, a wire network's speed can be significantly slowed by frequent retransmission of data due to errors.

Fiber LANs are particularly well suited to the factory floor, where emissions from heavy machinery are often so "noisy" that networking on copper is virtually impossible. Furthermore, because fiber is not electrical, it's safe—a boon in hazardous manufacturing environments, where even one tiny spark from a coaxial cable could set off an explosion (see the sidebar "Fiber at Clarkson Refinery").

Light and Flexible

Safety and ease of installation also make fiber desirable in office situations. Because fiber poses no fire danger, it can be strung without shielding in areas forbidden to copper, such as ceilings, air ducts, and elevator shafts. The lightweight fiber cables can be installed easily in walls and floors, where heavy copper would require support. Because of the smaller diameter of the cables, you can add more cable to normally overcrowded ducts and establish new connections without making major building modifications. In addition, because fiber suffers less signal attenuation

cleaner transmission than coaxial provides.
than copper, it can be strung for longer distances between repeaters.

One of optical fiber's chief attractions is that, unlike copper, it need not be restrung as a network changes and grows. On a coaxial network, devices cannot be changed to upgrade bandwidth because of the resulting mismatches in electrical impedance. Fiber, being dielectric, poses no such problem. A fiber LAN running at 10 megabits today can be running at gigabit speeds tomorrow. All the boost in capacity requires is a change of network devices at either end.

Says Cunningham of Siecor, "We're seeing a lot of growth in fiber sales to universities that want to allow for future networks of a higher speed and performance." Among the universities that have installed fiber LANs are Harvard University, Massachusetts Institute of Technology, Stanford University, the University of Wisconsin at Madison, and the University of Chicago.

Large corporations are already following suit. According to Bart Bielawski, senior vice president of corporate development for Siecor, businesses are coming to view fiber as a long-term investment. "Customers keep telling us, 'With coax I'm going to have a bunch of useless cables in my walls that will cost me money to rip out.'"

Problems in Paradise

Numerous problems have hindered fiber's success in the LAN environment, ranging from the difficulty of installing couplers and connectors to lack of standardization. Some still question the maturity of the technology, citing the remaining foibles of connectors and the paucity of test equipment. "For at least the next year or two," says Edgetech's Kopeck, "you'll still be reading horror stories about a customer trying fiber in environments where it's a total failure."

While many objections to fiber LANs have faded, the biggest complaint—high prices—remains. "It isn't so much the equipment costs as the cost of installation," says Abe Mazliach, product manager for fiber LAN vendor Ungermann-Bass of Santa Clara, California. "The splicing and the connectors get pretty expensive."

Labor intensive is the phrase fiber vendors use to describe the delicate process of lining up the micron-sized cores of two optical fibers with metal ferrules. Explains Bill Scull, Ungermann-Bass's group product manager for terminal switching and media, "So much of the cost of a fiber system is labor, getting in the people who have the expertise to do the splicing."

Fiber LANs will eventually dominate the backbone market, but whether fiber will become a mainstay of PC-based LANs is open to dispute.

Despite the advent of easier-to-install "twist-on" connectors, the process still causes even do-it-yourselfers to blanch. "You hear network managers say, 'I've existed with copper wires for years, and I can hook them up real easy with a penknife and some epoxy, so why should I use fiber?'" says John Fulenwider, a senior telecommunications analyst with Arthur D. Little of Cambridge, Massachusetts.

In addition to labor costs, hardware prices are still pretty steep. Although prices have plummeted in the past few years, they'll have to drop further for fiber LANs to become truly cost-effective, according to analysts. "Transceiver prices have decreased 30 to 40 percent per year for the past few years, and connectors have seen a 15 percent decrease," says Brad Baldwin, an analyst at Dataquest, a San Jose, California, industry research company. "Prices will continue to come down and by 1988 will finally stabilize."

As for fiber cable itself, it has at last reached the point where it's cost-competitive with broadband coaxial. A decade ago, fiber went for about $6 a foot. Today, the same cable costs 15 cents a foot, approximately the same as coaxial. Fiber's drop in cost can be attributed to refinements in mass production methods that allow glass to be pulled longer, faster, and with fewer breaks.

Knocking on the PC's Back Door

Despite the remaining problems, there is little question that fiber LANs will eventually dominate the backbone market, but whether fiber will become a mainstay of PC-based LANs is open to dispute. One key problem with implementing fiber on a small-scale LAN is the expense and difficulty of translating between electronics and optics for each PC. A star cluster configuration is currently the predominant topology in fiber PC LANs. Because fiber is a point-to-point medium that discourages taps, the star cluster is the network configuration best suited to optical wiring. The traditional coaxial Ethernet, in contrast, is based on a bus configuration in which workstations are wired to one long, snaking cable. These token-passing LANs are typically formed in a ring. The new fiber LANs have broken the rules by creating star-shaped Ethernet and token-passing LANs.

"You'll be seeing more ring topologies, probably star shaped," says Bob Reinhold of Network Strategies in Fairfax, Virginia. "Logically they'll operate like a ring, but they'll all be wired into a central point." According to Reinhold, the token-passing star configurations are easy to troubleshoot and repair. If one workstation goes down, transmission between the others will remain unaffected.

Normally, connecting a PC to fiber means running copper from the PC's network adapter board to a transceiver. Recently, fiber LANs have been introduced that make this conversion cheaper and easier by bringing both transceiver and network controller together on one PC expansion board. The PDI Fiber Optic LAN, a fiber-based ARCNET token-passing LAN from Pure Data of Toronto, operates at the standard ARCNET speed of 2.5 megabits per second. It comes in both full- and half-duplex versions and can link up to 255 PCs. The PC's fiber connection is made via the PDI508, a combined network controller and transceiver interface board equipped with a basic

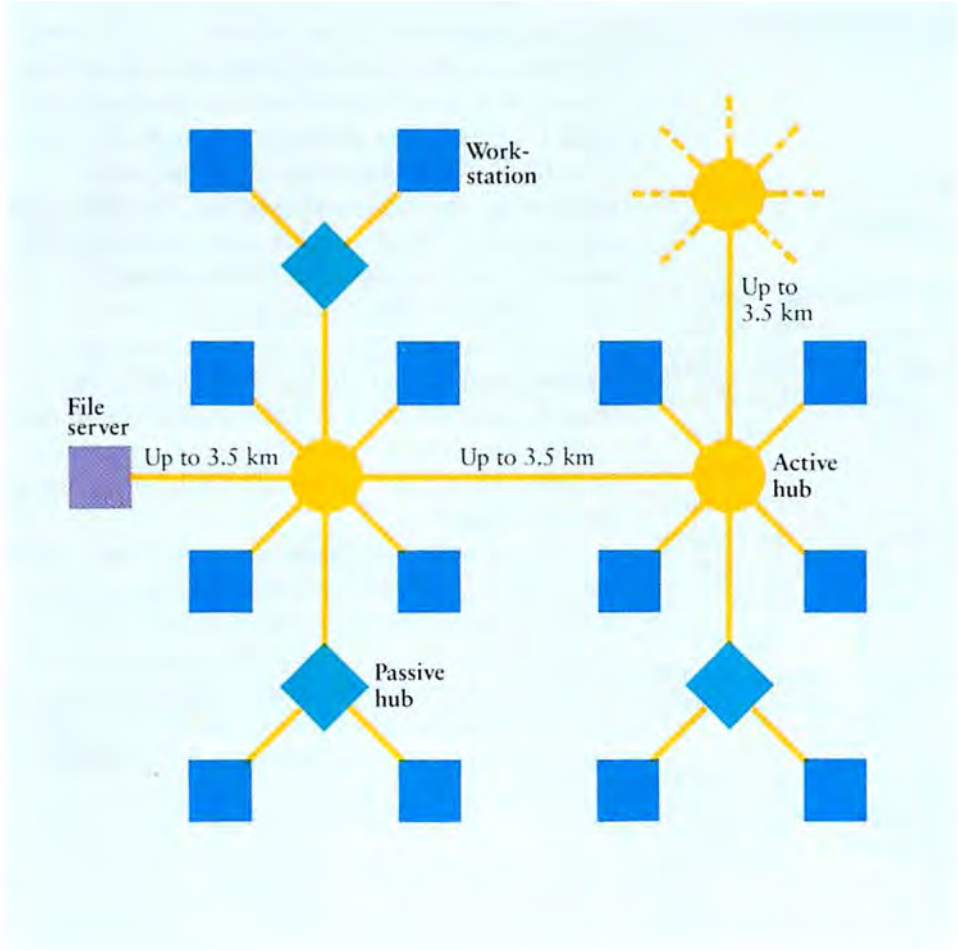


Figure 2: Pure Data's PDI Fiber Optic LAN is one of several new LANs that bring the fiber connection right into the PC. When installed with a PDI508 network board, a PC no longer requires an external optical transceiver to translate between the optical and electronic media. The PDI LAN is an ARCNET token-passing network, connecting various PCs, workstations, and file servers. The active hubs of the network are powered repeaters, boosting signals so that cables between hubs can extend up to 3.5 kilometers. The passive hub lacks power, limiting hub-to-hub links to 100 feet.

fiber optic connector. At $995 for the full-duplex version, the interface is about $300 cheaper than a network controller board with a separate transceiver.

The PCs are linked in a star configuration to a hub, which can be either active or passive; an active hub is a powered repeater, boosting optical signals so that cables between hubs can extend up to 3.5 kilometers. The passive hub is a nonpowered repeater, which limits hub-to-hub links to 100 feet. The active hubs sold by Pure Data include ports for both fiber and coaxial cable so media can be mixed in the network (see Figure 2).

Like the PDI LAN, Standard Microsystems' ARCNET-PC300 includes a $995 board that acts as both a network controller and a transceiver. When the board is plugged in to a PC, the PC may connect via fiber to an ARCNET hub, creating an all-fiber PC LAN.

The prices for PC fiber LANs are high, and the market is pretty much confined to organizations with security concerns and factory-floor wiring needs.

On the IBM Token-Ring and Ethernet fronts are two controller/transceiver boards introduced last summer by Codenoll Technology. The Codenet-3061 Fiber Optic Network Adapter Card converts a 2-megabits-per-second coaxial IBM PC Network or 4-megabits-per-second twisted-pair IBM Token-Ring to a 10-megabits-per-second fiber PC LAN. Developed in conjunction with Sytek of Mountain View, California, the $1195 board contains Sytek's PC bus connection and NETBIOS. Fiber running from a PC equipped with the 3061 is connected to Codenoll's Codestar Passive Optical Star Coupler. As many as 64 PCs can be connected to the coupler, and over 1000 such clusters can be linked together with fiber.

Codenoll's Ethernet fiber optic adapter board is the result of a joint effort with 3Com of Mountain View, California. Combining 3Com's PC bus and digital section with Codenoll's optical transceiver, the $995 Codenet-3051 can be used in server or client PCs to connect via fiber to a star coupler for a 10-megabits-per-second network. Theoretically, up to 64,000 PCs can be connected via star couplers and fiber, or coaxial cable.

Overkill, or On the Money?

As with backbone LANs, the prices for PC fiber LANs are high, and the market is pretty much confined to organizations with security concerns and factory-floor wiring needs. Currently, the cost of a PC-fiber connection for an Ethernet LAN is about 30 percent more than for a broadband coaxial LAN. "We're talking about cabling cost being greater than equipment cost," says Tim Sammons of San Francisco's Future Systems Technology. Future Systems is now selling a 10-megabits-per-second fiber token ring PC LAN, the FST LAN-100, but Sammons says this offering is "only for the sake of completeness in our product line. We don't see a big market for it."

While most analysts consider fiber optics in the office a dream of the future, others see it as a more immediate need. Raasch of Codenoll is one who anticipates that the fiber trend will quickly sweep into office PC LANs. Raasch believes the growth in fiber optic LANs will follow the trend toward wide area networking and multiple-ring setups. "As soon as you start putting networks together and stretching their capability, you run into trouble with twisted pair and thin coaxial," he says. "There are problems with distance and bandwidth that never showed up before." As companies begin to link their PC LANs, says Raasch, they'll discover that fiber's clean transmission and low error rate is required in order to perform massive data transfers without degradation in overall network speed.

Some see hybrid flutterings in the optic crystal ball. "The trend in personal computer networking will be to use twisted pair locally, then use fiber to bridge the distances," says Karel Kosman, chairman of Raycom Systems of Boulder, Colorado, a manufacturer of fiber optic transceivers. "We have a lot of customers who are doing exactly that." The fiber/

twisted-pair duo is regarded by many as the most likely candidate for future PC office wire-ups. Twisted pair is cheap (currently 10 cents a foot), and its speed is sufficient for a PC.

Last summer fiber LAN vendor Artel Communications of Worcester, Massachusetts, announced a fiber/twisted-pair combination LAN—The Fiberway LAN—that allows workstations to connect via a phone jack and cord to a 100-megabits-per-second broadband Ethernet fiber ring. The fiber connects the telephone closets on each floor of a building, and a 200-megabits-per-second fiber backbone ring runs from building to building. Gone is the need for a pricey optical transceiver for each PC. The phone cord connection races along at 2.7 megabits per second and will be supporting RS-232C traffic by the end of this year.

The Fiber Road to ISDN

While the present benefits of fiber optics are clear enough, some advocates expect the technology to play a significant role in the future of integrated services digital networks (ISDN). It is generally conceded that because of their great speed and bandwidth, fiber networks are prerequisite to a future ISDN network of combined voice and data services (see "ISDN: The Network of the Future?" *PCW*, January 1986, and read *Password: Communicate* in this issue for another view).

"Gradually we will go to some version of broadband ISDN that will link voice, data, and some form of interactive video in a workstation right on your desk," says Siecor's Bielawski. "ISDN will have to run on fiber because it won't run at anything slower than 1 megabit."

As for the PC's role in this coming epoch? The PC's 4.77-MHz clock speed and internal design for all practical purposes preclude it from future near-light-speed communications. While the 80286 and 80386 are raising the PC's clock rate to new heights, many analysts feel that silicon-based computers will always be a bottleneck in an otherwise fast fiber optic network. Research sponsored by the Pentagon's Strategic Defense Initiative program is already exploring the feasibility of creating a fully optical computer that would bring the fiber connection into the heart of the CPU. Who knows? Perhaps one day fiber will force the PC to hand over its crown to some nimbler, faster progeny.

Judy Getts is a freelance science writer and a regular contributor to PC World.

Artel Communications, Inc.
P.O. Box 100
Westside Station
Worcester, MA 01602-0100
617/752-5690

Codenoll Technology Corp.
1086 N. Broadway
Yonkers, NY 10701
914/965-6300

Proteon, Inc.
4 Tech Circle
Natick, MA 01760
617/655-3340

Pure Data
860 Denison St.
Markham, Ontario
L3R 4H1 Canada
416/475-3370

Raycom Systems, Inc.
6395 Gunpark Dr.
Boulder, CO 80301
303/530-1620

Siecor Corp.
Electro-Optic Products Division
P.O. Box 13625
Research Triangle Park, NC
27709-3625
919/549-6571

Standard Microsystems Corp.
35 Marcus Blvd.
Hauppauge, NY 11788
516/273-3100

Ungermann-Bass, Inc.
2560 Mission College Blvd.
Santa Clara, CA 95052-8030
408/496-0111

Avert Hard Disk Disasters

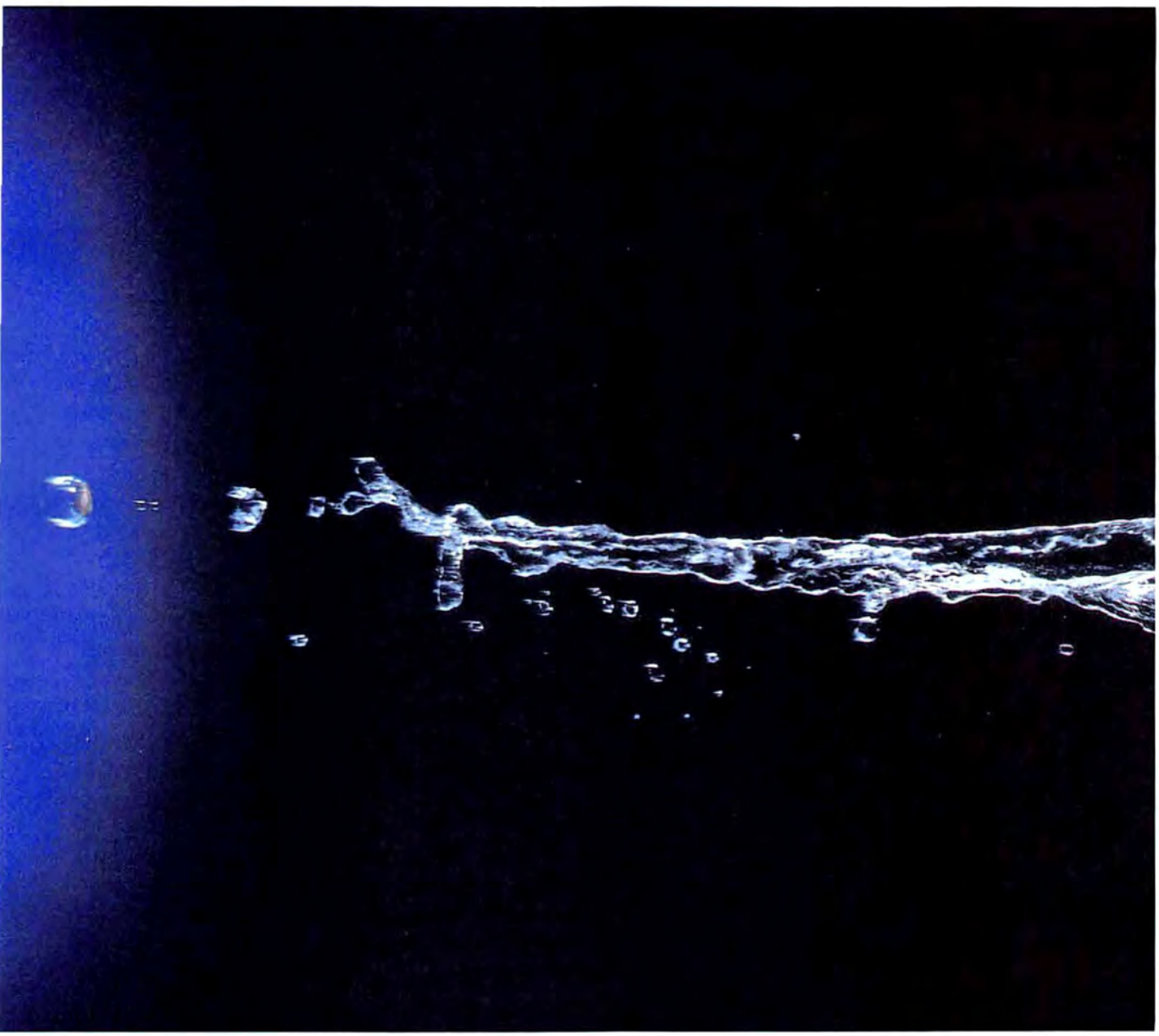
Nine rules of hard disk preventive maintenance to live by, along with a rundown of five programs that help enforce those rules

Donald B. Trivette

The speed and convenience of a hard disk are common knowledge, but keeping the disk organized and performing at peak efficiency aren't necessarily quick and easy tasks. With mail-order drives too reasonable to pass up, you may find yourself with a bargain hard disk—which may need extra TLC.

Whatever the cost of the media, your data certainly isn't cheap, and you'll want to avoid disk crashes, bad sectors, and DOS quirks at all costs. Eternal vigilance is the price of a low-cost hard disk. Whether you've got a blue-plate special or IBM's finest, hard-disk management begins with good preventive maintenance.

Fortunately, a multitude of solutions are available. Five utility programs—*PC Tools*, *Norton Utilities*, *Mace Utilities*, *Disk Optimizer*, and *Safety*



Stan Musilek

Table 1: A feature-by-feature breakdown of notable hard disk utilities

	PC Tools	Norton Utilities	Mace Utilities	Safety Net	Disk Optimizer
Copy/Delete	•				
Sort DIRs	•	•	•		
Reorganize			•		•
Park					
Mark bad sectors	•	•	•		
Undelete	•	•	•	•	
Restore boot			•		
Unformat			•	•	

Net—are particularly useful in implementing some basic rules of hard disk management. Most of those packages also include such capabilities as hiding file names, encrypting data, and searching for text, but those facets of disk management are the makings of another article. None of the five programs provides a friendly DOS front end, unlike such programs as *DirecTree* and *1-DIR* (see "Pathfinders," *PCW*, August 1985); rather, they excel at enforcing good work habits (see Table 1).

This article will focus on tips and product attributes that fall into two categories: those of a housekeeping nature that can help minimize problems, and those that assist in the recovery of data when problems occur.

Unfortunately, a surprising number of sophisticated users, steeped in their application program of choice, feel like hapless wanderers as they traipse through directory after directory, often missing the paths for the trees.

Organization Is Golden

Keep the disk tidy. Every now and then it's a good idea to clean out desk drawers, discard old files and scrap papers, stash pencils in a holder, and collect rubber bands in one place. The same is true for a hard disk. Is the ability to instantly access last year's reports really necessary?

Delete unnecessary and out-of-date data, remove obsolete subdirectories, and review files that have cryptic names like AAA, XYZ, and TEST. This chore won't make your disk any more reliable, but it will help separate the truly useful files from the dross.

Backing up files from your hard disk onto floppies seems a prudent technique. However, if you've accumulated scads of files to be archived, and if they're intermingled with program files or older data files, using the DOS COPY command is a distinctly unpleasant prospect. Indeed, relying on the COPY command to move these files to floppies and delete the originals means setting aside a few hours at minimum. With the Copy and Delete commands in the *PC Tools* utility program, the job takes 15 minutes. Rather than typing each file name and destination—as DOS requires—*PC Tools* asks only that you move the cursor around a directory of file names, marking the ones you want to copy; a single command then duplicates all marked files at a new location (see Screen 1). The Delete command works in the same way. The process is so quick and easy that you'll tidy up your root directory every few days and have that much more time to contemplate the awful mess in the basement.

Keep file names in order. DOS lacks a command to arrange file names in a directory. If you never deleted a file, the DIR command would display the names in the order of their creation. But over time, as files are deleted and new ones added, that order is lost. Although keeping file names in order won't increase the disk's reliability, establishing a naming sequence is a key tenet of disk management, useful in determining what to keep and what to scrap.

File sequence is a matter of personal choice; some users will prefer extensions in descending order and file names in ascending order. This scheme arranges programs with .COM and .EXE extensions first in a directory listing, while files without extensions come last. Most directory-sort programs offer several choices, including ordering by file size and creation date. Because only file names—never the actual data—are reshuffled, reorganization occurs at lightning speed.

Both *PC Tools* and *Mace Utilities* include directory-sort routines, but *Norton Utilities* takes a more practical approach. It's a stand-alone program and has no menu to bother with. Entering DIRSORT E-N rearranges a hundred file names and updates the directory in about 5 seconds. DIRSORT with no options displays a help screen. It's that simple.

Unscrambling the Media

Periodically reorganize your hard disk. Sectors are units of disk space. A small file may use a single sector while large files often claim dozens, even hundreds, of sectors. DOS allocates sectors on a "next available" basis, so a file occupying five sectors, for example, may begin with data on three adjacent sectors but place the remainder in two sectors elsewhere on the disk. Portions of updated files are routinely interspersed with older files.

Files that are frequently modified bear the brunt of this fragmentation. The resulting lack of contiguity significantly slows file access time, forcing the read/write head to scamper around the disk's surface in order to read a file. Contrary to what you might think, organizing a file into contiguous sectors has nothing to do with a hard disk's reliability. DOS is oblivious to whether a file's next sector is adjacent to the last one or tucked away in some far-flung nook or cranny of the disk.

To determine just how fragmented your files have become, type the DOS command CHKDSK *\path**.* (check disk, all files of the specified directory) for each subdirectory that contains data files

```
PC Tools - File Copy Service                          Volume Label=None

Path=C:\LETTERS2\*.*
   Name      Ext      Size #Clu   Date     Time  Attributes
   HDL5               597    1  3/29/86 10:56a Normal
   HDL6               590    1  3/29/86 10:57a Normal
   HEBRON1           1063    1  2/27/86 11:48a Normal
   HEBRON11          1063    1  2/27/86 11:48a Normal
   HEREFORD           635    1  6/25/86  3:01p Normal
   HODGINLE           698    1  5/09/86  8:24p Normal
   HOWTEK             511    1  7/07/86  2:56p Normal
   IANUZZI           1051    1  5/09/86 11:26p Normal
   IANUZZI2           603    1  5/15/86 12:35p Normal
   IREDELL            447    1  5/02/86 10:37a Normal
   IVEY               633    1  6/09/86  9:42a Normal
   IVEY2             1099    1  6/14/86  6:21p Normal
   JULIAN             594    1  3/11/86  6:14a Normal
   JULIAN3            698    1  7/08/86  8:12p Normal
   KIRKLET            821    1  5/09/86  8:08p Normal
   KIRKMAN           3241    2  3/25/86  9:17p Normal
   KLICOS3           1073    1  2/09/86  1:26p Normal
    146 entries listed totaling    132757 bytes.  4159488 bytes available.
```

Screen 1: The menu for the PC Tools Copy command enables you to do in one fell swoop what would take several hours using DOS.

that you or an application program update or modify. The directories that hold your word processing documents, data base files, and spreadsheets should all be examined by CHKDSK *path**.* statements. One 80K file can be scattered over as many as 23 sectors. CHKDSK can document such fragmentation, but it can't repair it. No single DOS command can fix fragmentation on a hard disk. Although you can reorganize floppies by copying fragmented files to a newly formatted disk with the COPY A:*.* B:*.* command, hard disk reorganization with DOS is a more arduous process, entailing use of the BACKUP, ERASE, RMDIR, and RESTORE commands.

Disk Optimizer and *Mace Utilities* both contain programs to reorganize a hard disk. *Disk Optimizer* includes an analysis program that reports the percentage of fragmentation on the total disk or on a file-by-file basis (see Screen 2). The initial optimization procedure takes from 30 minutes to an hour; subsequent optimizations consume considerably less time. Be advised, however, that reuniting orphaned sectors won't produce a net gain in disk space; you'll need a file compression utility to accomplish that goal. Fortunately, optimizing programs demand little or no additional disk space: *Disk Optimizer* requires one free sector; *Mace Utilities*, no free space at all.

This musical-chairs exercise is entirely automatic and, once initiated, demands no user intervention. Still, optimization can be such a trauma—what with files shifting about—that you may want to leave the house or office and pray no one crashes into a nearby power pole. The good news is that both programs are designed to preserve files and minimize damage should a power failure occur; program execution can be interrupted safely should that be necessary.

Just the Facts

Add CHKDSK statements to your AUTOEXEC.BAT file. In addition to identifying noncontiguous blocks, the CHKDSK command analyzes directories, file allocations, and file structures on any type of media. The CHKDSK command, with no parameters, will also detect and repair certain types of file allocation errors.

When CHKDSK finds sectors of data that don't belong to any file, it asks if you'd like them combined into a new file: 'Convert lost clusters to chains?'. This message is a bit misleading because the command won't create a file unless you've invoked it with the fix option activated (/F). Once CHKDSK reports the problem, you can rerun the command with the fix option and hope for the best.

Orphan sectors are often parts of temporary files that were left on disk when a program was exited abruptly or improperly. After CHKDSK has captured the fragments in a FILE*xxxx*.CHK file on the root directory (where *xxxx* is 0000 for the first fragment, 0001 for the second and so on), it's easy to examine or delete them, thus freeing space on the disk. CHKDSK (with no parameters) is a useful way to determine when things have begun to unravel; it belongs in your AUTOEXEC.BAT file so it can be run regularly. CHKDSK error messages may well be the first indication that your disk is ailing.

Looking for a Parking Place

Always park a hard disk prior to turning the power off. A hard disk's read/write heads float above the spinning platters on a cushion of air. When the power is shut off, either accidentally or intentionally, the head alights on the disk's sensitive surface. The resulting friction causes wear and kicks up microscopic particles. Although the head isn't likely to land repeatedly in one precise location, enough such landings can damage small regions of the disk, thus scrambling data.

Disks that employ voice-coil technology to move the read/write head often include a park and/or lock feature that automatically retracts the head to a safe landing zone when the power ebbs. These disks cost more than units that rely on a stepper motor to position the read/write head. A stepper motor cannot retract the head when there's a decrease in power, so it's necessary to run a head-parking program prior to turning the computer off.

Here's why parking is crucial: With an "unparked" head resting on a data track, any movement—bumping, shaking, casual jostling—can pit the disk surface. When the disk spins, the impaired area creates turbulence that may cause the flying head to collide with the spinning media, destroying both head and disk.

Diligent use of a park program will surely increase the life of the disk and may keep files out of trouble. Park programs can't, of course, prevent the head from hitting the pavement when the power fails abruptly.

None of the five utility programs includes a park program. If your disk came with one, use it; if not, contact the drive manufacturer and request one. And be supremely cautious about any public domain utilities you may find. Word is that running the XT park program (from the IBM Advanced Diagnostics disk) on an AT will result in a complete loss of data.

Periodically check for bad sectors. Even the best hard disks contain minute manufacturing flaws that render a few sectors unusable. DOS marks these locations in a table when the disk is formatted and won't permit data to be written to the offending areas. With the passage of time, however, it's not unusual for a hard disk to develop additional bad sectors, as we've seen. (Two sure signs of approaching disaster are large and sudden or slow and steady increases in the number of bad sectors.)

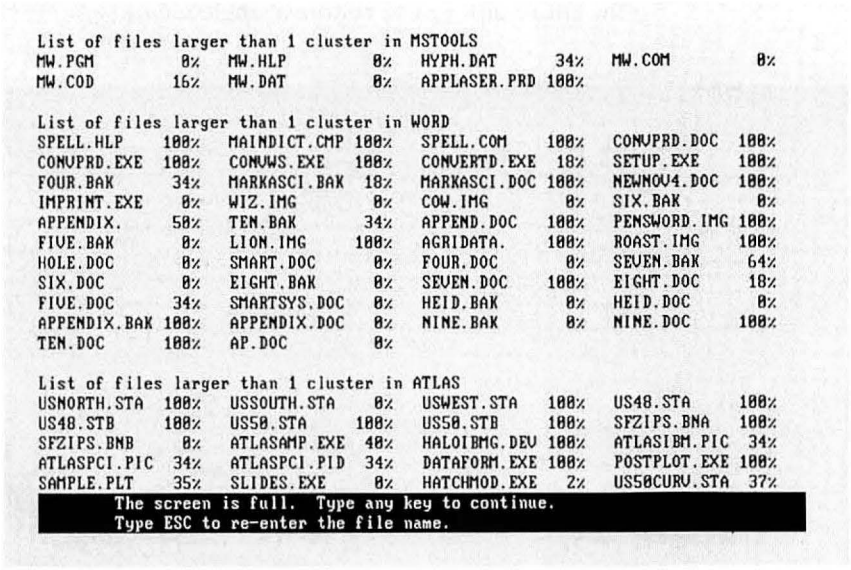
The idea is to find and mark such trouble spots before data gets there. *PC Tools*, *Norton Utilities*, and *Mace Utilities* all include programs to pinpoint bad sectors. All work well, but *Mace Utilities* is particularly appealing because it goes about its business graphically (see Screen 3).

Forgiving Your Mistakes

Learn how to undelete a file (before it's too late). When you delete a file with the DOS ERASE command, data isn't actually erased; instead, the first character in the file name is replaced with a special symbol, and the file's sectors are declared free and available for new files. That's why writing new data to disk after a deletion prevents recovery of old data.

PC Tools, *Norton Utilities*, and *Mace Utilities* enable you to dig up deleted files. These programs usually work successfully, but sometimes the file—or part of the file—simply can't be recovered. All three programs offer both manual and automatic modes. In automatic, the undelete program attempts to string the sectors together into a restored file—a process that often works. The manual mode enables you to examine potential sectors and decide whether they should be added to the file. However, it's more than likely that if the undelete program can't automatically put the file back together, neither can you.

Safety Net approaches file recovery differently; because it doesn't delete files, it has no difficulty recovering them. A RAM-resident program, usually loaded by the AUTOEXEC.BAT file, intercepts the DOS ERASE or DEL command, tricking DOS into



Screen 2: The analysis screen of Disk Optimizer indicates the percentage of hard disk file fragmentation prior to optimization.

believing the file was deleted. In fact, the file is intact and will remain hidden and undisturbed indefinitely. Three weeks later, when you realize you shouldn't have wiped out a dozen files, all can be retrieved quickly and easily from the *Safety Net* menu. And you needn't supply the first character of the file name or worry about missed or corrupted sectors.

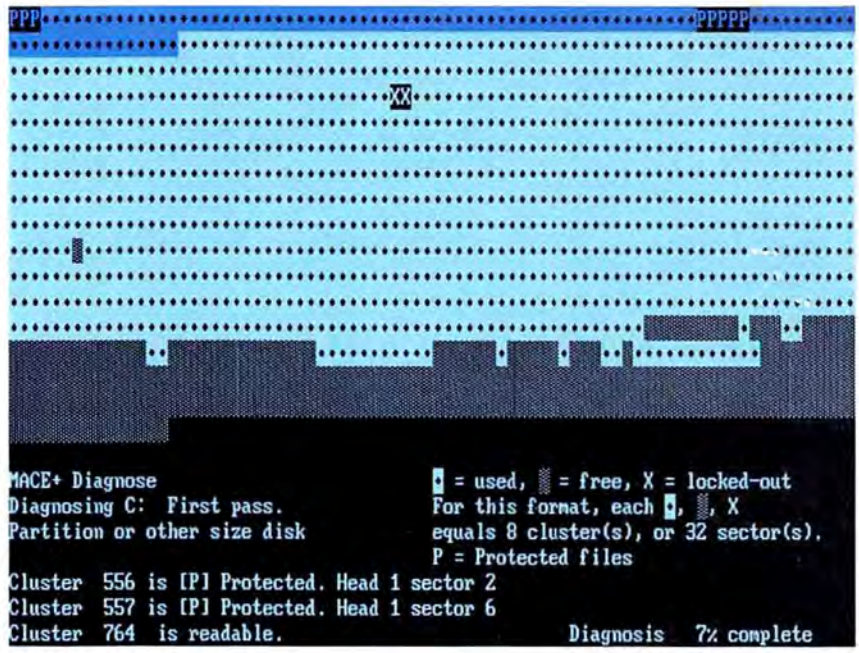
The only catch to this recovery scheme is that the few ill-behaved programs that clear system RAM will remove *Safety Net* without your knowledge; deleting a program under those circumstances really does eradicate it, and you may be none the wiser.

When you eventually run short of space and want to delete old files, you can use *Safety Net*'s purge command. Alternatively, you can turn the program off and use the DOS DEL command in the usual way.

Whether you use a recovery program or *Safety Net*, it's a good idea to prepare for the real thing—the day you accidentally wipe out your record of tax deductions isn't the best time to learn an undelete program. Delete a file intentionally and then try to restore it. Use both manual and automatic modes. Do not, however, delete more than a single file. Attempts to recover multiple files are likely to create confusion. That's because automatic recovery facilities seek out contiguous sectors, which may not correspond to your deleted files. In addition, when using your word processor to view portions of the recovered file (in manual mode), be aware that the word processor may insert codes—including an end-of-file marker—that make rebuilding the file impossible.

Be prepared to restore the boot record. The DOS FORMAT command creates the *boot sector* or *boot record*—the first sector of a disk—when the disk is formatted. The boot record contains the small but vital program that loads DOS into RAM. Damage to the hard disk's boot record will prevent the PC from using the disk to start the system. Other data on the disk is apt to be unaffected, and the computer can be started from a bootable floppy in drive A:, although that method is quite an inconvenience for anyone accustomed to starting directly from a hard disk. Without special arrangements, the only way to repair a defective boot record is to reformat the disk—an arduous process that requires you to back up all your files first.

Although the boot record is rarely damaged, it does happen, and *Mace Utilities* includes a program that can reconstruct the record, assuming you've done a little advance planning. The same special file that enables *Mace Utilities* to unformat a hard disk also contains enough information to rebuild a defective boot record. Once you select Restore Boot from the *Mace Utilities* menu, the process is automatic. And it certainly beats having to back up and reformat the entire disk just to restore a single sector.



Screen 3: If you've got bad sectors, you might as well figure out where they are. Mace Utilities graphically pinpoints trouble.

Wiping the Slate Clean?

Plan in advance to unformat your disk. It used to be axiomatic that formatting a disk destroyed all its data. Forever. Now you can protect your disk from the effects of accidental reformatting. Both *Safety Net* and *Mace Utilities* offer a utility to avert this catastrophe.

Both tool kits require that the AUTOEXEC.BAT file include programs that save vital address and directory information to a special file. Under DOS, disk formatting is similar to file deletion—the data remains but the names and addresses have vanished. Both unformat programs locate the special file that contains address/directory information; from this file they reconstruct the disk based on the last time the address/directory information was saved. The program that creates the file may be run at any time to ensure up-to-date restoration.

Note that this portion of *Mace Utilities* does not work on a 20MB Bernoulli Box, although the unformat utility performs satisfactorily on older 10MB Bernoulli drives. Developer Paul Mace is said to be at work on an update for the 20MB Box. *Safety Net* was not designed for the Bernoulli Box, regardless of capacity.

While such unformat programs can be extremely useful, the very thought of testing them—of intentionally formatting an active hard disk—is terrifying. It's the one utility you'd just as soon not use.

This collection of tools is, of course, only a first step toward fine-tuning and sensibly managing a hard disk. Other equally useful utilities are available commercially or are in the public domain. Just treat your hard disk with the same orderly approach you would its upright, steel counterpart. That ought to be enough to keep you from breaking into a cold sweat the next time a drawer gets stuck.

Donald B. Trivette is a freelance writer and consultant living in Wrightsville Beach, North Carolina.

Disk Optimizer
SoftLogic Solutions
530 Chestnut St.
Manchester, NH 03101
800/272-9900
List price: $49.95
Requirements: 128K, one disk drive, DOS 2.00 or later version

Mace Utilities
Paul Mace
206 Alicia Ave.
Ashland, OR 97520
503/488-0224
List price: $69.95
Requirements: 256K, one disk drive, DOS 2.00 or later version

Norton Utilities 3.1
Peter Norton Computing
2210 Wilshire Blvd.
Santa Monica, CA 90403
213/826-8032
List price: $99.95
Requirements: 128K, one disk drive, DOS 2.00 or later version

PC Tools
Central Point Software
9700 S.W. Capitol Hwy. #100
Portland, OR 97219
503/244-5782
List price: $39.95
Requirements: 256K, one disk drive, DOS 2.00 or later version

Safety Net
Westlake Data Corp.
P.O. Box 1711
Austin, TX 78767
512/474-4666
List price: $49.95
Requirements: 128K, one disk drive, DOS 2.00 or later version

SuperKey Creates Custom Tutorials

When it comes to commercial training programs, one size doesn't fit all. Some are too expensive, others, too general. With a little macro elbow grease and Borland's SuperKey, you can produce customized tutorials and learn the basics of program design.

Rick Altman

There was a time when creating applications was strictly the domain of professional programmers. And for good reason, when you consider that A$ = INPUT$(1) is as conversational as most high-level languages get. Those who sanely shun programming but need the power of a programming language can seek solace in keyboard macro processors like *SuperKey*. With *SuperKey* and a little diligence, you can produce an interactive application, such as a tutorial, that displays custom help screens, issues user prompts, receives keyboard input, orchestrates the execution of commercial programs, and performs any number of other tasks.

The advantage, of course, is that you can accomplish much of the programming simply by performing the desired tasks (loading a program, sorting a column of numbers, and so on) while using *SuperKey*'s Record function to transcribe the accompanying keystrokes. Thus, a *SuperKey* macro can run an off-the-shelf program like *WordStar*, open a file, write a letter, save it, and print it. If you weave more specialized macros into the fabric of the *SuperKey* application, it can govern operations to the split second, query the user for information and act on it, and hold a user's trembling hand as he or she ventures into new territory.

In this article, *WordStar* and *MailMerge* form the core of an interactive tutorial created with *SuperKey*. The macro-run tutorial shows *MailMerge* newcomers how to create a data file and form letter, use several dot commands, and actually print out "personalized" form letters. You don't have to be a programmer to concoct this setup, but you will have to grapple with some programming concepts—constructing individual modules of source code (in this case, macros), writing user prompts, linking program modules, plus testing and correcting the application as sections fall into place. To fully tap *SuperKey*'s talents in creating this tutorial, you must be familiar with its conventions and syntax. It also helps to have experience in linking and nesting macros, designing displays, and using timed delays, screen controls, beeps, and other special features.

Putting on a Good Interface

A successful do-it-yourself tutorial, like any professional program, should present a winning and dependable personality. It should allow the user time to pause and reflect on each lesson. Command structure should be logical and consistent, and the tutorial should remind the student what keys stop and start the show. Help screens and prompts should be lucid and to the point, sized according to importance, and generously sprinkled throughout the application.

In this sample tutorial, <Esc> always clears a message from the screen and moves the tutorial on to the next part of the lesson, <F1> reloads MERGE.MAC and starts the tutorial over again, while <F2> halts the tutorial in its tracks. Full-screen help messages appear before the tutorial launches into a new topic; when commentary relates directly to a *WordStar* function or feature, a slightly smaller message appears, leaving a portion of the program visible so that the student can still see it (see Screen 1). Small messages that pop up in the lower right corner of the screen signal the completion of a given action. In short, consistency and forethought make for a professional and effective tutorial.

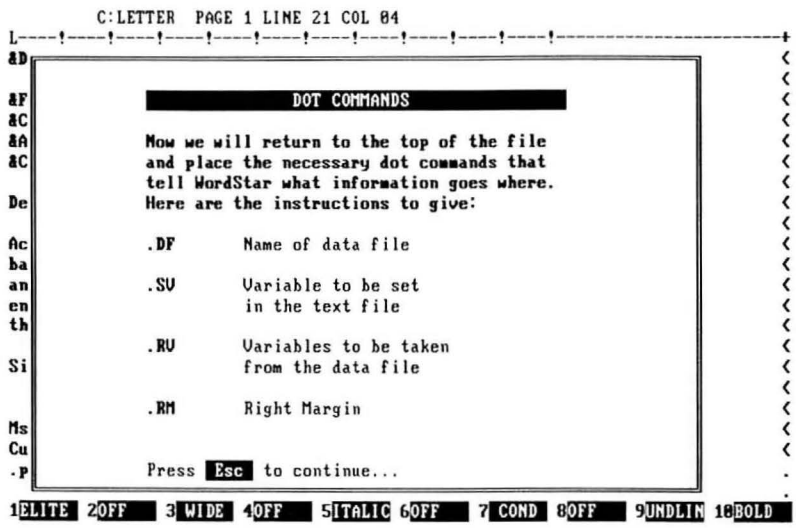
A Macro Toolbox

The tutorial relies on four types of macros: *Execution* macros actually perform the various tasks; *display* macros flash messages on the screen; *link* macros tie the display and execution macros together and order the sequence of playback, and *tool* macros work behind the scenes and help build the tutorial by offering shortcuts to commonly used but often unwieldy keystrokes.

The entire assemblage is stored in a single ASCII file called MERGE.MAC, which can be loaded from an AUTOEXEC.BAT file with the command KEY MERGE/ML and carried out instantly by *SuperKey* (see Listing 1).

SuperKey's built-in editor (an ASCII text editor) and on-the-fly recording are used to create the macros for building this tutorial. Although you can write execution macros with an ASCII word processor using *SuperKey*'s syntax—for example, by typing <RGT> for the <CursorRight> key—it's much simpler to actually perform the operations in question with *SuperKey*'s Record feature on. Because *SuperKey* records everything—typing errors, corrections, and wrong turns—you should later examine the macro with *SuperKey*'s eDit function and remove the errata. Display macros can only be created with an external text editor.

Once all the macros are created, it's best to edit MERGE.MAC directly with a text processor, then save the file and have *SuperKey* reload it for testing. Obviously, your choice of text editor is crucial. To save time, use *SideKick*'s notepad or a similar program. With a couple of keystrokes, you can jump directly from the DOS prompt into a file, and vice versa. If you must use a full-blown word processor, make sure it generates ASCII files; in the case of *WordStar*, use only nondocument mode.



Screen 1: A display macro window can be easily sized and located. This message is assigned to the <Ctrl5> macro.

```
LINK MACROS
-------------------------------

<BEGDEF><F10><AUTO><CMD>DP<F2><CMD><F9><ENDDEF>
<BEGDEF><F9><Ctrl0>""<Ctrl1>""<Ctrl2>""<Ctrl3><F8><ENDDEF>
<BEGDEF><F8><Ctrl4>""<Ctrl5><Ctrl6><Ctrl4>""<F7><ENDDEF>
<BEGDEF><F7><Ctrl7><Ctrl8>""<Ctrl9><Alt0><F6><ENDDEF>
<BEGDEF><F6><Alt1><Alt2><Alt3><Alt4><ENDDEF>


DISPLAY AND EXECUTION MACROS
-------------------------------

<BEGDEF>
<Ctrl0><CMD>fc<CMD>""""""<ENDDEF>

<BEGDISP> <Ctrl1>  1  1 78 22.
                <CtrlB>              USING MAILMERGE              <CtrlB>


                Do you write many form letters where the
                only things that change are the names and
                addresses?  You need MailMerge, a WordStar
                option that takes the tedium out of form
                letters.  All you need to do is write the
                letter once, type the various names and
                addresses in a separate file, and then
                "merge" them together.









                <CtrlD>Press <CtrlB> Esc <CtrlB> to continue...<CtrlD>
<ENDDEF>
```

continues

Listing 1: Creating the ASCII text file MERGE.MAC and loading it with SuperKey automatically runs the tutorial.

Macro Machinations

Programmers typically map out a program's operations with a flowchart. You needn't go into that much detail, but a little organization can go a long way toward combating chaos. Perhaps the best way to plan your tutorial is by jotting down the order of tasks to be accomplished as you run *WordStar* and *MailMerge*. Consider what functions need explanation and look for natural breaks in the action—such as when *WordStar* asks for a file name. (Don't overlook the obvious. The tutorial's first task is to greet the user and explain its raison d'être.) By breaking the tutorial into logical divisions or modules, you can keep sections of macro code short and manageable. Figure 1 lists the tutorial's execution and display macros and their key assignments.

In this example, <Ctrl>-0 through <Ctrl>-9 and <Alt>-1 through <Alt>-4 are dedicated to execution and display macros, and <F6> through <F10> to link macros. Make sure you don't use keys that are reserved by a program that is run by the tutorial. In *WordStar*'s case, this rule eliminates key combinations from <Ctrl>-A through <Ctrl>-Z.

If you assign keys to tool macros—those oft-used routines that pause, delay, beep, and clear the screen—your tutorial creation chores will be far easier (see Figure 2). Note that time and beep are special *SuperKey* functions that are accessible only from within a macro.

Time-delay macros are so convenient, you may want to assign several keys for various delays, such as the minus key for a ½-second delay, the plus key for 1 second, and the equals key for 2 seconds. Thus, when a 2-second delay is called for in a macro, you merely type <=> instead of <CMD>FR00:00:02.00 <CMD>. Naturally, if a tutorial involves performing mathematical functions, don't assign macros to the minus, plus, and equals keys. You will need time delays for most tutorials and similar applications, so you should create them immediately. Other tool macros will depend on the nature of a project, so build them as the need arises.

Creating Execution Macros

Once the initial tool macros are defined with *SuperKey*, enter the execution macros in sequence and save them to a file called MERGE before moving to the display and link macros. To create the first execution macro, load *SuperKey* and turn on the macro recorder by pressing **<Alt>-=** and choose <Ctrl>-3 as the key assignment. Follow the steps in Figure 3. Load *WordStar*, open a file named LETTER, change the margin to 80 columns, set the document for single spacing, and enter the letter and its data fields, which will be used later by *MailMerge*. Then end the macro with **<Alt>--**. In the same manner, create and assign the other execution macros shown in Listing 1.

If you play back the first macro by exiting to DOS and pressing <Ctrl>-3, you'll notice that it

```
<BEGDISP>
<Ctrl2>  1  1 78 22.

                <CtrlB>              THE FORM LETTER              <CtrlB>


                The first step is to create the form letter,
                using the document mode of WordStar.  In
                place of the data that will change--like
                the date, the name, and the address--we will
                put a label that will identify it, like
                DATE and NAME.  And so that MailMerge will
                identify the variables, we will surround them
                with a "&".

                Here goes.  To halt this demo, at any time,
                press <Ctrlb> F2 <CtrlB>; To restart, press
                <Ctrlb> F1 <Ctrlb>. <CtrlD>Press <CtrlB> Esc
                <CtrlB> to continue...<CtrlD>

<ENDDEF>



<BEGDEF>
<Ctrl3><Esc>del letter.*<ENTER>cls<ENTER>+-WS+<ENTER> ==D=LETTER
-+<ENTER>+<Ctrlo>r80<ENTER><Ctrlo>s1
<CMD>FR5<CMD>&DATE&-<ENTER><ENTER>
&FIRSTNAME& &LASTNAME&+<ENTER>
&COMPANY&+<ENTER>
&ADDRESS&+<ENTER>
&CITYSTATE&+<ENTER>
+<ENTER>Dear &FIRSTNAME&:=<ENTER><ENTER>
According to our records, it appears that you have an outstanding
+<ENTER>
balance with us in the amount of &AMOUNT&.  Surely this is merely
+<ENTER>
an oversight on your part, so we have enclosed a self<skip>-addressed
+<ENTER>
envelope for your convenience.  &FIRSTNAME&, your attention to
+<ENTER>
this matter would be greatly appreciated.
=<ENTER><ENTER>Sincerely,=<ENTER><ENTER><ENTER>
Ms. Wanna Gityoo+<ENTER>Customer Service Representative
<ENTER>.pa==<ENDDEF>



<BEGDISP>
<Ctrl4>59 18 19 5.


       DONE


<Ctrlb> Esc <Ctrlb> to continue.
<ENDDEF>



<BEGDISP>
<Ctrl5> 3 3 67 20.

          <CtrlB>              DOT COMMANDS              <CtrlB>

          Now we will return to the top of the file
          and place the necessary dot commands that
          tell WordStar what information goes where.
          Here are the instructions to give:

          .DF       <CtrlD>Name of data file

          <CtrlD>.SV       <CtrlD>Variable to be set
                    in the text file
```

continues

Listing 1 *(continued)*

```
          <CtrlD>.RV       <CtrlD>Variables to be taken
                    from the data file

          <CtrlD>.RM       <CtrlD>Right Margin<CtrlD>


          <CtrlD>Press <CtrlB> Esc <CtrlB> to continue...<CtrlD>
<ENDDEF>



<BEGDEF>
<Ctrl6><CtrlQ>r+<CtrlN><CtrlN><CtrlN><CtrlN>+=.DF LETTER.DAT<ENTER>
-+.SV DATE, July 1, 1986<ENTER>
-+.RV FIRSTNAME,LASTNAME,COMPANY,ADDRESS,CITYSTATE,AMOUNT<ENTER>
-+.RM 65<Ctrlq>r+=<ENDDEF>


<BEGDISP>
<Ctrl7>  3 3 67 20.

          <CtrlB>              NOW FOR THE DATA              <CtrlB>

          Now we are ready to create the other file
          that MailMerge needs--the "data file."
          So we must save this file, return to the
          no-file menu, and using nondocument mode,
          create the second file.

          Remember that we have already chosen a
          name for our data file.  At the .DF dot
          command, we chose the name LETTER.DAT.
          Therefore we must use the same name when
          WordStar prompts us for a filename.  Ready?



          <CtrlD>Press <CtrlB> Esc <CtrlB> to continue...<CtrlD>
<ENDDEF>


<BEGDEF>
<Ctrl8><Ctrlk>d<CMD>FR5<CMD>n=LETTER.DAT=
<ENTER><CMD>FR5<CMD>^^<ENDDEF>


<BEGDISP>
<Ctrl9>  3 3 67 20.

          <CtrlB>           THE LUCKY RECIPIENTS           <CtrlB>

          Who will be fortunate enough to receive
          our delightful form letter?  Anyone that
          we include in this file.  It is important
          that we type the information in proper order
          and that we separate ("delimit") the data
          so that MailMerge places the data in the
          right fields.

          We will separate the various fields with
          quotation marks--so all data within quotes
          will be equal to one field in the text file.
          Ready?  Here come two lucky recipients...




          <CtrlD>Press <CtrlB> Esc <CtrlB> to continue...<CtrlD>
<ENDDEF>
```

continues

Listing 1 *(continued)*

runs too fast for *WordStar*'s taste—the screen temporarily fills with exclamation marks as *SuperKey* races ahead. While the end result is correct, this behavior is hardly acceptable for a tutorial. To slow the macro down, edit the <Ctrl3> macro with *SuperKey*'s eDit function and insert delays in the appropriate places—namely, between each action. Inserting delays is a matter of trial and error, but *SuperKey*'s editor makes it easy to test <Ctrl3> over and over. Use your judgment—if you were an inexperienced, possibly intimidated *WordStar* user, how much time would you want between functions?

Here's where having defined the tool macros earlier pays off, because all you have to press is −, +, or =. Test the <Ctrl3> macro again, and if one part waits too long or not long enough, edit the macro again and run it until you're satisfied with the result (see Screen 2). You don't need to make the macro perfect quite yet—you can fine-tune this and other macros once the entire tutorial is assembled and can be run.

Displaying Your (Soft)Wares

Unlike execution macros, display macros don't pass characters and commands to *WordStar* but merely spew text out on the screen. If you've followed the steps outlined previously, you've listed the display macros in sequence and given them key assignments. Open MERGE.MAC with your text processor, type in the display macros as shown in Listing 1, save the file,

then load the macro with *SuperKey* and view the resulting screens.

For efficiency's sake, create all the display macros at one sitting, making full use of your text processor's block copy function to duplicate text that appears in more than one screen. It's best to type in the macros at the bottom of the MERGE.MAC file, then test and refine them before moving them to their ordained places in MERGE.MAC. As you can see in Listing 1, display macro <Ctrl1> is firmly nestled between execution macros <Ctrl0> and <Ctrl2>.

Remember: Don't use *SuperKey* to save MERGE.MAC at this point. *SuperKey*'s Save function puts the most recently changed macros at the end of the list, ignoring the sequence you've labored over.

The first line of a display macro must begin with <BEGDISP>, followed by the key combination to which the macro is assigned and screen coordinates specifying the position and size of the window where the message will appear. For example, to create the first display macro (titled 'USING MAILMERGE'), open a *SideKick* notepad or text file with a word processor and enter the line

< BEGDISP > < Ctrl1 > 1 1 78 22.

<Ctrl1> is the key combination the macro is assigned to, the first two numbers are the column and row coordinates where the message window starts (namely, the top left corner of the screen), the third number sets the window width at 78 columns, and the fourth sets the height of the window at 22 rows. To display the title in boldface, bracket it with

```
<BEGDEF>
<Alt0>+
"James"<ENTER>+
"Baud"<ENTER>+
"License to Dial"<ENTER>+
"1 Modem Court"<ENTER>+
"Telephone, TX  93005"<ENTER>+
"$230"<ENTER><ENTER>+
"Stan"<ENTER>+
"Centronics"<ENTER>+
"Printer's Inc."<ENTER>+
"8 Pin Row"<ENTER>+
"Italic, IL  22222"<ENTER>+
"$3,150"<ENTER><ENTER>=<ENDDEF>


<BEGDISP>
<Alt1>  3 3 67 20.

          <CtrlB>              THE RENDEZVOUS              <CtrlB>

          We're ready!  Now when we print the file
          "LETTER" using MailMerge, we should get two
          letters, each personally addressed.  You will
          need to turn your printer on and have at
          least one piece of paper loaded.

          Here we go...




               <CtrlD>Press <CtrlB> Esc <CtrlB> to continue...<CtrlD>
<ENDDEF>


<BEGDEF>
<Alt2>+<Ctrlk>d<CMD>FR5<CMD>M=LETTER
=<Esc><CMD>FR50<CMD><ENDDEF>


<BEGDEF>
<Alt3>+<CMD>FB00800 00800 00029<CMD><CMD>FR00:00:00.01<CMD>
<CMD>FB00670 00670 00015<CMD><CMD>FB00800 00800 00070<CMD>
+x<ENDDEF>


<BEGDISP>
<Alt4>  1 1 78 22.


               <CtrlB>             CONGRATULATIONS              <CtrlB>


               You have passed the MailMerge course and
               are now ready to tackle your own projects.
```

continues

Listing 1 *(continued)*

```
                Happy collection notices!


                Touch <Ctrld> Esc <Ctrld>

                then  <Ctrld> F1 <Ctrld> to repeat demo,
                or    <Ctrld> F3 <Ctrld> to quit.


<ENDDEF>


TOOL MACROS
-------------------------------


<BEGDEF>
~<TITLE>BEEP TONE<TITLE>
<CMD>FB01000 01000 0002<CMD><CMD>FB800 800 0003<CMD><ENDDEF>


<BEGDEF>
-<TITLE>HALF-SECOND DELAY<TITLE><CMD>FR.5<CMD><ENDDEF>


<BEGDEF>
+<TITLE>FULL-SECOND DELAY<TITLE><CMD>FR1<CMD><ENDDEF>


<BEGDEF>
=<TITLE>TWO-SECOND DELAY<TITLE><CMD>FR2<CMD><ENDDEF>


<BEGDEF>
<AltD><TITLE>BLOCK LINE<TITLE><CtrlQ>S<CtrlK>B<CtrlX>
<CtrlQ>S<CtrlK>K<ENDDEF>


<BEGDEF>
<PLS><CtrlK>QYX<VFLD><VFLD><SIDEKICK>N<PGUP><PGDN><ENDDEF>


<BEGDEF>
<MIN><CtrlK>D<VFLD><VFLD><Esc><CMD>MLY<CMD><ENDDEF>



<BEGDEF>
<F1><F9><ENDDEF>


<BEGDEF>
<F3><CMD>MC<CMD><ENDDEF>
```

Listing 1 ***(continued)***

<Ctrl>-Bs, then enter the body of the message starting with 'Do you write many form letters . . . '. To wrap a small message window around the prompt 'Press Esc to continue . . . ', surround it with <Ctrl>-D commands. Mark the end of the macro with the <ENDDEF> command and you're done. Now when you save MERGE.MAC and load it, you will be able to see the display macro as it appears in the tutorial by pressing <Ctrl>-1.

You don't even need to exit the text processor, because the display macro will pop up right over MERGE.MAC. If you need to modify the display, touch <Esc> and you're back in MERGE.MAC, probably at the very place where you need to make changes. Keep in mind that boldface and window attributes each take up seven invisible spaces in the file, which makes aligning text a matter of trial and error.

Making the Link

Once all the execution and display macros are stored in MERGE.MAC, they must be linked together in one long executable chain. A link macro takes on the same form as an execution macro: the <BEGDEF> code, the name of the assigned key, its new definition, and the <ENDDEF> code. The only difference is that the meat of a link macro is not a collection of *WordStar* commands but rather the names of other macros. Those macros play back one by one in the same order as they

appear in the chain (see Figure 3). Several small link macros are used instead of a single statement, so you can test a portion of the tutorial without having to start the chain from the beginning.

If the macros are labeled correctly, the link macros (<F9> through <F6>) are easily put in place. Open MERGE.MAC with your text processor and type in the lines in Figure 4 at the top of the file. As you can see, <F9> links the execution and display macros assigned to <Ctrl0>, <Ctrl1>, <Ctrl2>, <Ctrl3>, and finally, the link macro <F8>. The same pattern is followed by <F8>, <F7>, and <F6>. The display macro assigned to <Ctrl4> shows up twice in the chain, since it is used twice in the tutorial to flash the message 'DONE'.

Now you can get your first look at how your tutorial will run as a whole. Save MERGE.MAC, load it with *SuperKey*, and press **< F9 >**.

Finishing Touches

Capping the listing is the line **< BEGDEF > < F10 > < AUTO > < CMD > DP < F2 > < F9 > < ENDDEF >**, which starts the chain rolling. <F10> is a link macro that does a little preliminary housekeeping. The Auto command runs the tutorial automatically every time MERGE-.MAC is loaded. Naturally, you don't insert this line in MERGE-.MAC until debugging is complete, since you may want to run an individual macro—not the entire tutorial. Auto is always paired with the first link macro to set the chain in motion. To reassign

Figure 1: The sequence of execution and display macros used in the tutorial

	Macro type	Description	Key assignment
1.	EXECUTION:	Clears screen	<Ctrl0>
2.	DISPLAY:	'Do you write many form letters...?'	<Ctrl1>
3.	DISPLAY:	'The first step is to create the form letter'	<Ctrl2>
4.	EXECUTION:	Loads WordStar, opens file LETTER, and composes letter	<Ctrl3>
5.	DISPLAY:	Generates small message box. 'DONE. Esc to continue.'	<Ctrl4>
6.	DISPLAY:	Describes MailMerge functions. 'DOT COMMANDS Now we will return to the top of the file...'	<Ctrl5>
7.	EXECUTION:	Goes to top of form letter, inserts MailMerge dot commands	<Ctrl6>
8.	DISPLAY:	Describes saving LETTER and creating a data file. 'Now for the data...'	<Ctrl7>
9.	EXECUTION:	Saves the form letter and opens data file LETTER.DAT	<Ctrl8>
10.	DISPLAY:	Explains that names will be inserted in form letter. 'THE LUCKY RECIPIENTS...'	<Ctrl9>
11.	EXECUTION:	Types names and addresses (and other MailMerge fields)	<Alt0>
12.	DISPLAY:	Explains that now the two files can be "merged." 'THE RENDEZVOUS'	<Alt1>
13.	EXECUTION:	Executes MailMerge	<Alt2>
14.	EXECUTION:	Plays tune when done	<Alt3>
15.	DISPLAY:	End of tutorial. 'CONGRATULATIONS'	<Alt4>

Figure 2: SuperKey tool macros

Description	Key assignment
Half-second delay	–
Full-second delay	+
Two-second delay	=
Beep tone that is sprinkled throughout MERGE.MAC	~
Blocks out one line for easy move, copy, or delete	<Alt>-[
Saves MERGE.MAC, exits SideKick, loads MERGE.MAC into SuperKey	<GrayMinus>
Abandons edited WordStar file, exits WordStar, enters SideKick and MERGE.MAC	<GrayPlus>

```
WS <Enter>
D
LETTER <Enter>
<Ctrl0>r80 <Enter> <Ctrl0>s1
&FIRSTNAME& &LASTNAME& <Enter>
&COMPANY& <Enter>
&ADDRESS& <Enter>
&CITYSTATE& <Enter>
<Enter>
Dear &FIRSTNAME&: <Enter>
.
.
.
Customer Service Representative
.pa
```

Figure 3: To create execution macro <Ctrl3>, you merely type and record the session. In this case, you load WordStar, open a file named LETTER, change some program settings, type in the data fields, and finally type in the form letter.

SuperKey's stop command from <Ctrl>-<Esc> to <F2>, the command DP (Default stoP) is issued and <F2> specified. Finally, the link macro <F9> is called.

Other enhancements can be sprinkled throughout the code. Beeps are a useful way of grabbing a user's attention; in this case, they are included before major sections of the tutorial. As with BASIC's SOUND command, you must specify the frequency and duration of the beep. The beep following the display macro titled 'THE RENDEZVOUS' is forbiddingly expressed as FB00800 00800 00029—the command FB (Function Beep) followed by a tone starting at 800 Hz, ending at 800 Hz, and lasting 29/100 second.

Other Versions, Other Problems

At this point, the *MailMerge* tutorial may run unfettered within the comfy environs of your system—but how will it fare on PCs equipped with various versions of *SuperKey?* Given *SuperKey*'s finicky nature, probably not very well. In fact, *SuperKey* copes poorly with its own set of changeable defaults, so make sure that the tutorial disk holding MERGE.MAC contains an unmodified version of KEY.COM.

Most releases of *WordStar* don't pose any difficulties for MERGE.MAC, although esoteric user patches may. When in doubt, ask the *MailMerge* trainee to copy a pristine issue of *WordStar* onto the tutorial disk. To finish the job, make sure the disk holds COMMAND.COM, DOS's hidden system files, and an AUTOEXEC.BAT file with the line KEY MERGE/ML.

Finally, don't get jaded. As you build a tutorial like this, you will watch it run so many times that you will be able to recite the display macros in your sleep. Operations will seem to drag, but resist the impulse to speed up the tutorial by removing the delays. To a student, the slower the better.

Beyond Tutorials

The techniques demonstrated here are just a starting point. You could use the same procedures to turn your PC into a semiautomated desktop publishing system or an interactive "slide projector" that draws business graphics based on minimal user input.

With transparent display macros (available in *SuperKey* version 1.15), any keystroke, not just <Esc>, can be passed to an underlying application. As a result, you can create a menu-driven system for your PC that runs any program—and then some. For example, selecting 'Microsoft Word' from a *SuperKey*-generated menu could trigger a complex macro that installs several memory-resident utilities, loads *Word*, opens a document, attaches a new style sheet, and displays an outline in a window.

In short, *SuperKey*'s macros do more than just save keystrokes. The possibilities aren't endless, but they are intriguing—and you don't have to be a programmer to explore them.

```
<BEGDEF><F9><Ctrl0>``<Ctrl1>``<Ctrl2>``<Ctrl3><F8><ENDDEF>
<BEGDEF><F8><Ctrl4>``<Ctrl5><Ctrl6><Ctrl4>``<F7><ENDDEF>
<BEGDEF><F7><Ctrl7><Ctrl8>``<Ctrl9><Alt0><F6><ENDDEF>
<BEGDEF><F6><Alt1><Alt2><Alt3><Alt4><ENDDEF>
```

Figure 4: The four link macros used in MERGE.MAC

```
        C:LETTER  PAGE 1 LINE 21 COL 04
L----!----!----!----!----!----!----!----!----!----!----------+
&DATE&                                                       <
                                                             <
&FIRSTNAME& &LASTNAME&                                       <
&COMPANY&                                                    <
&ADDRESS&                                                    <
&CITYSTATE&                                                  <
                                                             <
Dear &FIRSTNAME&:                                            <
                                                             <
According to our records, it appears that you have an outstanding <
balance with us in the amount of &AMOUNT&.  Surely this is merely <
an oversight on your part, so we have enclosed a self-addressed <
envelope for your convenience.  &FIRSTNAME&, your attention to <
this matter would be greatly appreciated.                    <
                                                             <
Sincerely,                                                   <
                                                             <
                                                             <
Ms. Wanna Gityoo                                             <
Customer Service Representative                              <
.pa                                                          .
1ELITE 2OFF  3WIDE 4OFF  5ITALIC 6OFF  7COND 8OFF  9UNDLIN 10BOLD
```

Screen 2: When <Ctrl3> is finally called in the tutorial, a WordStar file named LETTER is opened, and this text is typed in by the macro.

Rick Altman is a software consultant in Hayward, California, specializing in custom word processing systems and macro programming.

SuperKey version 1.15A
Borland Int'l
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
408/438-8400
List price: $69.95
Requirements: 128K, one disk drive, DOS 2.00 or later version
Not copy protected

Word's Responsive Merge

Scott Stedman

Here's a simple method for inserting variable text in form letters—without creating a separate data file. Microsoft Word's powerful merge function lets you build on-screen prompts and branching systems that can import different text or files for each possible response.

Janet Crider

Producing individualized form letters in quantity is easy enough. Most word processors have some facility for integrating a file of names, addresses, salutations, and the like into standard skeleton documents. Names and addresses add the personal touch, while the bulk of the text remains the same from letter to letter.

For many letter writers, such simple mass-mailing features suffice. The data file approach is most useful if you already have the information in a file from another program or if you are likely to reuse the same list. Often, however, the volume of mail is insufficient to warrant the time and effort involved in typing information into a precisely constructed data file. You may also want to include a personalized addendum on a one-time basis. If such a message were made part of the data file, you would have to delete the message from each record every time you used the list—an absurdly inefficient setup.

Fortunately, *Microsoft Word*'s Print Merge command offers a simple solution for such quandaries. By embedding ASK instructions in a single master file, you can have *Word* prompt you for variable data. To further automate the process, the IF and INCLUDE statements will choose which text blocks or files to insert based on responses to the prompts. This technique makes it possible to set up a turnkey system that generates personalized form letters regardless of the operator's computer expertise.

The example used in this article solves an everyday problem for one Emily Dorson, an executive recruiter for the publishing industry. Ms. Dorson receives a constant influx of résumés from hopeful applicants, many of whom are unaware of her area of specialization. Her policy is to acknowledge all correspondence, even if applicants are not publishing professionals. If a résumé indicates some other field of expertise, such as photography or accounting, the acknowledgement letter refers the applicant to the appropriate headhunter.

To automate this operation, Dorson will create a main document that contains the body of the letter. Then she'll insert screen prompts so that *Word* will ask for an applicant's name, address, and area of specialization. Finally, she

will add some conditional instructions (IF commands) to control the text that will be selected on the basis of the response to the prompt about expertise.

Ready, SET ...

The form letter is created by constructing the main document, including the ASK statements, the constant part of the letter, and the IF instructions that evaluate keyboard input against specified conditions.

If the letter were to be merged with a data file, the first line of the main document would be a DATA instruction specifying the name of the data file. However, such an instruction is omitted because the keyboard operator enters the variable data.

The first piece of information the letter requires is a date. It could be typed in every time letters were sent, but that approach would require editing the letter before each Print Merge session. It's easier to use the SET instruction that causes *Word* to ask for the date only once during the printing cycle. SET will retain and print the supplied date on each letter.

SET and the other merge instructions are enclosed between small double brackets: « and » (ASCII characters 174 and 175, respectively). These delimiters are indicated by pressing <Ctrl>-[and <Ctrl>-]. Thus, the SET instruction at the top of the letter reads «SET DATE = ?Type the current date» (see Figure 1).

The format for all merge instructions is essentially the same. Following the left delimiter is the command name, then the name of the field set by the typed response. The question mark following the equal sign identifies the command as a prompt. The text after the question mark is the message *Word* will display as the prompt.

If no message is specified, *Word* simply displays 'Enter text' in the lower left corner of the screen during the merge. That tight-lipped message doesn't indicate what kind of information *Word* expects. Since most merged documents will contain several prompts, a clear message is essential.

It Never Hurts to ASK

The ASK statement causes *Word* to prompt for keyboard input for each letter in the printing cycle. In our example, the letter requires the inquirer's name, address, and field of expertise. ASK causes *Word* to prompt for these items one at a time.

Because the letter's address and salutation will be supplied from the keyboard, the document should ask for FIRST NAME, LAST NAME, ADDRESS1, ADDRESS2, CITY, STATE, ZIP CODE, SALUTATION, and EXPERTISE. Each of these fields will be named in an ASK instruction line, following the same format used with the SET command. The top section of Figure 1 shows the ASK instructions for the address.

Once the ASK instructions are specified at the top of the main document, each field's placement on the page should be indicated. This is accomplished by inserting the field name (enclosed within delimiting brackets) where the information is to be printed. Multiple fields may be placed on the same line separated by spaces or punctuation. For example, first-name and last-name fields in the address are separated by a space, while city and state fields are divided by a comma and a space. Field names in the body of the letter must exactly match what is specified in the ASK instructions.

Drawing a Blank

The ASK instructions and the printing template for the address in the main document accommodate two lines, but some letters will require only one line. An IF instruction in the address section of the template can prevent *Word* from inserting a blank line when a one-line address is typed. Later in this article IF instructions will be described in greater detail, but keep in mind that each IF instruction must conclude with ENDIF. The ENDIF is placed on a separate line so that the phrase will be omitted when there is no answer to the ADDRESS2 prompt.

The «IF ADDRESS2» «ADDRESS2» means, if data is supplied for ADDRESS2, print ADDRESS2. If no data is typed at the prompt for ADDRESS2, the instruction is overlooked and no blank line is inserted in the letter. Note that *Word* interprets a press of the space bar or any other character as a valid address; only <Enter> suppresses the blank line.

A similar technique is used for the salutation field. Unless a salutation is specified, *Word* will use the applicant's first name as the salutation.

Adding Body

The first paragraph of the letter is fixed, but the second varies depending on the response to the EXPERTISE prompt. When *Word* encounters an IF instruction, it evaluates the input and selects the appropriate text, based

on the conditions met. In the example given, if the response to the EXPERTISE prompt is «photography», *Word* supplies the name and address of a headhunter in that field.

The ELSE instruction directs *Word* elsewhere if conditions specified in the IF statement are not met. For example, if no salutation is supplied (in effect, if «SALUTATION» doesn't exist), *Word* is directed to print the first name.

IF and ELSE can compare numbers as well as words and can determine if one number is less than, greater than, or equal to another. In such cases IF is followed by the field name, the equal sign (or another relationship indicator), and the characters to be compared. If the match phrase is text, it must be enclosed in quotation marks; for numerical matches, the quotation marks are omitted. Double delimiter brackets conclude the condition statement. Immediately following the delimiter brackets is the text that will be printed if the stated condition is met. ENDIF concludes the IF statement, and an IF instruction is included for each anticipated response.

The power of the IF instruction redoubles when you use it to evaluate multiple conditions. In other words, IF commands can be nested (placed within one another). By this method, text is printed only if two or more different conditions are met. For example, in the first sentence of the letter's second paragraph, hopeful applicants are referred to a specific local recruiter when their field of expertise is accounting and their

```
«SET DATE=?Type the current date»
«ASK FIRST NAME=?Type applicant's first name»
«ASK LAST NAME=?Type applicant's last name»
«ASK ADDRESS1=?Type first line of address»
«ASK ADDRESS2=?Type second address line. Press <Enter> if none.»
«ASK CITY=?Type the city name»
«ASK STATE=?Type the state abbreviation»
«ASK ZIP CODE=?Type the zip code»
«ASK SALUTATION=?Type name for salutation. <Enter> for first name.»
«ASK EXPERTISE=?Type photography, accounting, or other»

«DATE»

«FIRST NAME» «LAST NAME»
«ADDRESS1»
«IF ADDRESS2»«ADDRESS2»
«ENDIF»«CITY», «STATE» «ZIP CODE»

Dear «IF SALUTATION»«SALUTATION»:«ELSE»«FIRST NAME»:
«ENDIF»

Thank you for your letter of inquiry and your interest in my company's
services. Because we specialize in executive placement in the
publishing field, we are not directly involved with searches for
«EXPERTISE» positions.

Let me suggest that you contact «IF EXPERTISE="accounting"»«IF
CITY="Chicago"»Alex Winthrop, 222 N. Michigan Avenue, Ste. 2102,
Chicago, IL 60202, 312/947-0880«ELSE»Mark Roberts, 2121 N. Cancun
Circle, Studio City, CA 94717, 415/884-0900.«ENDIF»«ENDIF»«IF EXPERTISE=
"photography"»Linda Musgrave, 88 N. River, Abilene, KS 67034, 913/933-
6710. «ENDIF»«IF EXPERTISE="other"» a specialist familiar with positions
in your area of expertise. You can contact the Professional Placement
Information Group (PPIG) at 1-800-555-1212 for assistance in your
field.«ENDIF».

I wish you well in your anticipated career advancement.

Sincerely,


Emily Dorson
```

Figure 1: Microsoft Word file for mail-merged letter

```
November 10, 1986

Jesse Jobseeker
2345 Main Street
Chicago, IL 30303

Dear Jesse:


Thank you for your letter of inquiry and your interest in my company's
services. Because we specialize in executive placement in the
publishing field, we are not directly involved with searches for
accounting positions.

Let me suggest that you contact Alex Winthrop, 222 N. Michigan Avenue,
Ste. 2102, Chicago, IL 60202, 312/947-0880.

I wish you well in your anticipated career advancement.

Sincerely,


Emily Dorson
```

Figure 2: A sample of a finished letter

address is in Chicago, and to a different recruiter if they live elsewhere. Each IF must have a matching ENDIF—hence the double ENDIF instructions at the end of a sentence. Substantial sections of text can be inserted as the result of an IF instruction (see the sidebar "The INCLUDE Alternative").

When the document is complete, it can be saved using the Transfer Save command. For each letter-writing session, the file can be retrieved with the Transfer Load command and the process started by invoking the Print Merge command. As the cycle of questions begins, the operator simply types the information requested by the prompt in the lower left corner of the screen. *Word* prints the letters as the information is supplied. Figure 2 shows a finished product.

The INCLUDE Alternative

The sample main document set up in the accompanying article contains all the possible text for each specified condition. This technique is appropriate because the conditional text is very brief. When the conditional text is long, a better method is the INCLUDE instruction. INCLUDE tells *Word* to pour another document into the current file.

In the example, the instruction «IF EXPERTISE = "photography"» «INCLUDE B:PHOTO» would insert the file named PHOTO from the disk in drive B: whenever the response to the expertise prompt was *photography*. Note that *Word* assumes the .DOC file name extension unless you specify another.

Use of the INCLUDE instruction keeps the main document as short as possible. For example, many documents, such as routine contracts, can be constructed by retrieving selected files from an already established collection. Thus, a command like «INCLUDE b:photo1»«INCLUDE b:photo2»«INCLUDE b:photo3» could be used to assemble multiple files into a single document when used with the Print Merge command.

Documents to be combined via the INCLUDE command should use *Word*'s preset page formatting so that the format can be controlled from the main document. Character and paragraph formats follow styles defined in the included file. —*J. C.*

Letters Aren't the Limit

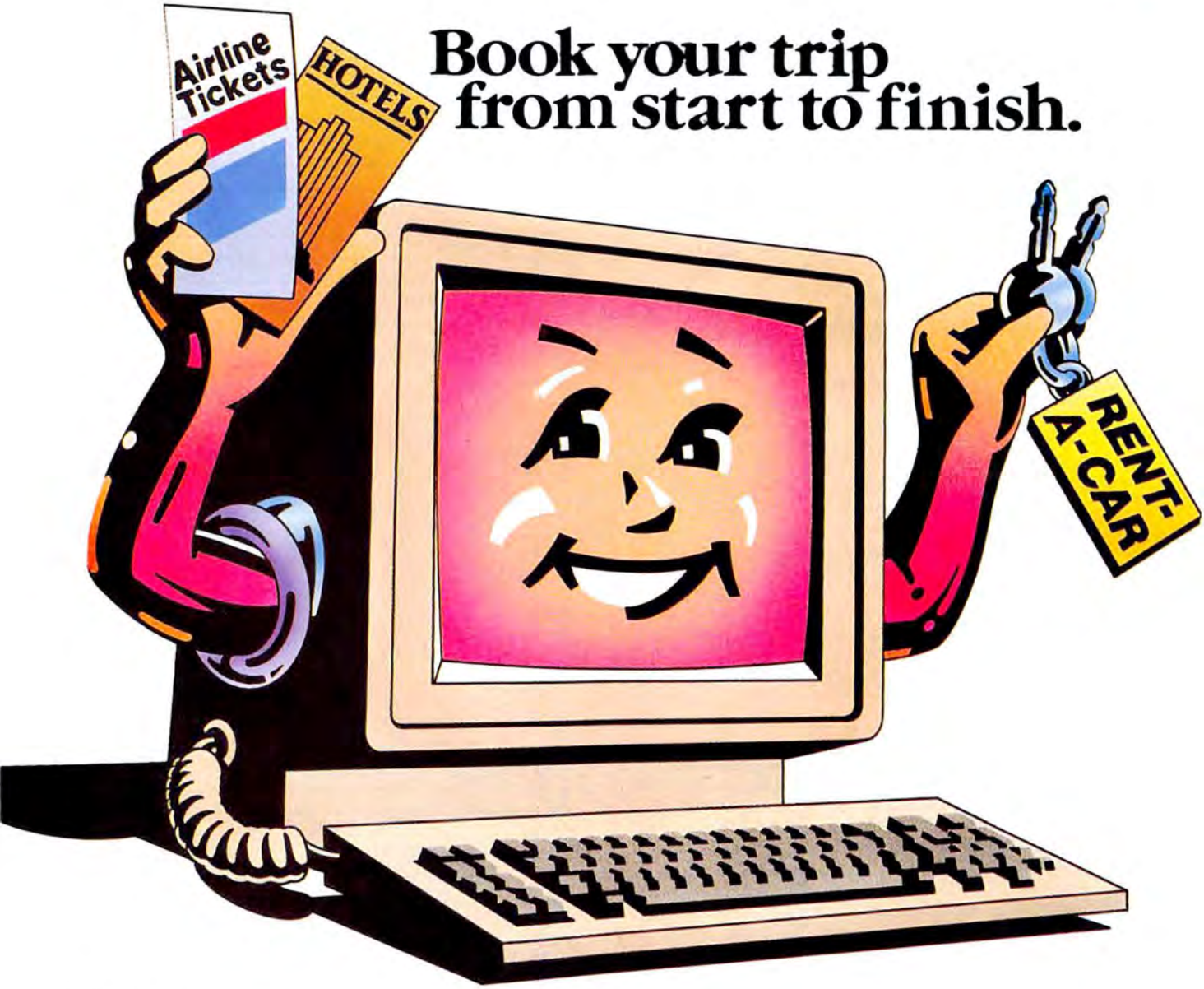
Listing all the possibilities of ASK, IF, ELSE, INCLUDE, and the other Print Merge siblings could fill several manuals. A host of examples would be needed to illustrate all the applications. Our example is brief, but the potential is in no way limited to correspondence.

A legal office could construct most of a standard will or contract by answering *Word*-prompted questions. A property manager could prepare a lease agreement tailored for residential or commercial clients, based on responses to the prompts. The home-based entrepreneur could generate invoices and statements. A salesperson could generate a brief follow-up letter to a recent prospect. Best of all, creating this interactive mail merge environment with *Word* is almost as simple as using it.

Janet Crider, the author of several word processing books, is a training consultant in Tucson, Arizona.

Word 3.0
Microsoft Corp.
16011 N.E. 36th Way
Redmond, WA 98073
206/882-8080
List price: $450
Requirements: 256K, two disk drives, DOS 2.00 or later version

Book your trip from start to finish.



All on your own PC.

Now you can get quick information and *immediate reservations* for flights, hotels and rental cars with EAASY SABRE, the American Airlines personal reservations system.

EAASY SABRE lets you look directly at schedules and fares, 24 hours a day. On any type of PC that has a modem or on any kind of communicating terminal. And, all the help you need is available on line.

This special service will show you flights for over 650 airlines worldwide. And the quickest routes to almost any place you want to go.

It will also show you more than 13,000,000 fares. Our exclusive Bargain Finder℠ feature assures that you'll get the lowest possible fares available for the seats you book.

In addition, you can reserve a room at more than 12,000 hotels — by name, by price or by location. You can also confirm a car from over 20 rental car companies. Look at your personal AAdvantage® account. And even check the weather in the city you'll be visiting.

Once your reservations are booked, EAASY SABRE lets you decide where to pick up the ticket — from your SABRE Automated Travel Agency or Corporate Travel Office, at the airport, at an American Airlines City Ticket Office, by mail or from any other American Airlines authorized distribution channel.

Access the world's most sophisticated travel automation system. It's that simple. And economical. Because there's currently no surcharge for using EAASY SABRE. You just need to subscribe to one of the data networks listed.

For more information on subscribing to a network, call:

Dialcom, Inc. **1-800-258-3311**	General Electric Information Services Company **1-800-433-3683**
QuantumLink (for Commodore computers only) **1-800-392-8200**	GEnie™ (General Electric Network for Information Exchange) **1-800-638-9636 Ext. 21**

EAASY SABRE℠

AAdvantage® is a registered service mark of American Airlines, Inc.

THANKS

Bulldog's Thanksgiving Specials

GRAPHICS CARDS

GENOA EGA	$299
GENOA SPECTRUM	199
QUADRAM EGA	349
STB CHAUFFUER	225
STB EGA PLUS	299
SIGMA COLOR 400	429
SIGMA EGA	369
HERCULES GRAPHICS PLUS	189
ORCHID TURBO EGA	575
EVEREX EGA	249
EVEREX THE EDGE	219
PARADISE EGA Auto Switch	379

MULTI FUNCTION BOARDS

AST 6 PACK w/384K	$189
AST 6 PACK PREMIUM w/512K	349
RAMPAGE FOR AT w/512K	445
INTEL ABOVE BOARD for PC w/256K	375
INTEL ABOVE BOARD PS for PC	299
INTEL ABOVE BOARD for AT w/512K	459
INTEL ABOVE BOARD PS for AT	369
ADVANTAGE w/128K	339
IRMA BOARD	769
J RAM III by Tall Tree for PC w/o K	189
J RAM III by Tall Tree for AT w/o K	225
J LASER	250
FAST 88	99
FAST 88 w/ V20	109
ORCHID PC NET STARTER KIT	735
AST 5251-11 PLUS	615
QUADBOARD w/o K	109
PC OPTION BOARD	89
EVEREX MAGIC CARD II w/384K	179
EVEREX MINI MAGIC w/o K	69
EVEREX RAM 3000 w/oK	175
AST FLASHPACK	289

MISCELLANEOUS

KODAK DATA SHOW SYSTEM	
POLAROID PALETTE	
KENSINGTON MASTERPIECE	
KENSINGTON MASTERPIECE PLUS	

Chips 64K - $1.25

Chips 128K - $4.00

Chips 256K - $3.25

Chips 8087 - $149

Chips 80287 - $199

Chips

PRINTERS

EPSON

LX 86	$229
FX 85	349
FX 286	489
LQ 800	489
LQ 1000	699
LQ 2500	1025
EX 800	489
RX 100	319
DX 10 Daisywheel	199
DX 35 Daisywheel	589
420 I	1250

OKIDATA

182	229
192	299
84 P	635
193 Plus	535
2410	1729
292	469
293	595

TOSHIBA

321	459
351	969
341 or 341E	709
351 Color	1095

NEC

P5	935
P5 XL	1050
P6	440
P7	595
3550	725
8850	1020

PRIMAGE 90

w/Pagemate III 90 CPS Daisywheel	1550

DRIVES & TAPES

Everex 60 m.b. tape backup internal/external	799/935
SYSGEN Quic 60 internal/external	949/995
Genoa Galaxy 60 mb internal/external	799/935
Galaxy 20 mb Internal/External	625/769
Tallgrass 20 mb Internal	550

MODEMS

HAYES 1200	365
HAYES 1200 B	335
HAYES 2400 External	559
HAYES 2400 Internal	499
US ROBOTIC COURIER 2400 or MICROLINK 2400	389
VENTEL HALF CARD	349
VENTEL 1200 PLUS	339
EVEREX 300/1200 Internal Modem	129

Sales Hot Line

1-800-438-6039

3241-E Washington Road • Martinez, Georgia 30907

Bulldog Computer Products

For folks on the go — Bulldog is the name to know!

AMERICA

Find Out Why—

- Bulldog mail order customers purchased over 20 million dollars last year.
- Fortune 500 companies love Bulldog
- America's dealers & systems consultants buy from Bulldog

If you're not buying from Bulldog, you're barking up the wrong tree!

IBM

PC SYSTEMS

256 K, 2 Drives	1049
256 K, 2 Drives Monochrome Monitor and Card	1249
256 K, 2 Drives Color Monitor & Card	1449

XT SYSTEMS

256 K, 1 Drive, 10 mb Hard Disk	$1925
256 K, 1 Drive, 20 mb Hard Disk	1975
256 K, 1 Drive, 10 mb Hard Disk Monochrome Monitor & Card	2165
256 K, 1 Drive, 20 mb Hard Disk Color Monitor & Card	2365

AT SYSTEMS

AT BASIC 256 K, 1.2 mb Floppy	$2450
512 K, 20 mb Hard Disk 1.2 Floppy	2795
512 K, 20 mb Hard Disk 1.2 Floppy Monochrome Monitor & Card	3035
512 K, 30 mb Seagate Hard Disk 1.2 Floppy	3045

PORTABLES

IBM CONVERTIBLE	$1595
COMPAQ II MODEL II	2750
ZENITH Z171	1795
TOSHIBA T 1100	1595
TOSHIBA T 1100 Plus	1795
TOSHIBA 3100	3400

AT&T SYSTEMS

2 Drive System	$1795
10 mb System	2070
20 mb System	2120
Upgrade to 640K	50

Systems include Keyboard, Bit Image Graphics, Green Monitor, 256K DOS, and On-Board Clock Calendar.

AT&T Color Monitor	675

SOFTWARE

IBM DISPLAY WRITE III	$319
WORDSTAR 2000	249
WORDSTAR 2000+	279
WORD PERFECT 4.1	205
MICROSOFT WORD	259
VOLKSWRITER III	159
FREELANCE	219
CROSSTALK	99
WORD FINDER	49
SUPER CALC IV	289
LOTUS 1 2 3	329
SYMPHONY	429
D BASE II	299
D BASE III+	399
FRAMEWORK	399
REVELATION	575
MULTIMATE	205
CLIPPER	349
R BASE SYSTEM V	399
ENABLE	349
MICROSOFT WINDOWS	59
EASY	89
OPEN ACCESS II	329
CHARTMASTER	239
TURBO PROLOGUE	$59
TURBO LIGHTNING W/ Word Wizard	89
REFLEX 1.1	99
NORTON UTILITIES	59
MULTIMATE ADVANTAGE	289
FASTBACK	89
CORNERSTONE	69
OFFICE WRITER	239
Q & A	275
NORTON COMMANDER	49
MICROSOFT MOUSE	119

HARD DRIVES

SEAGATE 10 mb w/controller	$375
SEAGATE 20 mb w/controller	410
SEAGATE 30 mb w/controller	495
SEAGATE 30 mb for AT ST4038	595
SEAGATE 40 mb for AT ST4051	725
IOMEGA BERNOULLI 10 mb w/card	1319
10 + 10 w/card	1875
20 + 20 w/card	2425
BERNOULLI PLUS	3895
SYSGEN DURAPACK single	995
dual	1595
MOUNTAIN 20 mb drive card	649
WESTERN Digital 10 mb Hard Card	559
WESTERN Digital Hard Card 20 mb	625
PLUS HARD CARD 10	549
PLUS HARD CARD 20	649
PRIAM 60 mb AT	1179
PRIAM 43 mb AT	925

Prices Subject To Change

For Orders Call: 1-800-438-6039
For Shipping, Technical & In Georgia Call: 1-404-860-7364

Circle 865 on reader service card

Bulldog Computer Products

We accept VISA MasterCard American Express

TEST OF STRENGTH:

PC/FOCUS gives Micro Managers the muscle for future growth and expansion.

Frankly, there are many capable DBMS's available in today's PC marketplace.

But only PC/FOCUS has the extra capabilities you need to support your growth and expansion. Decision support capabilities like business graphics, statistical analysis and spreadsheet. Application portability to VAX/VMS, WANG/VS, AT&T UNIX and IBM mainframe environments. Even built-in micro-to-mainframe links for data transfer!

So when you select your PC DBMS, make sure it's the one that "rings the bell." PC/FOCUS.

For details, call the IBI office nearest you or write to Donald Wszolek, Information Builders, Inc., 1250 Broadway, New York NY 10001.

PC/FOCUS

Information Builders, Inc.

World Headquarters: New York City, U.S.A., (212) 736-4433
Toronto, Canada: (416) 364-2760 • London, England: 903-6111

One language. One solution.

dBase III is a trademark of Ashton-Tate.
AT&T UNIX is a trademark of AT&T Corp.
WANG/VS is a trademark of Wang Laboratories, Inc.
VAX/VMS is a trademark of Digital Equipment Corp.
IBM is a trademark of International Business Machines Corp.

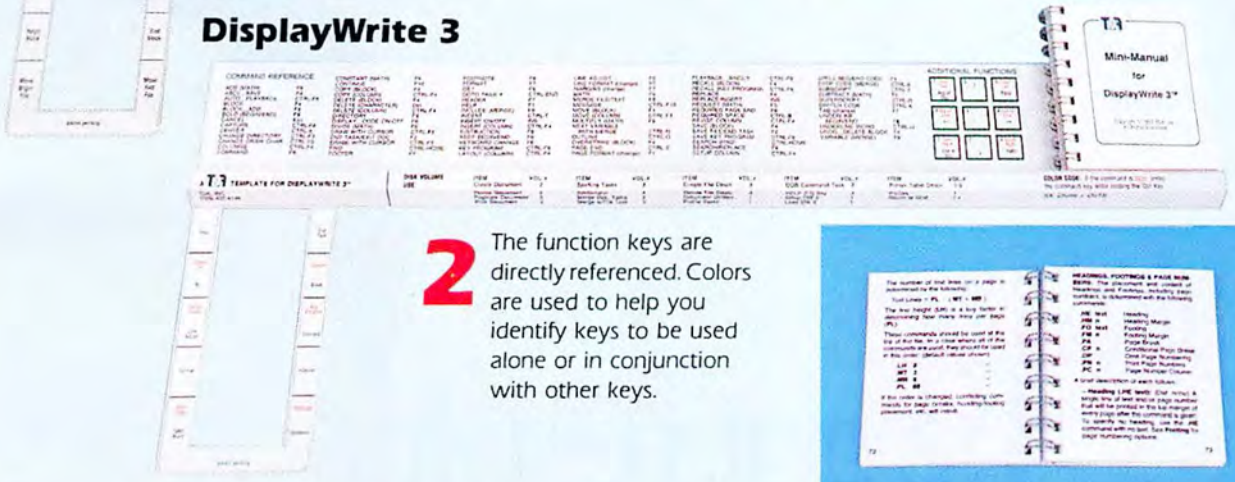
Circle 499 on reader service card

KEYBOARD TEMPLATES FOR WORD PROCESSORS

WordStar Professional

1 The surface of each template shows the complete menu structure of the program. It *may* also *include* such things as page number references to the Mini-Manual, cursor controls for various environments, etc.

DisplayWrite 3



2 The function keys are directly referenced. Colors are used to help you identify keys to be used alone or in conjunction with other keys.

3 The Mini-Manual acts as a perfect compliment to the template. Explanations, examples and graphics will help you get your job done quickly and well.

WordPerfect 4.0/4.1	$22.95
Lotus 1-2-3 1A/2.0	$22.95
WordStar	$19.95
Symphony	$24.95
WordStar 2000	$19.95
dBase II/III	$24.95
DisplayWrite 3	$19.95
Turbo Pascal	$19.95
MicroSoft Word 2.0/3.0	$22.95
DOS/BASIC	$19.95
MultiMate	$19.95
Blanks–Create Your Own	$12.95

Designed to fit IBM(PC,XT,AT) Compaq and most compatible PC's.

"Answers at your fingertips"

THE TEMPLATE SERIES

Call 703-437-4148

Circle 713 on reader service card

THE TEMPLATE SERIES

"Answers at your fingertips."

445-A Carlisle Dr., Herndon, VA 22070 703-437-4148

Qty	Description	Price	Extended Price

*Shipping & Handling $3.00

☐ VISA ☐ MC Exp. Date Total

Card No.

Name

Street Address

City, ST, ZIP

Phone

CCD

A funny thing happened on John Hart's first day at his computer...

he got results.

John Hart was already convinced his new computer could make life easier. What worried John was that it would take him weeks, maybe months to get the most out of a software program.

PFS®: First Choice changed all that. The first thing John noticed was the instruction manual. It wasn't huge and complicated like other software programs. In fact, First Choice let him get started immediately.

Then John found out First Choice was one integrated program that could handle all his business needs. A versatile word processor with spell checking, flexible file management, a powerful spreadsheet program, and resourceful electronic communications were right at his fingertips. And they all worked faster and more efficiently than he ever imagined.

By the end of the day, John Hart discovered that in the time he had set aside for his first lesson, he had already used First Choice to write a dozen error-free letters, create customer files, make sales calculations, and check the Dow® Jones News/Retrieval.

He can hardly wait for tomorrow. PFS: First Choice.
No Experience Required.

Special Introductory Offer. Save $50, limited time only.

Ask your nearest dealer for a demonstration.

© Software Publishing Corp., Mountain View, CA. Works on IBM and compatible computers only.

Password: Communicate

Information and insights on the PC communications marketplace

This month: While videotex flounders in the United States, the French Minitel system flourishes. Plus . . . an ISDN update: Bellcore scientists explore new techniques for voice/data transmissions on integrated services digital networks.

Edited by Eric Brown

On Line

Minitel: The French Find the Key to Videotex

In May of 1986, the three major NAPLPS graphics videotex experiments in the United States (Viewtron, Gateway, and Keyfax) shut down due to lack of interest, causing many observers to proclaim the death of videotex. Yet that same month videotex traffic in France totalled 2,325,254 access hours, with 1,724,193 Minitel videotex terminals in active use.

In contrast, British Telecom—which started the original videotex service, Prestel World System, in 1979—has barely 65,000 users today, and CompuServe, the most successful videotex system outside France, has about 265,000 subscribers.

The French success is the result of a difference in philosophy. If videotex is computer communications, the French emphasize communications while everyone else emphasizes the computer. In France the national telephone company, the Postes Téléphones Télécommunications (PTT), runs the Teletel videotex system. Teletel is popularly referred to as Minitel, in honor of the petite videotex terminal that finds its way into thousands of new homes each month. Featuring over 2000 services, ranging from bulletin boards and real-time "chat" facilities to electronic banking and shopping and specialized interactive data bases, Minitel lays heavy stress on interactive communications.

(continues)

John Greenleigh

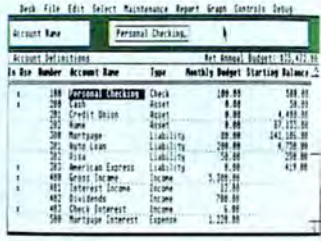
Le Minitel, the terminal that has found its way into millions of French homes. The French are turning their legendary gift for gab into a multimillion-dollar videotex industry.

WE'VE PUT 200,000 PEOPLE INTO ANALYSIS.

Making tax decisions before tax season. (Version 2.0/IBM® and compatibles)

Analyzing your financial position with graphs and reports. (Version 1.4/ Macintosh™)

Using graphics to capture your complete financial picture. (Version 1.5/ Apple® II family)



Using "What if?" analysis with budgeting to decide whether to lease or buy. (Version 1.1/Atari® ST)

Money.

As a source of emotional distress, few things can compete with it.

So it's nice to know that, when it comes to dealing with money, nothing competes with Dollars and Sense.®

For over three years, Dollars and Sense has been the world's best-selling way to come to grips with your financial behavior.

At home. At the office. Or both.

Dual personality.

If you yearn for user-friendliness and crave a context-sensitive helping hand, Dollars and Sense offers plenty of comfort.

Not to mention two sets of starting accounts (one for personal and one for business), a menu-driven interface and a manual that's couched in terms even a novice can quickly come to terms with.

If, on the other hand, you seek software that can stand up to a small business, then the speed and automatic double-entry accounting that's built right in will give you a sense of power.

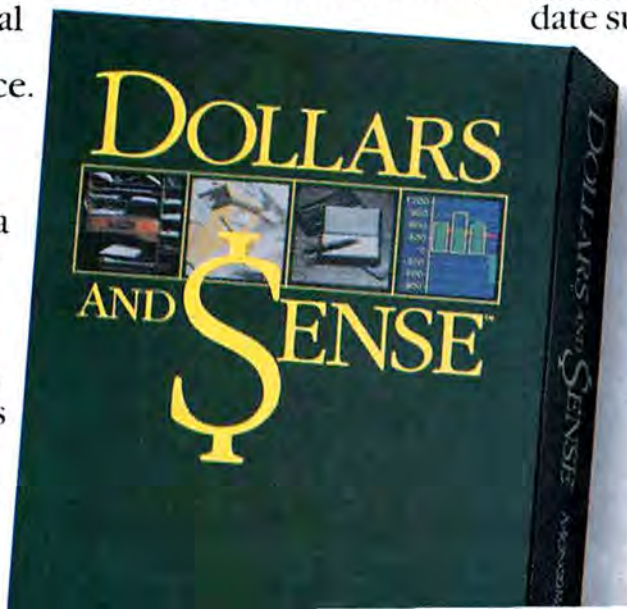
While the absence of copy protection will keep you from feeling frustrated.

Achieving instant gratification.

When it's time to examine your financial profile—at tax time or any time you're in the mood—a keystroke is all it takes to generate the kind of detailed self-analysis you see at the top of this page.

Income statements, balance sheets, year-to-date summaries, cash flow analyses and a variety of charts and graphs will bring you face-to-face with financial reality.

At which point, you may want to lie down.



MONOGRAM

8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529

See your dealer for a demonstration. For upgrade information or a copy of InfoWorld's top-rated review, call (800) 843-2482.

Circle 864 on reader service ca

TurboGraphics™: Graphics struck by lightning.

10MHz acceleration and dazzling graphics in a single board: *Turbo* ΣGA!™ and *Turbo*400™

Sigma Designs' new *Turbo*Graphics series incorporates state-of-the-art cache memory technology with the fastest clock speed yet to be used with an 80286 accelerator.

And they come with the exceptional color graphics capabilities of SigmaΣGA!™ and Color400.™

The result: a PC that runs up to 7 times faster and displays high-resolution graphics, all from just one board.

*Turbo*ΣGA! combines faster processing speed with IBM EGA, Color Graphics, Monochrome, and Hercules graphics compatibility.

*Turbo*400 brings even higher resolution (640 x 400), sharper colors, and crisper text to your graphic software, while also accelerating your PC. Both include a free copy of PC Paintbrush, for the artist in you.

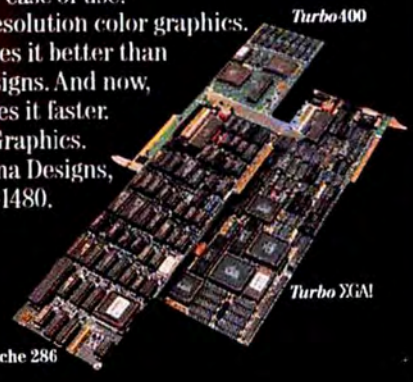
And *Turbo*Cache 286™ is a pure accelerator board, for those who already have graphics.

No software patches to install. RAM resident, dynamic switching to and from 8088 mode, for 100% software compatibility. A hardware reset switch. And an optional 80287 coprocessor.

For graphics, spreadsheets, or even windows, no other accelerator offers greater speed and ease of use.

High-resolution color graphics. No one does it better than Sigma Designs. And now, no one does it faster.

*Turbo*Graphics. From Sigma Designs, (408) 435-1480.



SIGMA DESIGNS

Sigma Designs, Inc. 2023 O'Toole Avenue San Jose, CA 95131 telex: 171240

*Turbo*Graphics, *Turbo*400, *Turbo* ΣGA! , and *Turbo*Cache 286 are trademarks of Sigma Designs, Inc. IBM and Hercules are trademarks of International Business Machines Corp. and Hercules Computer Technology, respectively.

Circle 169 on reader service card

The PTT advocates a five-point plan for system development that differs radically from the philosophy of other videotex services. The first principle of this plan is that everything is interactive. For instance, the astrology program on the Paris-based Funitel service asks the date, time, and place of your birth and gives you three pages of detailed information. By comparison, Viewtron's astrology program made do with the same one-paragraph predictions that run in the newspaper.

Many French doctors run scheduling services on their office PCs. To make an appointment you call in through the Minitel system and list your name at an open time slot. If you need to give the doctor information on your condition, you can enter a confidential electronic mail message.

The second component is the easy-to-use, inexpensive terminal, the Minitel. Unlike the American NAPLPS services, which emphasized elaborate color-graphics screens, the French display graphics sparingly, using a less complex, alpha-mosaic videotex standard called Antiope. While Antiope supports multiple colors—and most French services transmit in color—the vast majority of Minitel terminals are black-and-white.

The Antiope transmission creates a rather coarse image but cuts screen-building time to a fraction of that required for a detailed NAPLPS screen. It also works with much less complex—and less costly—terminals and software. AT&T's NAPLPS terminal costs about $700. A Minitel retails in France for about $150.

The PTT lends Minitel terminals without charge to homeowners; the many French businesses that use Minitels pay about $12 per month to rent them. Although private companies also sell communications software for the IBM PC and the Macintosh, the Minitel terminal is so inexpensive that businesses often rent them even if they already own PCs.

Infocom introduces four new gam

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

One's really warped.

Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization. One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime

Built by Telic Alcatel, one of the world's largest telephone equipment manufacturers, the Minitel comes in several varieties. All the units are small (12 by 9 inches for the basic model) and contain a built-in modem and a fold-down QWERTY keyboard with 11 special keys. These include an index key, which invokes an index for any service, and a guide (help) key that lists the commands for any service. The basic model has a 5½-by-7-inch black-and-white monitor, large enough to display the standard French 20-line-by-40-column screen.

According to Georges Nahon, the French videotex system would never have succeeded without the Minitel terminal. "Our experience shows that you cannot rely on PCs as terminals for a mass-audience videotex system," says Nahon, managing director of Intelmatique, the French government arm that is attempting to market the Minitel abroad. "Most Minitel users would not consider buying a PC for their homes."

The third principle in PTT's 5-point plan is centralized networking. Like the telephone system, the Minitel system relies on a single network to link a large population of users with a large number of separate services. In the United States, on the other hand, scores of networks compete to provide access to services, but none provides access to all services.

The fourth point is the Electronic Kiosk, a PTT-run service that allows users to tap into Minitel services without having to subscribe to them. With the Kiosk, users are spared the inconveniences of identifying themselves with ID numbers and passwords and of trudging through several layers of menus. Not only does the Kiosk make the services easier to use, but it gives users the freedom to sample services without having to commit to subscriptions.

To use the Kiosk, you dial a number that's the same all across

(continues)

s. One really smells.

Every package includes an integral set of props to excite your senses and enhance the game.

and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

Wrapping up this new quartet is a classic gothic mystery set in a haunted castle on the mist-shrouded seacoast of Cornwall. In "Moonmist"™ you'll explore the darkest reaches of Tresyllian Castle and get involved with an eccentric cast of characters, including British nobility, while trying to save your best friend from a vengeful ghost. "Moonmist" offers four distinctly different sets of clues, problems, solutions and hidden treasures. So you'll die to replay it again and again.

All four are easy to get.

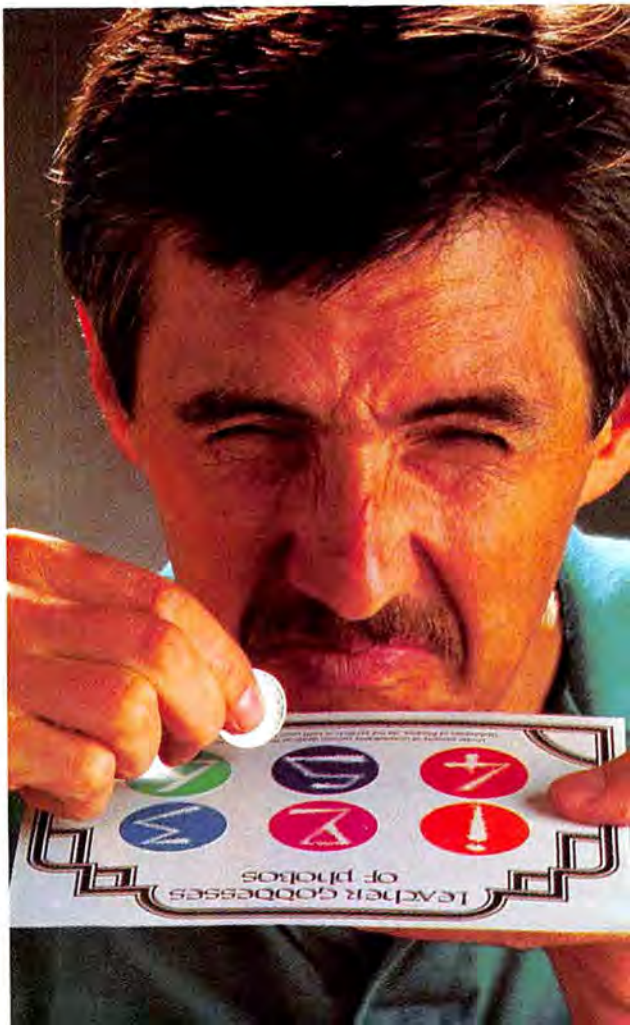
Simply follow your nose to your local software store today.

INFOCOM™

For more information, call 1-800-262-6868, x. 17P. Or write to us at 125 CambridgePark Drive, Cambridge, MA 02140.

© Infocom, Inc. Zork is a registered trademark and Ballyhoo, Trinity, Leather Goddesses of Phobos and Moonmist are trademarks of Infocom, Inc. The Hitchhiker's Guide to the Galaxy is a trademark of Douglas Adams.

Circle 949 on reader service card



If only there were

Wouldn't it be great if you could multiply yourself? Do an honest day's work before lunch?

Well, you can. With Microsoft® Windows.

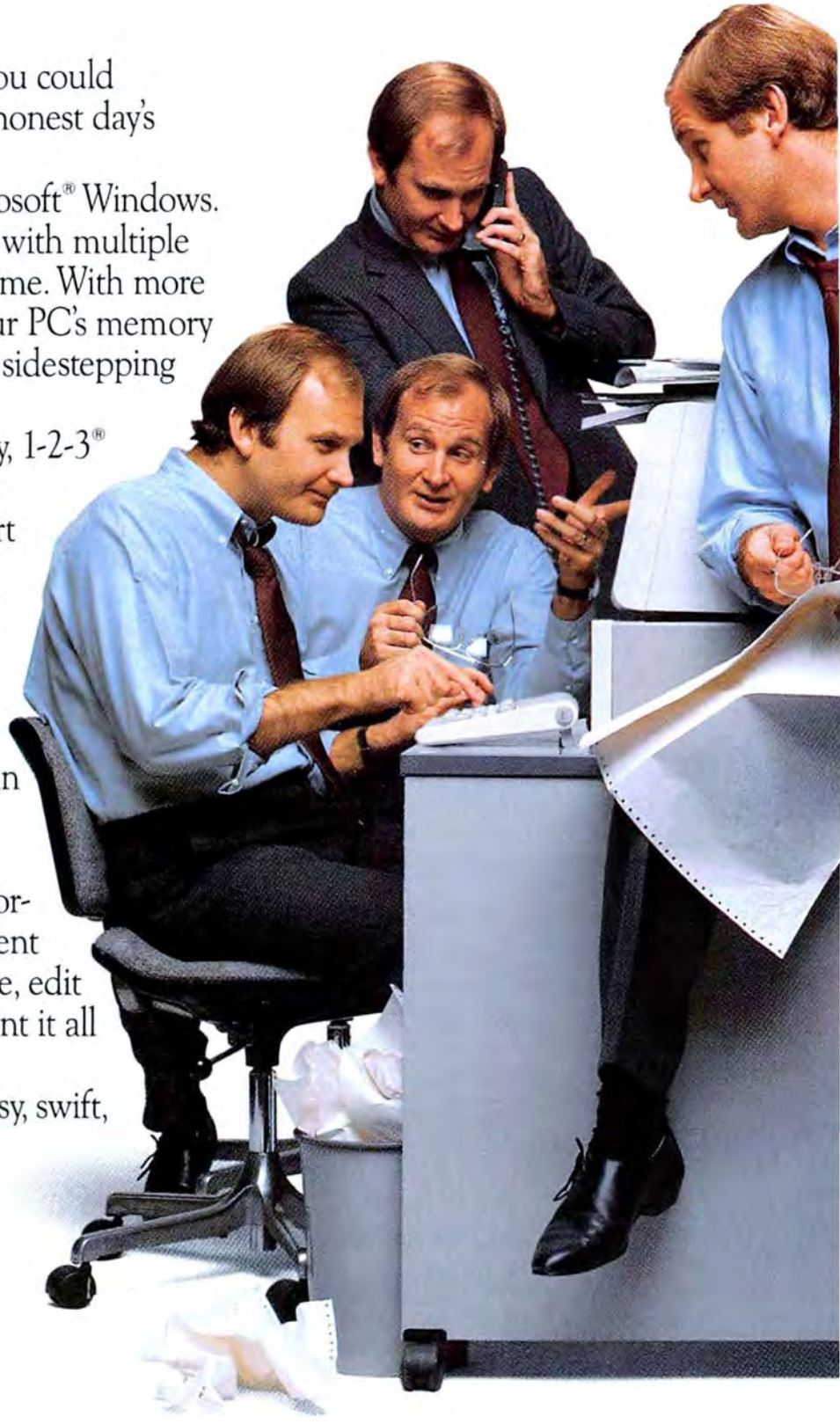
Windows lets you work with multiple applications at the same time. With more programs, in fact, than your PC's memory can normally hold. Neatly sidestepping the 640K limit.

You can switch from, say, 1-2-3® to dBase II® or to Microsoft Word or to Microsoft Chart in a couple of keystrokes.

Leave one program and jump to another. Then jump right back to where you were. In an instant. Nothing to break your train of thought or waste your time.

Then you can select information from several different programs. Collect, combine, edit it all in one place. And print it all on a single piece of paper.

The whole process is easy, swift, and natural.



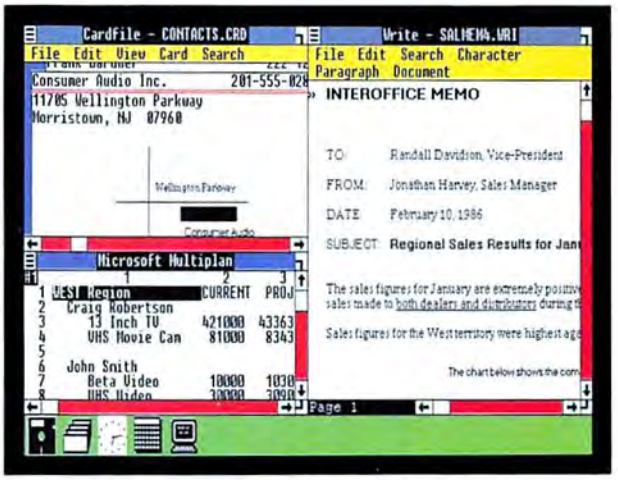
more of you.

We've only just begun.

Windows is a graphic extension of MS-DOS® which adds a powerful new dimension to the system. A more inviting interface of pull down menus, dialog boxes, scroll bars, and icons. Which give you a more intuitive way to work.

All these elements are your bridge to the next generation of applications. Programs which can be easily integrated and which take advantage of Windows' common interface for commands, options, and data exchange. Learn one Windows program, you've virtually learned them all.

In the Windows world, you move information freely. Do more work, more kinds of work, and do it faster.



A startling value.

Buy Windows now and you get a whole desktop full of applications, including: A calendar, clock, cardfile, notepad, and calculator, as well as telecommunications and DOS file management programs. All to help you manage your day to day business.

In addition, you get Windows Write, a graphically-based word processing program. And Windows Paint, a simple, easy to use drawing program.

Not bad for $99.

Find out how productive you can be with a Windows office. Get all of yourselves down to your Microsoft dealer.

And take a good look into Windows.

Microsoft® Windows

The High Performance Software

For the name of the nearest Microsoft dealer, call (800) 426-9400. In Washington State and Alaska, (206) 882-8088. In Canada, call (416) 673-7638.

Microsoft and MS-DOS are registered trademarks of Microsoft Corporation. 1-2-3 is a registered trademark of Lotus Development Corporation. dBase II is a registered trademark of Ashton-Tate.

France. At the prompt you type in the name of the service you want. The Kiosk, which is actually a modified telephone switch, connects you to the service through the national packet network. The switch automatically keeps track of the telephone number you call from and bills you for time on the network just as it does for normal long-distance phone service. Kiosk services cost about $6 an hour, regardless of which service you use. The PTT keeps about a third of this, and the rest is paid to the service providers, who bill the PTT according to the total usage logged on their systems each month.

Not only is this system convenient, it ensures privacy. Unlike CompuServe or Prestel, no one tracks who accesses which services.

Although users can also subscribe to individual services, most choose the Kiosk. Even when a service offers its subscriptions at a substantially lower price, the response is minimal. This situation also puts pressure on service developers within the Kiosk, who are vulnerable to competition, to maintain quality services.

The final element of the French plan is the Electronic Directory, a complete listing of the country's 25 million listed telephone numbers. The first 3 minutes of each access are free, and it seldom takes more than a few seconds to find a number. You can identify the number you want by subscriber name, address, or partial information. If you ask for Marie on Rue Pigalle in Paris, for instance, you'll receive listings for all Maries who have phones on that road. You can request a number by street address without knowing the name of the subscriber, and if you misspell a name, the service will guess at the number you want.

It's also possible to find a service or business by subject. For example, if you develop a sudden chest pain you can enter *douleur de poitrine* on a terminal and get a listing of all the heart doctors in the neighborhood, or in all of France. When you log off, the terminal keeps the number displayed on its screen, so you don't have to write it down or memorize it.

The PTT grossed nearly $4 million with videotex in May, which was a typical month in France. Many service operators are becoming rich on the profits from their systems. But the record 2-million-terminal population is still less than 8 percent of the size of the French telephone population. Each year the number of terminals increases by nearly 1 million, a rate limited primarily by France's capability to produce terminals rather than by any lack of demand. At the end of a decade the French may have about 10 million terminals operating, averaging 85 minutes of use per terminal per month, with the network supporting 14 million hours of access time a month.

Considering the success of videotex in France, why hasn't it caught on in the United States? One of the reasons that graphics videotex services have failed is that the fancy NAPLPS screens are slow to display, require expensive equipment, and don't have a high enough resolution to compete with print media. Yet, even ASCII services have experienced only sluggish growth.

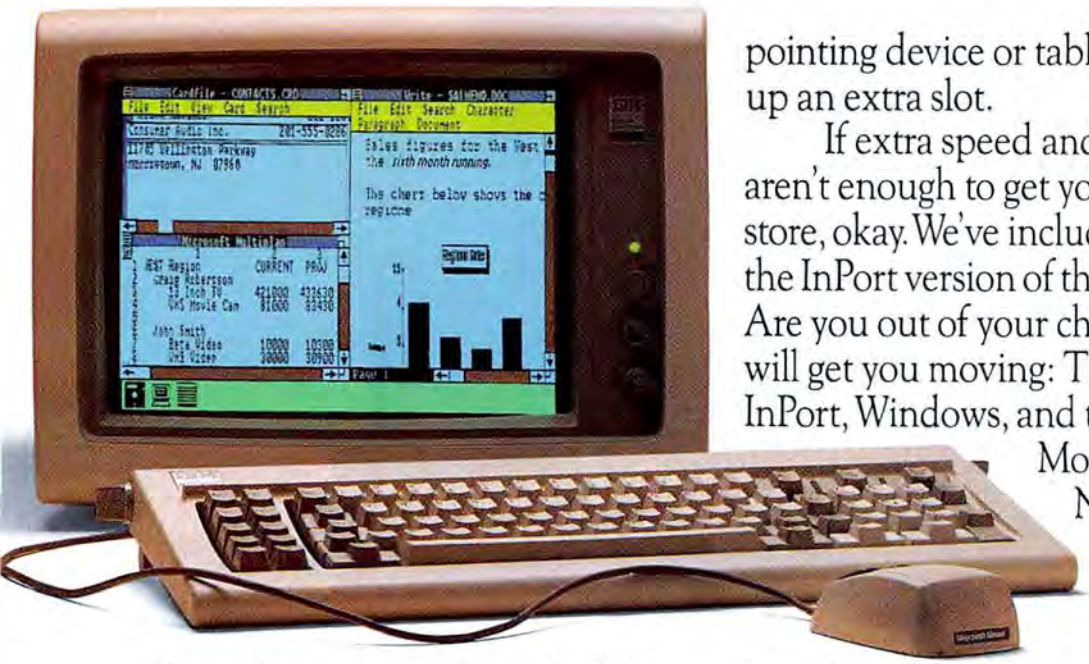
The major puzzles are not technical issues but problems of organization. With AT&T's divestiture an accomplished fact, only the Regional Bell Operating Companies (RBOCs) are in a position to develop successful videotex systems on the scale of the French model. Only the local telephone companies have the electronic networks in place that can reach every home and office. And according to law, only the RBOCs can publish white-pages directories or automatically bill network usage to telephone numbers.

Yet the RBOCs have been slow to involve themselves in videotex. With luck, this situation will soon change. Freed of many old regulations, the RBOCs are becoming more aggressive and hunting new sources of profits (see *Password: Communicate, PCW,* September 1986). Some are building packet networks and looking for traffic for those networks. Others have even started commercial electronic directories. Due to the directories' high prices, however, they are used only by such concerns as delivery services and bill collectors, who make heavy use of directory assistance. Mountain Bell, for instance, charges a $400 sign-up fee for its ScanTel service. Users are charged 30 cents per minute of access plus 5 cents per response from the system.

Even if the telephone companies do not become involved immediately, however, the French success will push Minitel to expand internationally. Already, the PTT and

(continues)

Save $3000 on Windows.



If you thought you needed a PC AT to get the speed to take maximum advantage of Microsoft® Windows, cancel your order. You can get a Microsoft Mach 10 for about $3000 less than an IBM® PC AT.

Microsoft Mach 10 is a hardware performance enhancer. Your own IBM PC or IBM PC XT can go up to twice as fast when you're running Windows and Microsoft Word or other favorite applications.

Speed isn't all you get, though. Microsoft's exclusive InPort™ Device Interface, the new graphic input device standard, is built into Mach 10. Use our new InPort version of the Microsoft Mouse or any other compatible pointing device or tablet without using up an extra slot.

If extra speed and an extra port aren't enough to get you hurrying to the store, okay. We've included Windows and the InPort version of the Microsoft Mouse. Are you out of your chair yet? If not, this will get you moving: The Mach 10 with InPort, Windows, and the Microsoft Mouse costs only $549. Now, take a look around and try to find a better value.

If you're wondering why we're offering all this together, don't forget who we are: Microsoft. The inventor and developer of software used by more people than any other. That means we've learned the kinds of things that will help you get the most out of your computer. And your mind.

Can you think of a smarter way to open your Windows and save $3000?

Introducing Microsoft® Mach 10

Microsoft is a registered trademark and InPort is a trademark of Microsoft Corporation.
IBM is a registered trademark of International Business Machines Corporation.

For the name of your nearest Microsoft dealer, call (800) 426-9400. In Washington State and Alaska, (206) 882-8088. In Canada, call (416) 673-7638.

Introducing the 10/6 MHz Multitech 900
Innovation without compromise

The high-performance Multitech 900 is your innovative alternative in an AT system.

Poised to run faster.

The Multitech 900 operates at 6 or 10 megahertz. With this speed advantage switching from 6 to 10 megahertz cuts processing time almost in half — you spend less time waiting for the information you need to analyze.

Bundled Soft-white display.

A high-resolution, non-glare, soft-white display and monochrome-graphics adapter are included with your Multitech 900 — not priced separately.

Price/performance breakthrough.

At $2395 the Multitech 900 delivers the high-performance you demand in an AT system but at an affordable price to fit within all budgets.

Uncompromising.

While the Multitech 900 introduces innovation it doesn't compromise any industry standards.

For example: *Software compatibility* with programs designed for the IBM PC/AT and PC/XT; *hardware compatibility* to tie into your networking options; full *one-year warranty* and guaranteed *support* from Multitech, a company with a proven track-record in quality microcomputer manufacture; and, *Nationwide service** that is convenient and dependable. Call us today for more information about the Multitech 900 or our full line of personal computer products.

	CPU Speed	Mother-board Memory	Max. # of Half-Height Internal Drives	Display	Operating System	Warranty Period	Suggested List Price
Multitech 900	**10 or 6 MHz Keyboard, Software or Hardware Switchable**	**512K RAM Up to 1MB**	**5**	**Hi-Res., Soft-white**	**MS-DOS 3.1**	**12-Months**	**$2395**
IBM PC/AT	8 MHz Only	512K RAM Up to 640K	3	Option	Option	12-Months	$5295*
Sperry PC/IT	6, 7.16 or 8 MHz Hardware Switchable	512K RAM Up to 1 MB	4	Option	MS-DOS 3.1	12-Months	$3395
Compaq Deskpro 286	6 or 8 MHz Keyboard & Software Switchable	256K RAM Up to 2.2MB	4	Option	Option	3-Months	$3395
Tandy 3000	8 MHz Only	512K RAM Up to 640K	3	Option	Option	3-Months	$2599
Televideo Telecat-286	6 or 8 MHz Keyboard & Software Switchable	512K RAM Up to 1MB	3	Hi-Res., Green	Option	3-Months	$2995**

*Includes 30MB Hard Disk Drive
**Includes 20MB Hard Disk Drive

All prices reflect manufacturers' suggested list for base models as of June 4, 1986

Multitech 900 is a trademark of Multitech Electronics Inc
All other product names are trademarks of their respective manufacturers

Multitech ELECTRONICS INC.

Committed to Excellence, Quality & Service

1012 Stewart Drive
Sunnyvale, CA 94086
Tel: (408) 773-8400
(800) 538-1542

A Division of MSC International
**Serviced Nationwide by TRW*

Circle 505 on reader service card

The Only Multi-Scan Monitor You Will Ever Need

Application flexibility?
YES. Our superbly designed 13″ color monitor is compatible with **IBM, PC/XT/AT** and their clones.

Adapter variety?
YES. Our multi-scan feature gives you the opportunity to use **CGA, EGA,** and **PGA** due to the wide range of scanning frequencies from **15**kHz to **34**kHz.

Comparable dot pitch?
YES. We provide a dot pitch of **0.31 mm** for clear text, graphics and **CAD/CAM**.

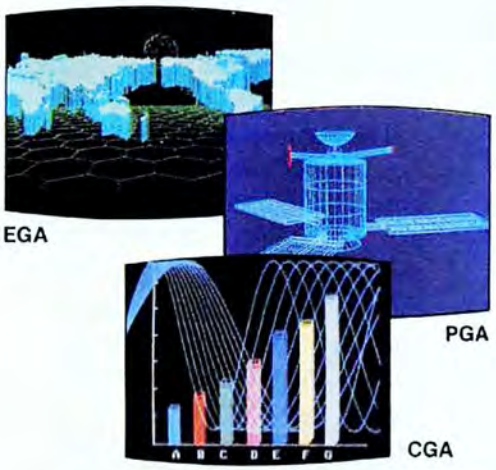
High resolution?
YES. The MJ-503 offers **16** color/**64** color switch with a high resolution of up to **800** horizontal dots and maximum of **560** vertical lines.

Accessory variety?
YES. Accessory cables are available to easily connect the monitor with the computer.

Convenient features?
YES. For less eye strain and easier viewing, the MJ-503 comes equipped with a 13″ **non-glare screen** and optional swivel base.

Easily accessible controls?
YES. The up-front controls allow for easy adjustment of horizontal position, brightness, and contrast.

Compatible decor?
YES. Teknika's clean design beautifully compliments contemporary decor as well as it combines with business use.



So when looking for a monitor that's appropriate for business and personal use the name to remember is Teknika.
No matter what computer you own now, or intend to buy in the future, the MJ-503 is an investment that makes good sense today and will continue to pay off tomorrow.
Does Teknika back its monitor with dependable service?
DEFINITELY. We offer a **two-year parts, CRT and Labor warranty** because Teknika has faith in the quality of this monitor.
YES...

All above at an affordable price.

MJ-503

IBM is a registered trademark of International Business Machines Corporation.

YES, WE ARE

TEKNIKA

TEKNIKA ELECTRONICS CORPORATION
353 ROUTE 46W., FAIRFIELD, N.J. 07006
A Subsidiary of ***FUJITSU GENERAL LIMITED***

Please Send MJ-503 Brochure
please print

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ **STATE** _____
ZIP _____ **PHONE** _____

Circle 997 on reader service card

Circle 238 on reader service card

British Telecom have signed an agreement to link Prestel World Service to the Minitel network using a dual-standard Prestel/Antiope Minitel.

Meanwhile, Minitel business services are already reaching beyond the French borders. Vestra, a major custom-suit manufacturer in Strasbourg, is placing Minitels in tailor shops in the United States. Tailors enter the measurements of their customers on electronic forms and send them to Strasbourg via satellite. At the plant the forms are checked for inaccuracies and fed into a computer, which drives laser cutting machines that automatically cut the suits. The result: within two weeks the U.S. client receives a tailored suit from France.

Many other French companies that operate private services on the network are major exporters to the United States. All the French car manufacturers, for instance, use videotex to take orders and provide information on model and color availabilities to their dealers in France. It won't be long before they offer the same service to U.S. dealers. Several American multinational corporations, including Singer and Mobil Oil, use videotex in their French offices to keep in contact with their retailers and field sales force. It's a good bet that they'll soon bring their systems across the Atlantic.

Eventually, an American demand for Minitel service may develop, and the hesitant American telephone companies may be forced to pay attention. After all, 2 million French people can't be wrong. —*G. Berton Latamore*

Trends

ISDN: Networking in Base Three

Everyone reading this article presumably knows that the foundation of digital computing is the mathematical concept of base two, also known as binary. It seems, however, that the next big step in computer communications may rest in part on base three: ternary.

The breakthrough in question, integrated services digital networks (ISDN), is a series of standards and technologies that essentially amount to digital telephony. ISDN differs from current telephone technology like compact disks differ from LPs.

The relevant technical protocols are extremely complex and are still being written. In fact, the first large-scale field test of ISDN won't happen until early 1987. The test is slated for the world headquarters of McDonald's in Oak Brook, Illinois.

The promises of ISDN are many (see "ISDN: The Network of the Future?" *PCW*, January 1986). For personal computer users the immediate advantages boil down to this: Rather than tying up your phone line to transmit data at a modem speed of 300 to 18,000 bits per second (bps), you'll have two 64,000-bps channels to talk on and still have a 16,000-bps channel for your computer to communicate on. ISDN planners have even allowed for a yet-to-be-assigned fourth 16,000-bps channel, which would increase the line's capacity to 160,000 bps.

(continues)

OBJECTIVE
- GET EVEN MORE OUT OF OUR 1-2-3 DATA

You already know how valuable your 1-2-3® or Symphony® data is.

But what if you need your data on paper? In a specific form? Fast? Lotus has the answer.

It's called 1-2-3 Report Writer.™ It lets you easily format and print customized reports, presentations, and pre-printed forms. So you can generate monthly status reports. Weekly sales analyses. Presentation-quality financial reports. Claim forms and invoices. Even mailing labels.

And Lotus-like commands and simple prompts mean you can get started right away.

The cost? Just $150.

And you can try 1-2-3 Report Writer for 30 days without obligation. If you don't like it, send it back. We'll refund your money.

To take advantage of this offer, just complete and return the coupon below. Or call **1-800-345-1043.**

Lotus 1-2-3 Report Writer

A Lotus companion for reports, forms, and mailing labels

NEXT STEPS:

1. BUY REPORT WRITER FROM LOTUS. (IF WE DON'T LIKE IT, WE GET A REFUND.)
2. MAIL THIS COUPON →

Complete and mail to: Lotus Development Corporation, Atlanta, Georgia 30390-0370.

To order by phone, **call 1-800-345-1043**

☐ Send me 1-2-3 Report Writer for $150.* (PN 1229).
Payment: ___VISA ___MasterCard ___Money Order ___Check
(make payable to Lotus Development Corp.)

I understand I can return it within 30 days for a full refund.

☐ Send me more information (PN 1278)

Card # |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| Exp._____

Name_____

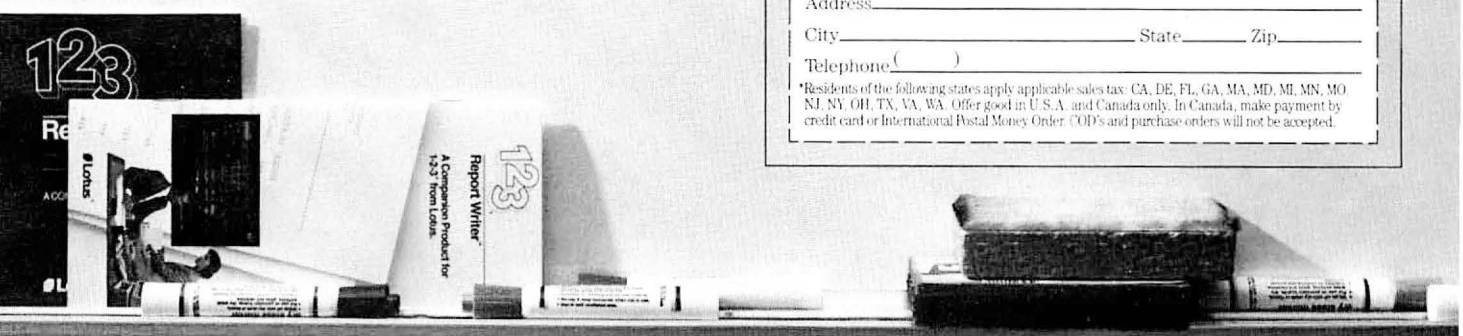
Company_____

Address_____

City_____ State_____ Zip_____

Telephone( )_____

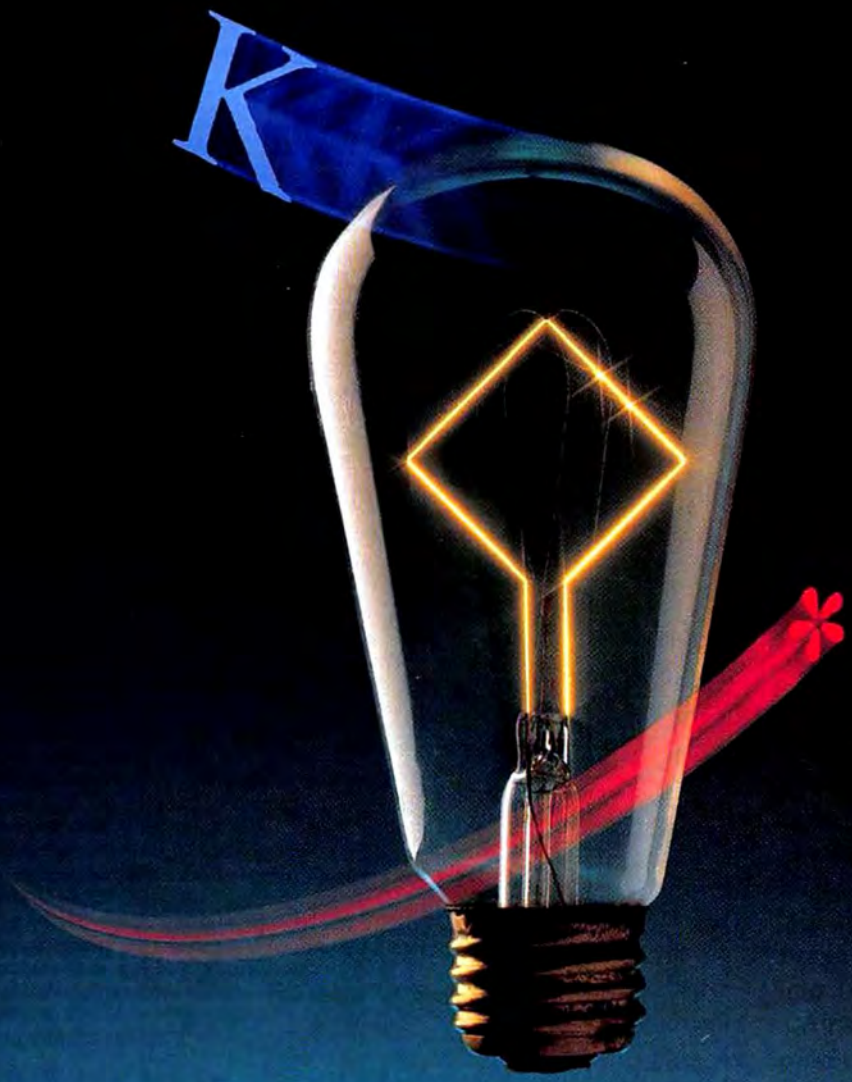
*Residents of the following states apply applicable sales tax: CA, DE, FL, GA, MA, MD, MI, MN, MO, NJ, NY, OH, TX, VA, WA. Offer good in U.S.A. and Canada only. In Canada, make payment by credit card or International Postal Money Order. COD's and purchase orders will not be accepted.



System Requirements: Worksheet files from 1-2-3 Rel. 1A, Rel. 2, or Rel. 2.01 or Symphony Rel. 1.0, Rel. 1.1, or Rel. 1.2; IBM® PC, XT™ AT® Portable, 3270-PC, COMPAQ® Computers, or AT&T® PC 6300; 256K RAM; DOS 2.0–3.1, inclusive.

© 1986 Lotus Development Corporation. 1-2-3, Symphony and Lotus are registered trademarks and 1-2-3 Report Writer is a trademark of Lotus Development Corporation.

For bright new ideas in personal computing...



...subscribe to PC WORLD today.

You'll save $17 and ensure access to the best new ideas in business and personal computing!

VISA and MasterCard accepted—
call TOLL-FREE:
800/642-9606

YES! Enter my subscription for 12 issues of *PC World* at just $17.97. I'll save $17 off the single copy price!

☐ Payment enclosed ☐ Bill me

Name _____

Company _____

Address _____

City, State, Zip _____

Offer good in the U. S. only. Please allow 6 to 8 weeks for shipment of your first issue. Offer expires April 30, 1987.

PC WORLD

4BRA1

YES! Enter my subscription for 12 issues of *PC World* at just $17.97. I'll save $17 off the single copy price!

☐ Payment enclosed ☐ Bill me

Name _____

Company _____

Address _____

City, State, Zip _____

Offer good in the U. S. only. Please allow 6 to 8 weeks for shipment of your first issue. Offer expires April 30, 1987.

PC WORLD

4BRA1

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

What's more, all this can be accomplished without a modem.

There is, of course, a problem. The copper wire that runs between your house and the local phone company switch simply can't carry 160,000 bits of data every second. The logical (and expensive) answer is to install fiber optic cable. With its wide bandwidth, fiber can simultaneously transmit several lines of voice and data at breakneck speeds (see "Fiber Optic LANs" in this issue). While long-distance vendors are already in the process of laying down a national network of fiber, it may take several decades or longer, if ever, before all residential copper telephone wire is replaced with fiber.

In the meantime, some kind of cheap and highly reliable data compression is needed to squeeze a fast and voluminous bit stream into one that a copper phone line can handle. The trick to running three different channels of data over the same wire at the same time is to assign each bit a specific place in line, a technique called time division multiplexing, or TDM. Software running on an ISDN network would gather the bits into groups of 48 and place each group in a predetermined sequence before transmission. Each group is called a frame, and consists of 38 data bits and 10 overhead bits. Every second, 4000 frames attempt to move over the wire, an onslaught that would ordinarily push a copper wire to the edge of an electronic nervous breakdown.

Enter the engineers at Bell Communications Research in Livingston, New Jersey, an R&D group created when AT&T divested its local phone businesses. Better known as Bellcore, the group is owned and financed by all seven RBOCs. Think of it as the Bell Labs of the local phone companies.

Bellcore is currently testing a number of ways to cram an immense amount of voice and data onto a single phone line. Most of those techniques involve converting a small number of bits into ternary and sending the tripartite signals over the wire to be re-

(continues)

Teach your PC to print perfect Bar Codes*

***with big characters on Epson/Okidata/IBM Printers**

- Labels for shelves, bins, shipping, inventory, Department of Defense – LOGMARS, AUTOMOBILE (AIAG) • Bar coded catalogs • Large text up to 1.2" tall • Codabar, Plessey, I 2 of 5, UPC and Code 3 of 9 • Menu driven or Ram-Resident user-controlled • Fast • Easy • 30 day guarantee. $49–299
- Also Readers (Portable and PC attached)

WORTHINGTON DATA SOLUTIONS
130 Crespi Court, Santa Cruz, CA 95060
408/458-9938

Circle 312 on reader service card

LIFETIME WARRANTY
Verbatim®
Special 12 PACK ENDS 12-31-86
* 12 Pack Special 5¼" SS-DD & DS-DD

5¼" Disks		Digital Cassettes		3½" Disks	
S-Side D-Den.	7.95*	T300.....	4.05	S-Side	12.95
D-Side D-Den.	10.95*	R300...	3.85	D Side	18.95
S-Side 96tpi	15.75	T450.....	5.55	8" Disks	
D-Side 96tpi	18.75	DC 30 ..	6.60	S de S-Den.	15.40
HIGH DEN.	20.95	MI 50 ..	4.90	S-Side D-Den.	17.95
		HD 10 ..	7.95	D-Side D-Den	20.95
		HEAD CLEANERS			
		5¼" Kits...	4.75		
		5¼" Refills	7.00		
		8" Kits...	5.05		
		8" Refills	8.00		

Old Reliable Diskette Connection
• Delaware 1-800-451-1849
• Oklahoma 1-800-654-4058
• Nevada 1-800-621-6221

3M LIFETIME WARRANTY
3M
Call For Quantity Discounts

5¼" Disks		Data Cartridges		3½" Disks	
S-Side D-Den	7.95	DC 100A	12.95	S-Side	13.95
D-Side D-Den	9.95	DC 1000	12.95	D-Side	19.95
S-Side 96tpi	15.75	DC 300A	16.60	8" Disks	
D-Side 96tpi	19.75	DC 300 XL	19.55	S-Side S-Den.	15.40
HIGH DEN.	21.95	DC300XLP	19.85	S-Side D-Den.	18.95
		DC 600A	22.00	D-Side D-Den.	20.95
		HEAD CLEANERS 12.75 EA. 30 Cleanings			

Old Reliable Diskette Connection
• Delaware 1-800-451-1849
• Oklahoma 1-800 654-4058
• Nevada 1-800-621-6221
3M

Circle 691 on reader service card

If you own an IBM computer (or compatible) with an Enhanced Graphics Adapter card (EGA), you should have EGA PAINT! EGA PAINT is an electronic paintbrush AND a powerful business presentation tool for users of the EGA. EGA PAINT gives you power to create and display polished, effective visual aids to help you get your message across. EGA PAINT makes the transition from mind to screen. Here's why:

ENHANCED SCREEN CAPTURE

Use any graphic screen from most any program (Lotus™, Symphony™, Windows™, etc.) and move, reduce, enlarge, flip, rotate and even bend your images. Then, add text in a variety of fonts to make your point! Magnify the impact of charts, graphs or flow charts with vivid colors and patterns.

ATTENTION DEALERS

CALL NOW TO GET A WORKING ROLEX™ SCREEN AND OVER 40 NEW IMAGES FOR YOUR SHOWROOM DISPLAY (JUST $19.95)

EXTENDED TEXT FEATURES

Why settle for just the standard fonts? We give you those as well as Avant, Broadway, ArtDeco, and many more contemporary, attention getting types of styles in extended sizes from 10 to 72 points! Change spacing, make it light, bold, bolder, regular or proportional, etc. Then add the power of color to your lettering!

WE PROVIDE THE TOOLS

- ★ A unique Dual-Mode ZOOM feature gives you a 24 x 24 pixel window that you can enlarge 4 OR 8 times for precise touch-ups.
- ★ The COLOR MIXER makes special colors and textures easy AND you can mix millions of colors DURING EDITING.
- ★ An IMAGE LIBRARY feature lets you save and recall frequently used designs (Charts, grids, logos, etc.)
- ★ The SMALL command saves your picture in from 50% to 90% LESS disk storage space with little loss of speed!
- ★ FULL SCREEN DISPLAY. No Icons clutter the screen with our Pop-up menus!
- ★ A STATIONARY CURSOR function keeps you from losing your screen position when you need additional commands.
- ★ Mouse or Keyboard operation.

EGA SLIDE™

EGA SLIDE presents as many illustrations as yo want, in any sequence, for any length of tim and for the professional touch, we include a larg selection of cuts /dissolves which you contro

EGA PRINT™

Is a menu driven print screen tool that support most PC Dot-Matrix Printers, and Canon Lase and color printing on the Okimate 20 and Epso JX-20.

SPECIAL INTRODUCTORY OFFER

EGA PRINT™ AND EGA SLIDE™ INCLUDED WITH EGA PAINT™

ONLY $79.00

PLUS $5.00 SHIPPING AND HANDLING.

RIX

RIX SoftWorks Inc.

18552 MacArthur Blvd.
Suite 470 Irvine, CA 92715

(714) 476-8266

ORDER YOURS TODAY!

1 (800) 233-5983 (In California)
1 (800) 345-9059 (Outside CA)

OTHER PRODUCTS FROM RIX

EGA 1-2-3 - $39.00
- ★ Drivers for Lotus 1-2-3
- ★ 50% larger viewing area
- ★ Hi-Res Print Screen

EGA GRAPH - $49.00
- ★ Subroutines for Hi-Res graphics for BASIC and Pascal

EGA UTIL - $49.00
- ★ 35 & 43 line mode
- ★ Palette adjust
- ★ User defined character set

Endusers circle 801 on reader service card Dealers circle 802 on reader service card

$39 Trial

Value Line's new software: For the complete investor.

Value Line's software lets you get the whole investment picture in clear focus.

Simply awesome —*T.J.M.*

Amazingly complete —*B.A.L.*

A quantum leap forward —*J.A.H., Jr.*

A valuable, easy-to-use, foolproof tool —*C.R.R.*

Well done and very useful—*R.S.E.*

Editor's Choice-*PC Magazine*

VALUE/SCREEN *Plus* packs a lot of investment power into one integrated investment package. ***Stock Selection:*** You can instantly screen the entire VALUE/SCREEN *Plus* database for all the stocks that meet your unique, demanding investment criteria. ***Stock Reports:*** You can get stock reports, just as fast. ***Portfolio Management:*** You can enter your own stock ownership information to create a powerful computer-driven portfolio. You can even track hypothetical investment portfolios to evaluate stock selection criteria. ***Report Generator:*** You can get formatted or customized reports up to 230 columns wide. ***Spreadsheet Files:*** You can load any of this data into spreadsheets, using the popular DIF spreadsheet data format.

Lotus 1-2-3, Symphony, and Multiplan are among the popular spreadsheets to which VALUE/SCREEN *Plus* can be linked.

Lotus 1-2-3 and Symphony are registered trademarks of Lotus Development Corp. Multiplan is a registered trademark of Microsoft, Inc. VALUE/SCREEN *Plus* is a registered trademark of Value Line, Inc.

$39 Trial If you act right now, we'll send you the complete software package—which regularly sells for $95—for only $39. And we'll include 2 monthly data disks worth $29 each, *absolutely* free. There are no timesharing charges, since up-to-date data is mailed to you regularly on disk.

800-521-5257

☐ I have an IBM compatible, 256K, and want to take the $39 two-month trial.
☐ Please send information on the [ ] Apple II [ ] Macintosh version
☐ My check for $39 is enclosed (NY residents, add sales tax)
☐ Please bill my (circle one) Visa MasterCard American Express

Account# _____ Exp. Date ____
Signature _____
Name _____
Address _____ Dept.836G01
City, State, Zip _____

Tax-deductible if used in managing your investments. Purchase is nonassignable.

Value Line Software
711 Third Avenue
NY NY 10017

Circle 832 on reader service card

converted to binary at the telephone company's switch.

Binary is conceptually elegant: Either something is on or it is off. It's either a 1 or a 0. It's the Yankees or the Mets. Ternary is not quite so immaculate. It doesn't deal with on, sort-of on, and really off but rather with positive, negative, and zero. Sounds simple enough, but there's more. Instead of the binary method of sending either a high voltage or a low voltage in a particular time slot, ternary involves sending a positive voltage, a no voltage, or a negative voltage. (If negative voltage seems like an odd concept, consider the S-shaped sine wave of alternating current. Everything below the *x*-axis is negative voltage.)

Bellcore engineers are weighing the benefits of translating 4 binary bits at a time into 3 ternary versus turning 3 binary into 2 ternary. Conveniently, the 48 bits in an ISDN frame happen to divide evenly by both 4 and 3. The 4 binary/3 ternary technique would reduce the number of bits per second from 160,000 to 120,000 bps; the 3 binary/2 ternary technique would compress throughput to about 108,000 bps. Either amount would be feasible on a standard copper phone line.

Also being considered is a technique called modified duo-binary (MDB), which just piles all the bits onto the wire, lets them overlap, and makes the central office sort it out. To top it off, Bellcore is testing a quaternary scheme, one that takes groups of 2 binary bits and converts them into base four: strong positive voltage, weak positive, weak negative, and strong negative.

Bellcore will soon be placing its recommendation into the international standards hopper, where it faces a long road toward fruition. The ISDN transmission standard must traverse numerous ANSI and CCITT committees before reaching the full international CCITT committee, which, according to most analysts, should accept the standard in 1988.

So although one more piece of the ISDN standard will be established, don't throw away those primitive modems yet. ISDN has many miles to go, especially when you consider that the telephone companies probably won't implement ISDNs until several years after the standard is set in granite.

If ternary proves itself to be efficient for communications, it might eventually be adopted for computer communications. The difficulties would be considerable, however. For one thing, microprocessors operate on direct current, while ternary's reliance on negative voltages seems to require alternating current. A ternary computer would be an entirely different creature from a binary computer, perhaps as different as analog and digital computers—and we all know which side won *that* battle. —*Daniel J. Rosenbaum*

G. Berton Latamore is a writer based in South Burlington, Vermont, and the editor of Video Print, *a videotex industry newsletter. Daniel J. Rosenbaum is executive editor of* Wiretap, *a monthly analysis letter covering the information industry.*

'TIS THE SEASON! And now Santa's magical touch is yours with the introduction of the HOLIDAY clip art volume from PC QUIK-ART. From the copyrighted files of SCW Services, Inc. (a Scripps Howard Company), PC QUIK-ART brings you one of the most varied and complete volumes of holiday art ever compiled. Just name a holiday and you'll find it...from New Year's to Christmas and every holiday, celebration and seasonal event in between, you'll put your finger on just what you need in seconds!

Make full use of today's desk-top publishing possibilities by incorporating PC QUIK-ART's special HOLIDAY volume in conjunction with the regular monthly releases. Available in 5.25" IBM-PC compatible disk format (200 "clips") for only $59.95 per release. Custom volumes available on request. Call for special pricing.

With PC QUIK-ART, **you** can turn your mouse's squeak into a lion's roar. Even on the night before Christmas!

NOTE: Compatible with major graphics editing programs, such as PC Paintbrush, ClickArt Personal Publisher, Pagemaker, Spellbinder, Front Page, Printrix and Fontrix, and many more.

Dealer inquiries welcome.

PC Quik-Art™

394 S. Milledge Avenue • Athens, GA 30606

1-800-523-1796

(In Georgia, call 404/543-1779)

PC Quik-Art is a trademark of PC Quik-Art, Inc. All images copyrighted by SCW Services, Inc.

Circle 710 on reader service card

Business Acquisition.

In business, the smart money is spent in areas that improve the bottom line. Areas like productivity and efficiency. That's why a lot of companies today are investing their money in WordPerfect 4.1 for powerful business word processing.

Substantial dividends.

With unsurpassed business features for the IBM PC and compatibles, WordPerfect 4.1 pays for itself again and again with professional documents turned out in record time. Features include an elegant thesaurus, 115,000-word spelling dictionary, columns displayed side-by-side on screen, math capabilities, split screen, and line drawing.

In addition, WordPerfect Corporation offers an excellent site licensing program so major customers can receive the software and support they need for a pre-determined, discounted fee.

The top seller.

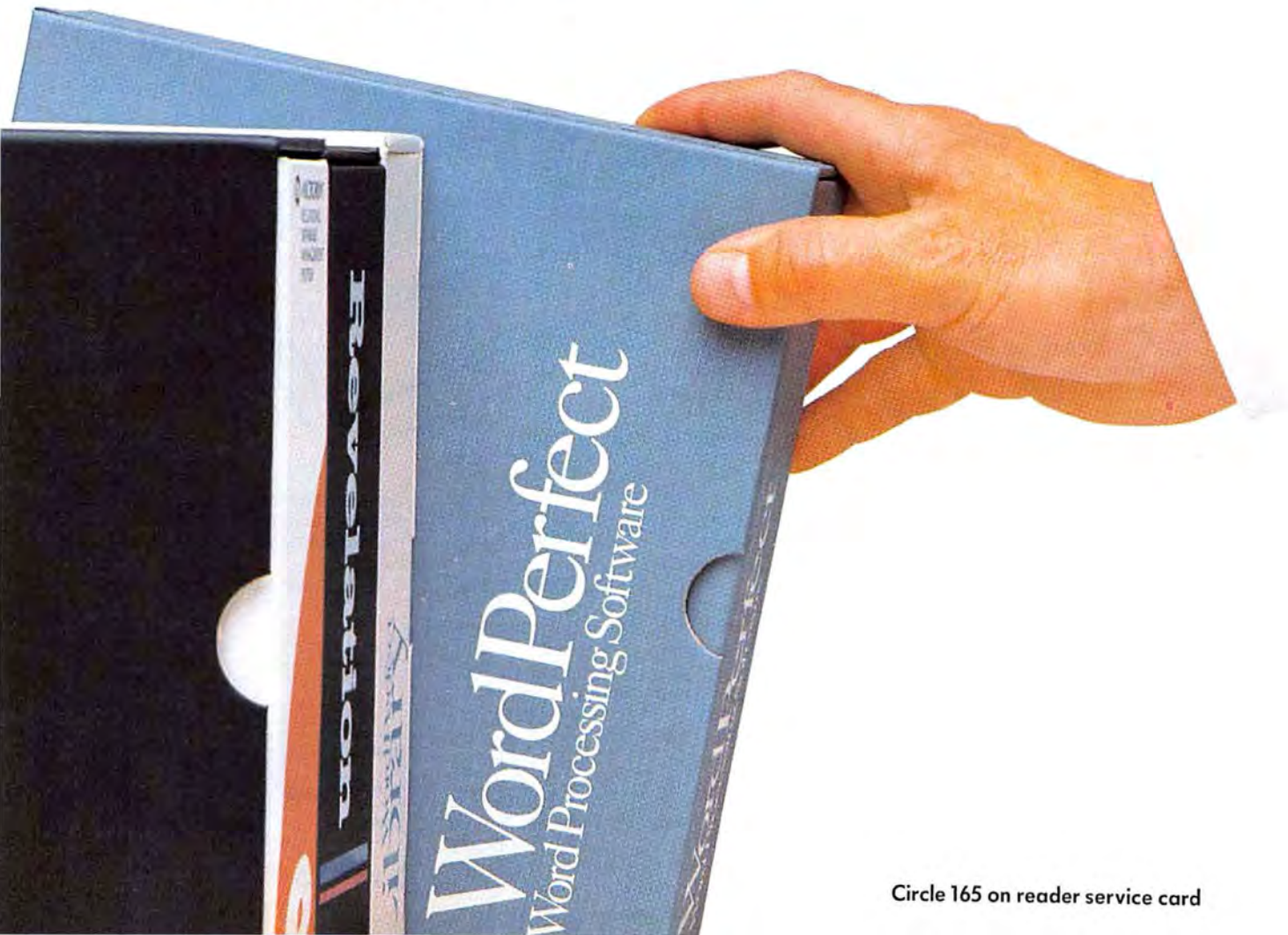
With so much to offer, WordPerfect has now become the best-selling word processor for the IBM PC, according to market research firm InfoCorp. And customers like Merrill Lynch, Upjohn and General Dynamics are leading the way.

Maximize your investment.

Get the word processor designed to improve your company's bottom line. WordPerfect 4.1. It's the perfect corporate investment. For more information, call or write WordPerfect Corp., 288 West Center St., Orem, Utah 84057, (801) 227-4000.

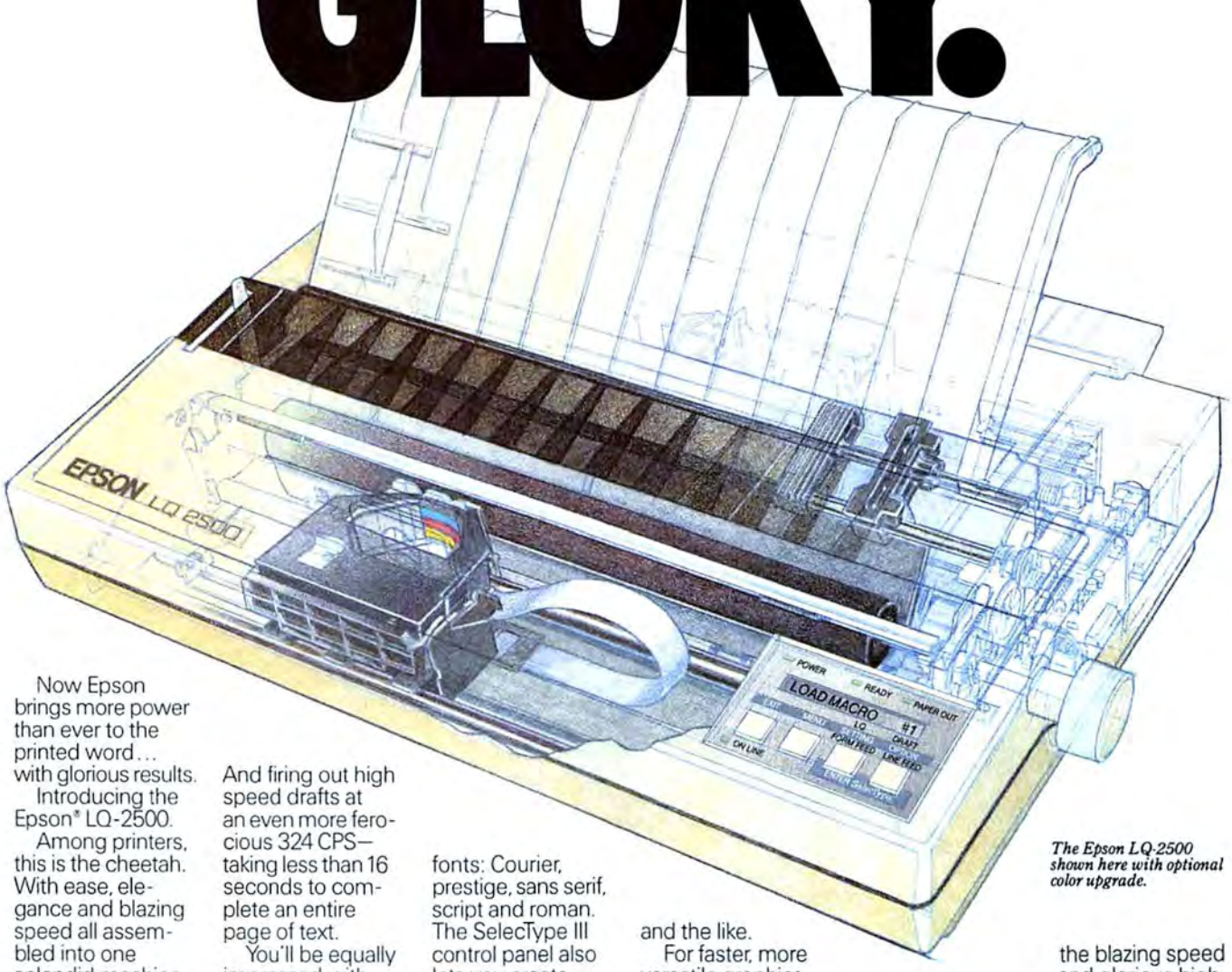
WordPerfect versions available for Apple IIe/IIc and Data General. Features and prices vary.

WordPerfect CORPORATION



Circle 165 on reader service card

BLAZING GLORY.



The Epson LQ-2500 shown here with optional color upgrade.

Now Epson brings more power than ever to the printed word... with glorious results.

Introducing the Epson® LQ-2500.

Among printers, this is the cheetah. With ease, elegance and blazing speed all assembled into one splendid machine.

A machine that not only exceeds, but actually redefines today's standards in dot matrix technology.

At the heart of the LQ-2500 is a 24-pin print head that gives new meaning to the words "born to run." Producing high resolution letter quality documents at a print head speed of 108 characters per second.

And firing out high speed drafts at an even more ferocious 324 CPS—taking less than 16 seconds to complete an entire page of text.

You'll be equally impressed with how little time it takes to *operate* the LQ-2500—thanks to an advanced LCD control panel that eliminates the need for DIP switches, allowing you to command fourteen important printer functions at the mere touch of a button. Including print quality, pitch, margins, and your choice of five popular letter quality fonts: Courier, prestige, sans serif, script and roman. The SelecType III control panel also lets you create and store up to four combinations of printer set-ups for different applications.

Sophisticated paper-handling features—including automatic single sheet loading and a built-in push feed tractor—make the job easier, too. And an extra-wide 136 column carriage gives you plenty of room for spreadsheets and the like.

For faster, more versatile graphics, the LQ-2500 also comes equipped with bidirectional printing capabilities. For fast access to your computer while the printer is running, there's a built-in 8K buffer. And for brilliant color printing, an easy-to-install color upgrade. Naturally, the Epson LQ-2500 works with virtually all IBM® compatible hardware and software, and comes equipped with our one-year limited warranty.

To experience the blazing speed and glorious high quality output of the Epson LQ-2500 for yourself, visit your nearest Epson dealer.

For more information on Epson's full line of dot matrix, daisy wheel, ink jet and color printers, call (800) 421-5426. Or (213) 539-9140 in California.

Epson is a registered trademark of Epson Corporation. IBM is a registered trademark of International Business Machines Corporation.

EPSON

P R I N T E R S

Circle 699 on reader service card

GET SERIOUS

...ABOUT ANALYZING YOUR DATA.

You might be spreading your spreadsheet a little too thin. Or maybe you're starting from scratch. But if you're serious about data analysis, you're ready for SPSS/PC+™ – a full software family that brings you six high-powered ways to complete any data analysis task.

Enter it. SPSS/PC+ Data Entry™ takes the effort out of entering and correcting data.

Analyze it. The SPSS/PC+ Base Package provides a powerful array of statistical and reporting procedures.

Examine it. SPSS/PC+ Advanced Statistics™ lets you get more serious with your data.

Table it. SPSS/PC+ Tables™ produces presentation-ready tables instantly.

Chart it. SPSS/PC+ Graphics™ featuring Microsoft® Chart creates show-stopping graphs and charts.

Map it. SPSS/PC+ Mapping™ featuring MAP-MASTER™ – our latest option – creates maps where vast amounts of data can be summarized and presented in one, simple picture.

SPSS/PC+ products are being put to productive use by serious fact finders in business, government and education. For countless purposes such as market research. Wage and salary studies. Survey analysis. And quality control. Plus each product is superbly documented and supported by SPSS Inc., a leader in statistical software for nearly 20 years.

So if you're serious about data analysis, step up to SPSS/PC+. For details, contact our Marketing Department. **CALL 1/312/329-3640**

SPSS inc.

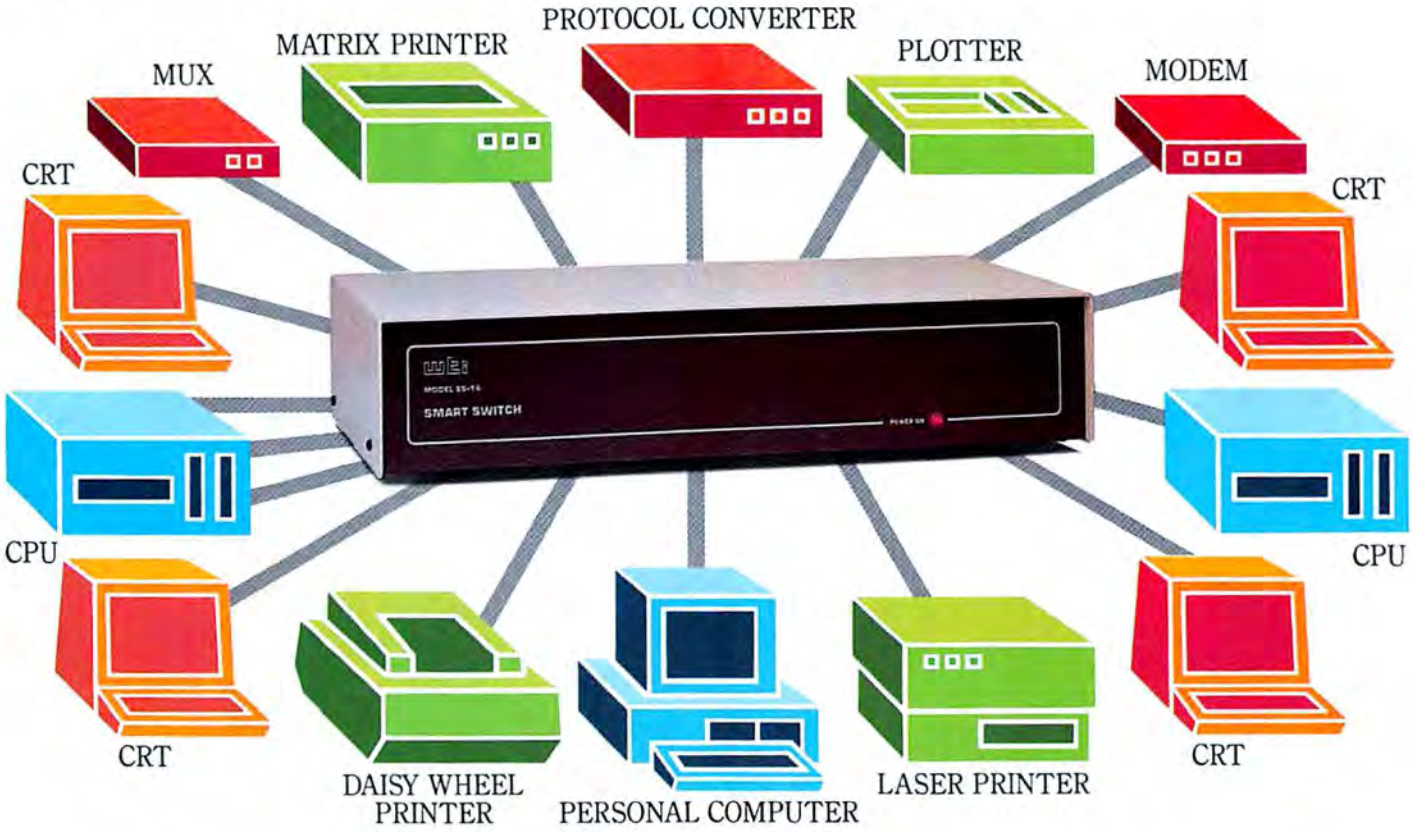
SPSS Inc. • 444 North Michigan Avenue, Suite 3000 • Chicago, Illinois 60611
In Europe: SPSS Europe B.V. • P.O. Box 115 • 4200 AC Gorinchem, The Netherlands • Telephone: +31183036711 • TWX: 21019

SPSS/PC+ runs on IBM PC/XT/AT's with hard disk. Contact SPSS Inc. for compatible microcomputers. SPSS/PC+, SPSS/PC+ Data Entry, SPSS/PC+ Advanced Statistics, SPSS/PC+ Tables, SPSS/PC+ Graphics and SPSS/PC+ Mapping are trademarks of SPSS Inc. for its proprietary computer software. Chart and Microsoft are trademarks of Microsoft Corporation. MAP-MASTER is a trademark of Decision Resources.

© 1986, SPSS Inc.

Circle 844 on reader service card

TIE IT ALL TOGETHER WITH THE ANY-PORT-TO-ANY-PORT SMART SWITCH. $1895.



Here's an affordable way to switch up to sixteen RS-232 ports in any interconnection. It's called the Smart Switch™ controller.

The SS-16 accommodates any peripheral: terminals, printers, CPUs and modems. Any port can select any other port. With up to eight pairs of ports communicating at the same time.

Create your own local network. The SS-16 is ideal for computer port expansion, computer sharing, engineering work clusters, and much more.

Each port has its own spooling buffer. So any baud rate can communicate with any other baud rate. Anywhere in the system.

You can name your ports. Like "PRINTER," "MODEM," or whatever. Or give multiple ports the same name, like "CPU," and the SS-16 will connect you to the first "CPU" port available.

A battery backup system ensures your system configuration and port names are maintained anytime the system is shut off.

A special supervisory port lets you monitor any other port. Connect ports together. Broadcast messages. Or designate the same supervisory power to other ports.

You'll also find the SS-16 user-friendly. It tells you when your selected port is busy. Sends a "port available" message if you choose to wait. And optionally times-out ports not in use. There's even a HELP command.

And for quick and easy installation, a push button defines each port for either DTE or DCE.

So if you need an intelligent, affordable way to link your RS-232 system, you're ready for WTI's Smart Switch.

For more information on the SS-16, or our other RS-232 switches, call Western Telematic toll-free at (800) 854-7226. In California call (714) 979-0363. Or write WTI, 2435 South Anne Street, Santa Ana, California 92704. Or telex 467741.

wti **western telematic inc.**

See WTI at COMDEX Booth #1198

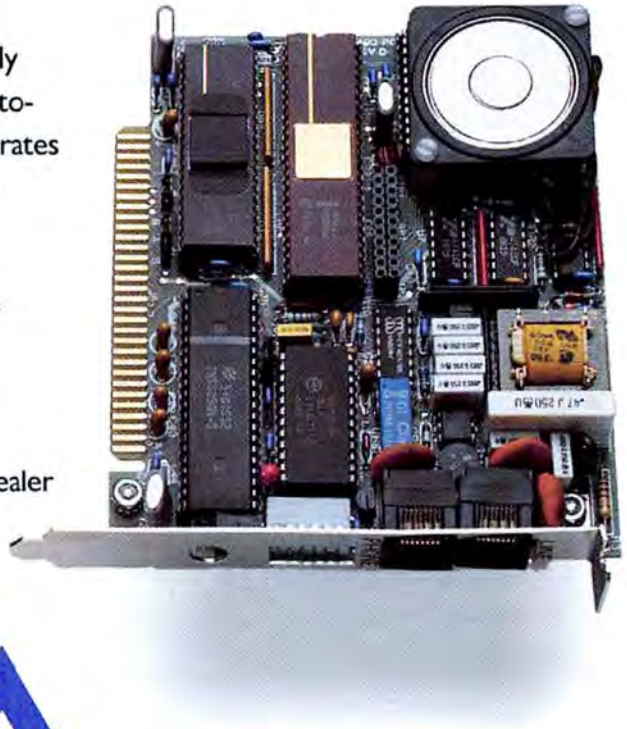
Circle 869 on reader service card

You can buy the Leading Edge® Model "L" Series™ 2400B Modem with communication software for less than what you'd pay for a Hayes® 1200B Modem.

And the Leading Edge Model "L" Series 2400B is fully Hayes and IBM®-compatible, has auto-answer and auto-dial features, fits in a half-size expansion slot and operates at 300, 1200 and 2400 bps as well. It's priced at only **$289.00**

Also available, the Leading Edge® Model "L" Series™ 1200B Modem priced at **$149.95**

Call 1-800-USA-LEAD for more information or a dealer near you. In MA call (617) 828-8150.



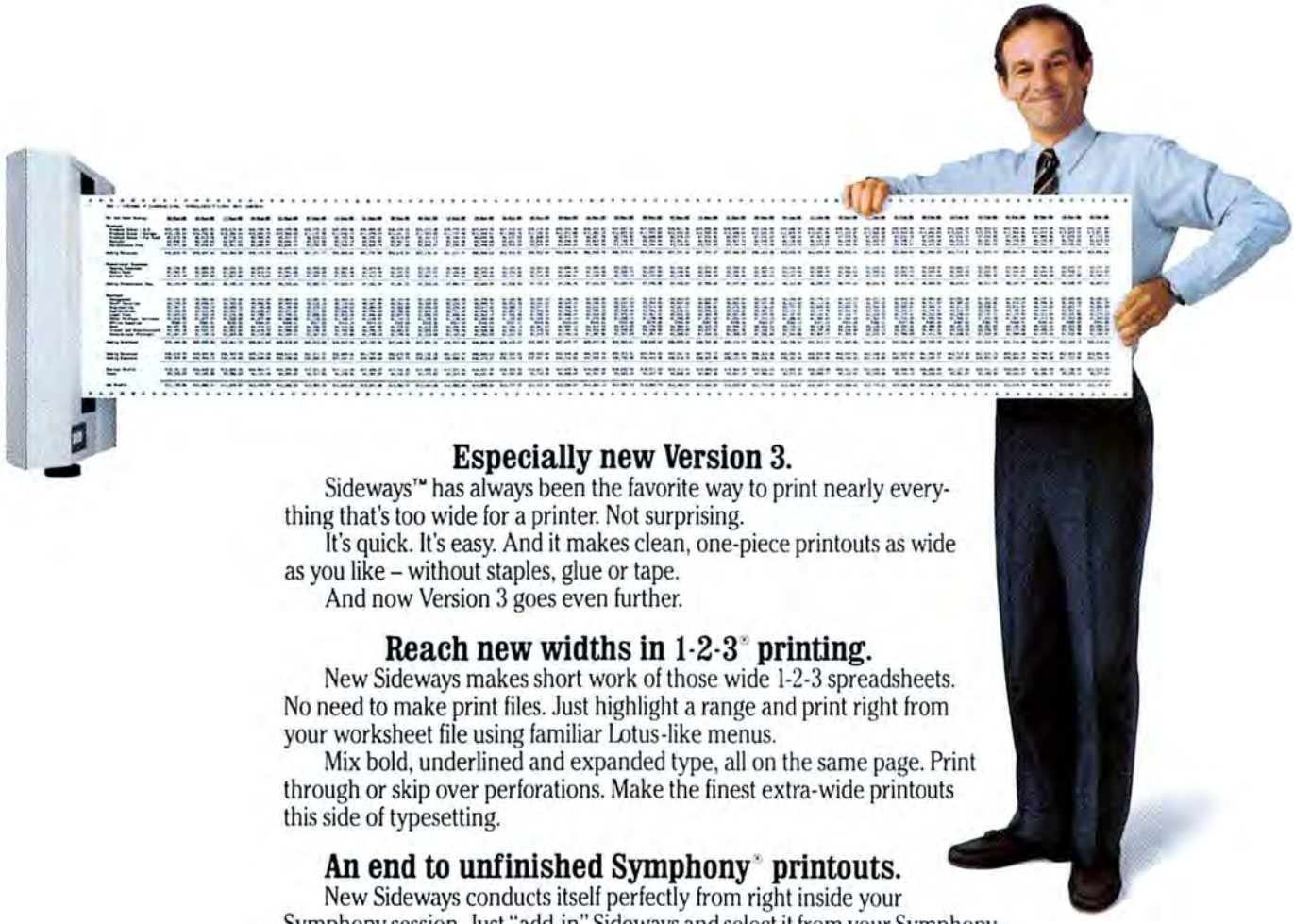
LEADING EDGE®

Leading Edge Hardware Products, Inc.
225 Turnpike Street, Canton, MA 02021
1-800-USA-LEAD or (617) 828-8150 in MA

Leading Edge is a registered trademark and Model "L" Series is a trademark of Leading Edge Products, Inc. Hayes is a registered trademark of Hayes Microcomputer Products, Inc. IBM is a registered trademark of International Business Machines Corp.

Circle 593 on reader service card

We've gone to great widths to make you look good.



Especially new Version 3.

Sideways™ has always been the favorite way to print nearly everything that's too wide for a printer. Not surprising.

It's quick. It's easy. And it makes clean, one-piece printouts as wide as you like – without staples, glue or tape.

And now Version 3 goes even further.

Reach new widths in 1-2-3® printing.

New Sideways makes short work of those wide 1-2-3 spreadsheets. No need to make print files. Just highlight a range and print right from your worksheet file using familiar Lotus-like menus.

Mix bold, underlined and expanded type, all on the same page. Print through or skip over perforations. Make the finest extra-wide printouts this side of typesetting.

An end to unfinished Symphony® printouts.

New Sideways conducts itself perfectly from right inside your Symphony session. Just "add-in" Sideways and select it from your Symphony menu. Move effortlessly from Symphony to Sideways and back again, and print the whole score in one movement, without an intermission.

No matter what software you use.

Sideways prints the right way with non-Lotus software too. Including spreadsheets, databases, word processors and project planners.

Choose from nine different type sizes. Print bold, underlined and expanded – whatever your software can create. Even foreign language and line-drawing characters.

Sideways Version 3 for the IBM® PC and all popular dot-matrix printers. Available now at computer dealers everywhere. Or directly from Funk Software with your check, Visa or Mastercard.

At just $69.95 a copy, you'll never want for width again.

Funk Software, 222 Third Street, Cambridge, MA 02142. Phone (617) 497-6339.

© 1986, Funk Software, Inc. Sideways is a registered trademark of Funk Software. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corp.

Circle 92 on reader service card

The Help Screen

PC World offers answers and advice at every level

Advice about using replaceable DOS parameters with the IF . . . = = batch command, the BASIC novice's common problems with X-MAKER.BAS, and adjusting color displays, plus the why and where of floppy disk wear

Karl Koessel

Spacing Out a Batch File

Jesse B., a reader in San Jose, California, inadvertently inserted a space when he copied COLOR-.BAT from *The Help Screen*, August 1986. When the program did not work properly, he made a "correction" and sent me a note that he had found an "error."

While typing in the listing, Jesse had accidentally placed a space between the second period and the first percent sign in the line IF NOT . = = .%1 GOTO %1, rendering the line ineffective. His solution was to place the first occurrence of the replaceable DOS parameter %1 to the left of the first period and the double equal signs. The line worked, even with spaces between the %1 and the period.

Checking the COLOR.BAT listing, I noticed that the fourth line, IF %1. = = . GOTO HELP, also has a replaceable DOS parameter to the left of the double equal signs. Although this line will function correctly, it raises an interesting point about the placement of DOS's replaceable parameters. It reminded me of reader Paul Penfield's advice concerning batch file language with DOS versions 1.00 through 2.10 in *The Help Screen*, April 1985. Penfield noted that the location of the replaceable parameter is all-important, and that a batch file's conditional test for a blank DOS parameter should use 'if x = = %1x *command*' rather than 'if %1x = = x *command*', because if the string to the right of the = = matches the first characters of the left string but the left string is longer, DOS will execute *command* incorrectly. You can demonstrate the bug by creating two different batch files, A.BAT and B.BAT, and then typing the line **IF NOT CONCEPT = = CONC A B** and pressing <Enter>. Because CONCEPT is not equivalent to CONC, DOS should perform A. Instead, it selects B. Although DOS 3.00 and later versions don't exhibit this bug, play it safe and always use the proper syntax. And watch those spaces.

X-MAKER.BAS Extra

Another reader is having problems getting *.*'s program-making program X-MAKER.BAS to create a *.* utility from the data lines shown in CLOCKTIC.DAT (*.*, *PCW*, July 1986). After loading BASIC, typing in X-MAKER-.BAS and the data lines, and then entering the BASIC command RUN, he received the message 'Error in DATA line 6'. However, he was not able to find the error because he was not familiar with X-MAKER.BAS or BASIC.

A few tips should help novice BASIC users avoid the common pitfalls associated with the X-MAKER.BAS program listing.

Carefully type in the program. It's easy to confuse the letter *l* for the numeral 1, the letter *O* for the numeral 0, and, less often, the letter *S* for the numeral 5 and the backslash for the forward slash. (Note that line 60 in X-MAKER-.BAS contains a backslash.) Do not add extra spaces to (or omit spaces from) the program listing.

X-MAKER.BAS consists of 18 lines numbered 10 through 180, and can be saved using the BASIC command **SAVE "X-MAKER"**. When you want to type in data lines, load BASIC (or type **NEW** if BASIC is already loaded), type **AUTO 1000**, and press **< Enter >**. BASIC will

(continues)

"With Boeing's new entry, the 3-D spreadsheet comes of age."

PC Magazine
August 1986

Boeing CALC makes the 2-D spreadsheet obsolete

"This thing is hot . . . fast . . . I used it effortlessly." That's what PC Magazine says about Boeing™ CALC — the 3-D spreadsheet so powerful it makes memory expansion boards overpriced and obsolete.

Like a giant ledger book, Boeing CALC's 32 MB file capacity lets you consolidate spreadsheet information from any department or location into a single file . . . with up to 16,000 *rows*, 16,000 *columns*, and 16,000 *pages*. Enough power and speed for even the most sophisticated finance and planning needs.

You can do arithmetic and command execution between pages as easily as you would on one. That means no more complex multi-page consolidations and cross-file analysis. And no more grueling hours reconstructing equations and relationships when you add or delete pages. Boeing CALC reassigns them automatically.

Designed to work with other spreadsheets

Boeing CALC uses a command structure familiar to Lotus 1-2-3® users. And it reads and writes 1-2-3 and Symphony® binary files directly. You can consolidate spreadsheets quickly and simply. With no rekeying. And no retraining.

Give your spreadsheet users real power . . . with Boeing CALC

It's inexpensive. And it's available locally. For the name of the authorized dealer nearest you, call TOLL-FREE 1-800-551-0800, ext. 12 (in Washington State and Canada, 1-206-763-5000, ext. 12). Or write BOEING COMPUTER SERVICES, P.O. Box 24346, M/S 7K-11, Seattle, WA 98124.

Another quality software product from Boeing.

Boeing is a trademark of The Boeing Company.
Lotus, 1-2-3, and Symphony are registered trademarks of Lotus Development Corporation.

BOEING

Circle 975 on reader service card

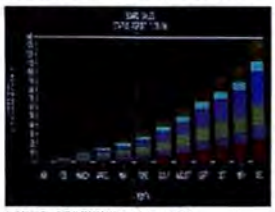
Seal of Approval

Lotus certifies ATI's Graphics Solution

ATI's **"Small Wonder" Graphics Solution** has never been slow to pick up compliments, particularly in the area of multi-mode flexibility. Much of the credit for this is due to ATI's use of advanced technology. Therefore it's not very surprising that Lotus – the world's leader in software – has certified the "Graphics Solution" for 132 x 44 monochrome spreadsheets and 640 x 200 7 color graphics so you can see more spreadsheet and sharper, more colorful graphs on 1-2-3 (2.0) and Symphony (1.1).

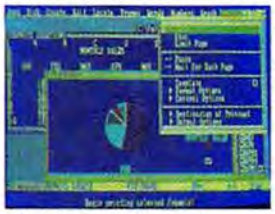
At ATI, we think we've developed a better graphics card. It just might surprise you how much better. Call us at **(416) 477-8804** for more information.

LOTUS CERTIFIED 132 x 44
MONOCHROME SPREADSHEETS

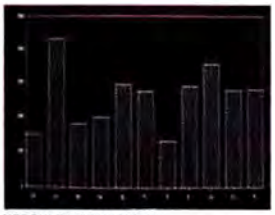


LOTUS CERTIFIED 640 x 200
HIGH RESOLUTION COLOR/GRAPHICS

COLOR SOFTWARE ON
MONOCHROME MONITOR IN 16 SHADES

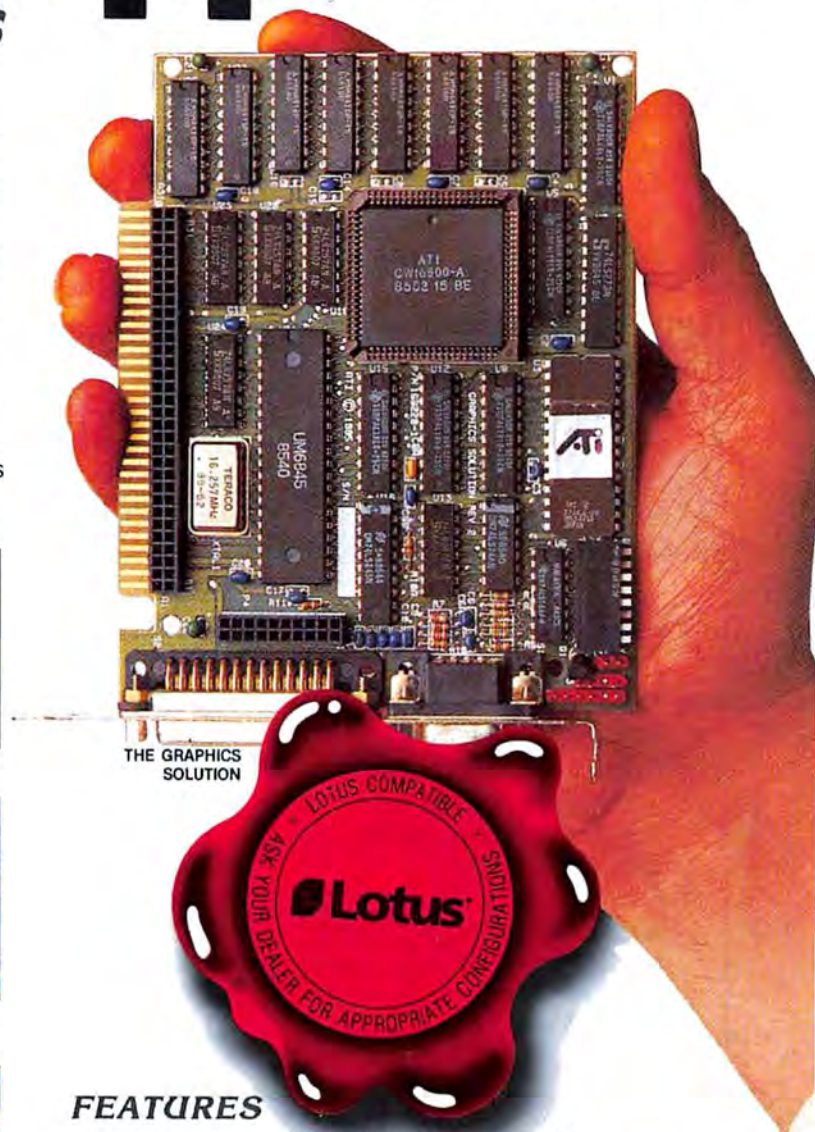


ASHTON-TATE FRAMEWORK II
4 COLORS, 640 x 200 ON DESKTOP
16 COLORS, 640 x 200 GRAPHICS



HERCULES COMPATIBLE
MONOCHROME GRAPHICS

PLANTRONICS COMPATIBLE
HIGH RESOLUTION 16 COLORS



FEATURES

- **Hercules Compatible Monochrome Graphics**
- **Runs Color/Graphics Software on Monochrome Monitor in 16 Shades Without Pre-Boot Drivers**
- **High Resolution Color/Graphics — 320 x 200 16 Colors**
  — 640 x 200 4 Colors
  — 640 x 200 16 Colors
- **IBM Compatible Color/Graphics**
- **132 Columns in Either Color or Monochrome**
- **Lotus Certified Drivers for 132 Columns and 640 x 200 High Resolution Color/Graphics**
- **Drivers for 640 x 200 High Resolution 16 Colors on Framework II**
- **Parallel Port and Serial Port Optional**
- **2 Year Warranty**
- **$299 Suggested Retail**

DISTRIBUTORS
F.A. COMPONENTS
NY (718) 507-1444, outside NY (800) 847-4148
IN (219) 432-8540, outside IN (800) 331-7567
SC (803) 288-2422, outside SC (800) 845-2747
WA (800) 321-6012, outside WA (800) 426-1412
SAI America – MD (301) 459-2100, outside MD (800) 638-9579
Compuserve – CAN (416) 477-8088
EMJ Data – ONT (800) 265-7212, outside ONT (800) 837-2444
Electronic Marketing Specialists
S.CA (714) 832-9920, (818) 708-2055, (619) 560-5133
N.CA (408) 245-9291, UT (801) 268-9866
CO (303) 745-0745, AZ (602) 840-8855
WA (206) 575-0223

NOW! ATI ALSO HAS **DRIVERS** FOR ASHTON·TATE® **FRAMEWORK II**

Small Wonder From ATI®

450 Esna Park Dr.
Markham, Ontario, Canada L3R 1H5
TELEX 06-966640 (CMC - MKHM)

ATI TECHNOLOGIES INC.

Technology you can Trust.

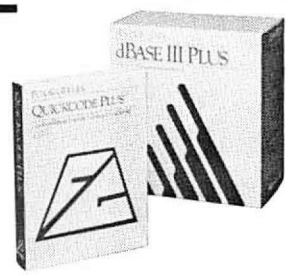
*Trademarks: Lotus, 1-2-3, Symphony, — Lotus Development Corporation; Framework II — Ashton-Tate Inc.; PC Paintbrush+ — Z-Soft Inc.; IBM — International Business Machines Inc.; Hercules — Hercules Computer Technology Inc.; Plantronics — Plantronics Enhanced Graphics Corp.

*This Lotus logo is used by permission of Lotus Development Corporation.

The Graphics Solution has successfully passed compatibility testing with 1-2-3 (2.0) and Symphony (1.1) on an IBM PC-XT with PC-DOS 3.1. The Graphics Solution must be installed.

Circle 846 on reader service card

NEW for dBASE!



Fox & Geller
introduces
QUICKCODE PLUS™
The *Intelligent* Program Generator for dBASE.

A whole new technology for dBASE:

- Uses *programming intelligence* to automatically create dBASE applications in minutes.
- Takes advantage of the powerful *new features* of dBASE III PLUS.
- Creates almost *any application* from "one page, one file" up to 11 page forms that read and update *dozens* of databases!
- 9 data types; 16 field types
- Protected fields
- Spreadsheet-like computed fields and Recalc
- Use printer features like **BOLD**, *italics*, etc.
- Easy to customize
- A recommended way to learn dBASE *fast*!

Requires dBASE-III PLUS

Call or write today for EXPRESS INFO

(201) 794-8883 604 Market St. Elwood Park, NJ 07407

FOX & GELLER

Circle 71 on reader service card

PC World Creates a Long Buy-Line for You

Queue up! *PC World* readers mean big business—for you. Call your Account Manager to reserve your advertising space today—please see page 4 for phone numbers.

automatically insert the line numbers (in increments of 10) for the data lines. When you have entered all the data lines, type **SAVE** *"filename*.**DAT",A** and press **< Enter >**. (The ,A causes a BASIC file to be saved in ASCII format so that later it can be merged with a loaded BASIC program.) Then type **LOAD "X-MAKER"** and press **< Enter >** to reload the program. Next type **MERGE** *"filename*.**DAT"** and press **< Enter >** to append the data lines to X-MAKER.BAS. Then type **RUN** and press **< Enter >**.

The first data line (1000 DATA) always lists the drive specifier and file name of the program that X-MAKER is creating. If you want, you can change the drive specifier to save the file on a drive other than A:. You can also include a path if you want the file stored in a specific subdirectory.

The subsequent data lines start with a line number, the word DATA, and a number indicating that line's position among the other data lines. The next 16 elements of data on each line are the hexadecimal values that actually make up the program. Each element consists of two characters, which are always either a number from 0 to 9 or a letter from *A* to *F*. Take care that only one comma appears between pieces of data. Each data line ends with a −1 and a checksum value that X-MAKER.BAS uses to catch missing values or values that are entered in the wrong order. If X-MAKER tells you that there is an error in line 6,

(continues)

Capture images that capture attention.

TV-quality images far beyond conventional PC graphics.

AT&T Truevision™ high color-resolution graphics products can unleash powers you never dreamed your PC possessed. The power to work with digitized video images, captured in living color. The power to create your own images, with incredible flexibility. And the power to blend a little of both, with remarkable dexterity.

Amazing but true.
Digitize an image with your Truevision Advanced Raster Graphics Adapter (TARGA) or Image Capture Board (ICB). And then put our Truevision Image Processing Software (TIPS) to work. To airbrush, retouch, and redesign. To change colors, tints, and shades. To copy portions of the screen and blend them. Smoothly. To move objects from here to there, or eliminate them completely. To add elements from other pictures. And to superimpose text and graphics.

Pre-time and pre-arrange your TV-quality images into an electronic slide show with our PC Carousel Presentation Software. Send them to other locations over ordinary phone lines with Truevision Still-Frame Teleconferencing Software, or produce slides, transparencies or instant photos with the Truevision Film Printer.

Truly economical.
Everything you need comes right off the shelf and works with AT&T, IBM, and plug-compatible PCs. And everything is affordably priced:

- Truevision Image Processing Software (ICB version, $695; each TARGA version, $1,250);
- AT&T TARGA graphics board (Model 16, $2,995; Model 24, $3,995; Model 32, $4,995), or
- a Truevision Image Capture Board ($1,295);
- Truevision Film Printer ($2,995).

True Advantages.
Picture all the ways you can use TV-quality graphics to heighten creativity, increase productivity, and enhance communications efficiency. So call. We'll help you capture the images that will help you capture attention. AT&T Electronic Photography & Imaging Center, 2002 Wellesley Boulevard, Indianapolis, IN 46219. **1-800-858-TRUE.**

AT&T
The right choice.

Truevision is a registered trademark of AT&T. IBM is a registered trademark of International Business Machines Corp.
Truevision design and development by: KLACAACCCJWHCBHRAKSGKBBPJSSJKSJAWANW
© 1986 AT&T.

Circle 433 on reader service card

***PC Magazine* calls Sysgen's Smart QIC-FILE their "hands-down choice for the best of the units tested."**

***And PC Magazine* says, "The Sysgen Smart Image is an ideal choice" for backing up your XT.**

CARTRIDGE OR CASSETTE: *NO ONE* BACKS YOU UP LIKE SYSGEN, THE BEST SELLER IN AUTOMATIC TAPE BACK-UP.

The smartest back-up solutions at the best prices.
If you're looking for 20Mbytes of the easiest, most reliable data back-up around, the Sysgen Smart Image is for you. It's the most popular system of its kind, delivering back-up protection on high density data cassettes.

If you work with high volumes of data, the Sysgen Smart QIC-FILE is your ideal choice. It gives you 60Mbytes of back-up protection on interchangeable, QIC-24 standard cartridge tapes.

SMART QIC-FILE. 60Mbyte cartridge tape protection. $1395 internal, $1495 external.

SMART IMAGE. 20Mbyte high-density cassette protection. $795 internal, $895 external.

Both systems include Sysgen's Smart Software. And both come with the high quality, reliability and technical support that have helped make Sysgen #1 in tape back-up systems.

Automatic back-up. Painless data protection.
You won't believe how *easy* it is to use Sysgen's automatic tape back-up. Set your Smart QIC-FILE or Smart Image once, like a VCR, and it will back up your hard disk *automatically*, once or twice a day, seven days a week. If you're using your system, it will wait till you're through, then back up the files you select. *That's* smart! And painless.

You *know* it's smart to back up your valuable data. It's even smarter to use the #1, *automatic* back-up systems.

Call our toll-free hotline today for your free Sysgen product family brochure, and Sysgen dealer near you.

Literature Hotline:
***1-800-821-2151* Dept. 51**

47853 Warm Springs Blvd., Fremont CA 94539, (415) 490-6770, Telex 4990843
Trademarks: Sysgen, Smart QIC-FILE, Smart Image. Sysgen, Inc., PC/XT, PC AT. International Business Machines Corporation. Registered Trademarks: IBM, PC DOS — International Business Machines Corporation.

SYSGEN
INCORPORATED

F-15 STRIKE EAGLE

For Fighter Pilots—*Not* Sightseers

Enjoyed by over **200,000** satisfied computer fighter pilots!

THE FIRST. THE BEST.
THE ONLY REAL COMBAT FLIGHT SIMULATOR.

MAJOR BILL
OVER
3000 FLYING HOURS

F-15 STRIKE EAGLE is the most realistic, accurate and fun combat flying simulation available. Others have tried to copy it. But none of them have ever strapped on a fighter to experience the thrill and excitement of real combat fighter missions like our Major Bill's has. Compare F-15 STRIKE EAGLE versus our famous competitors, better known for their fancy hangar graphics. If you want a **slow sightseeing hangar queen, buy theirs!** If you want a product that has had over 50 outstanding reviews, thrilled over two hundred thousand satisfied computer fighter pilots, and gives you **real** fighter pilot action, then you want F-15 STRIKE EAGLE!

COMPARE—

COMPARE	F-15 STRIKE EAGLE	IMITATION GAME
SPEED	4 TIMES FASTER	SLOW AND UNRESPONSIVE**
COMBAT AREA	7 REAL MISSIONS—LIBYA TO THE PERSIAN GULF	2 SMALL FICTITIOUS FLYING AREAS
COCKPIT	SOPHISTICATED NAVIGATION MAP, MULTIPLE RADAR AND WEAPONS DISPLAY	TWO LINES OF TEXT
ACTION	MULTIPLE MISSION OBJECTIVES AND THREATS	PICK ONE MISSION OR ONE SET OF THREATS
VALUE	GREAT VALUE—(HUNDREDS OF HOURS OF PLAYTIME)	OVERPRICED

**C-64 COMPARISON

-15 STRIKE EAGLE is for Commodore 64/128, Atari 800/XE/XL series, Apple II+ amily, IBM PC and PC JR computers for a suggested retail price of only $34.95. Call r write for more information or Money Order, MC/Visa orders. Add $2.50 for shipping nd handling.

egistered trademarks of Commodore Business Machines, Inc., Atari, Inc., Apple Computer Inc., and ternational Business Machines, Inc., respectively.

Major Bill Stealey, USAF Reserve, President, MicroProse

MICRO PROSE
SIMULATION • SOFTWARE

120 Lakefront Drive • Hunt Valley, MD 21030
(301) 667-1151

Circle 827 on reader service card

Managing?

Look what EndUser Software has for you.

Office Organizer

12 programs to increase your productivity at work. All are easy to use, with clear menus and plain-English instructions. All documentation is included on disk–you can read it on screen or print it out. Includes ***Memobook/Tickler-File, Address Book/Form Letter Maker, Do List, Filer, Tax Fax,*** *plus 7 more programs.*

Get far more from your PC than you ever expected–for only $29.95. With EndUser Software, end-user satisfaction is guaranteed.

Hardware requirements: IBM PC family or compatibles, 128K memory, monochrome or color monitor (no graphics board required for most programs), DOS 2.00 or higher.

A lot of great software . . .
A great little price:

$29.95

Office Organizer *#EU-101*

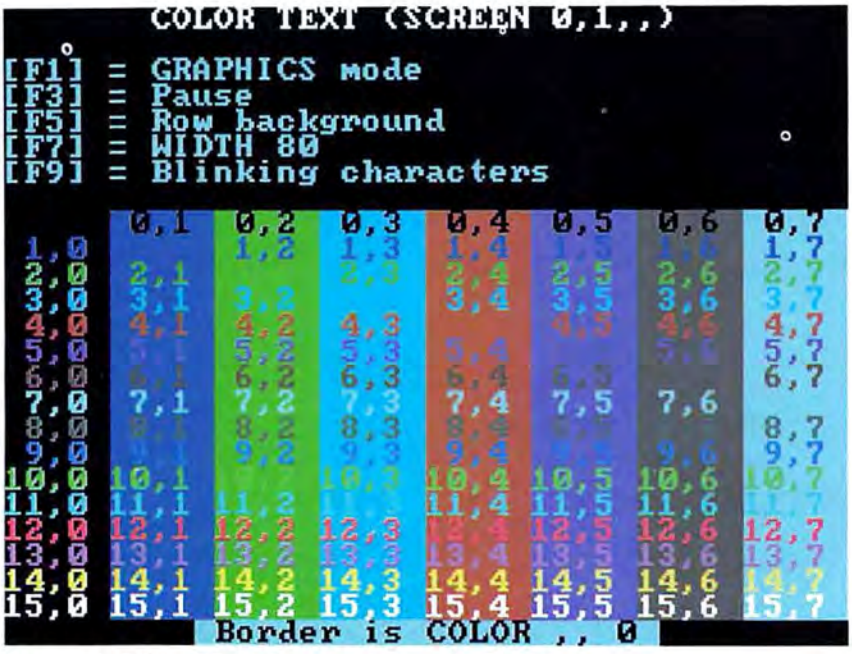
Order by phone
800/222-2990
800/526-8000 in Canada

(Credit card orders only)
Or send check or money order
(U.S. funds payable through a U.S. bank) to:

EndUser Software

P.O. Box 10120
Palo Alto, CA 94303-0976

California residents add appropriate sales tax.
NO POSTAGE, HANDLING, OR CREDIT CARD SURCHARGES on U.S. and Canada orders.
Orders outside U.S. and Canada: Add $15.00



Screen 1: This PColor image shows the PC's 16 colors in WIDTH 40. The user controls the program with the function keys listed at the top of the screen.

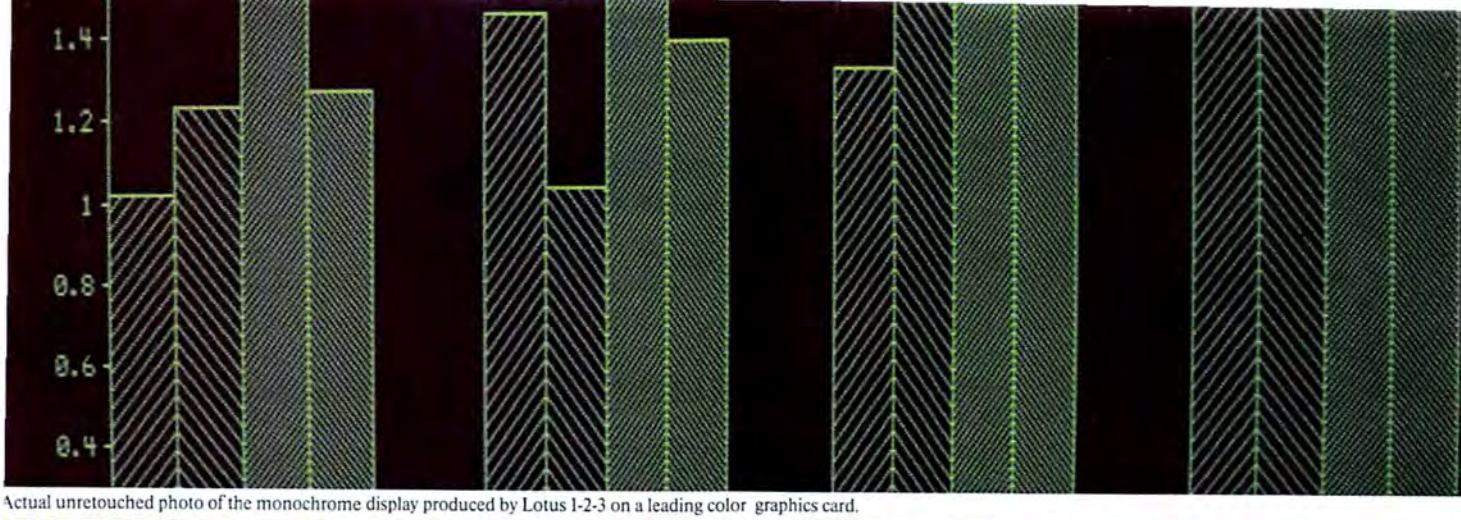
double-check the 6th data line. The last data line always ends with a −1 to tell X-MAKER.BAS that there are no more data lines.

Somewhere Near the Rainbow

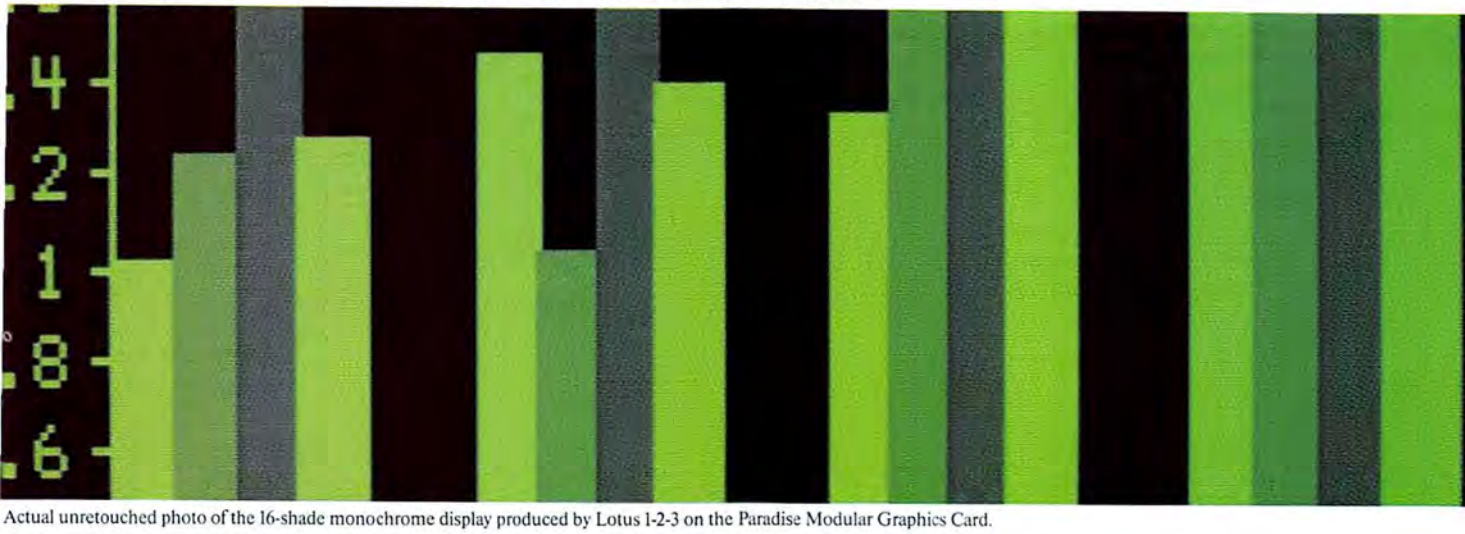
After working with an IBM Enhanced Graphics Adapter and Enhanced Color Display, a friend of mine enthusiastically purchased a VEGA graphics board with EGA emulation and an NEC MultiSync Monitor (see "Seven Up on EGA," *PCW*, August 1986). He expected his graphics program to generate high-resolution, 16-color graphics comparable to the EGA's on this cheaper and (supposedly) compatible system. But the images that he brought up on the new NEC MultiSync didn't look as crisp. Gold appeared yellow, and it seemed that the monitor displayed only 8 colors, not 16. Further investigation revealed that the palettes available in the graphics application didn't look right either. Wailed my perplexed friend: "Doesn't the NEC MultiSync automatically adjust to the display adapter?"

I, too, suspected that the NEC MultiSync was displaying only 8 colors. When I dropped by my friend's house and ran a program that I'd written to display a 16-color text test pattern (see Screen 1) on the IBM Color Display driven by the Color/Graphics Adapter, my suspicion was confirmed. Because the second 8 of

(continues)



Actual unretouched photo of the monochrome display produced by Lotus 1-2-3 on a leading color graphics card.



Actual unretouched photo of the 16-shade monochrome display produced by Lotus 1-2-3 on the Paradise Modular Graphics Card.

See What You're Missing.

Now you can see the full benefits of business graphics on your monochrome monitor. Because the Paradise Modular Graphics Card (MGC) displays up to 16 different shades of green, gray or amber on a standard monochrome monitor (while most monochrome graphics cards display only 2 or 3 shades).

With the MGC you can see everything your business graphics software is capable of showing you. Without a color monitor. Including sharp, high quality display of the IBM character set. You won't suffer the frustration of trying to decipher what various blocks of data represent because they're all shown in the same shade. Instead, you'll see your data in a clearer, more easily understood form. Which, of course, is why you're using business graphics in the first place.

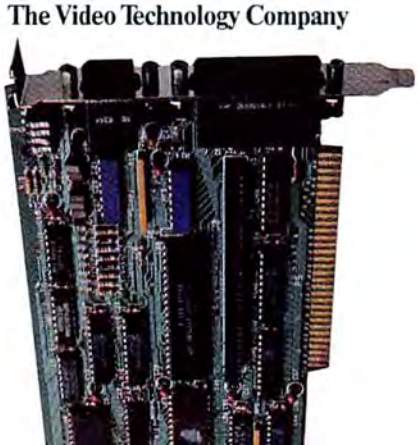
You also get 100% compatibility with all the software written for the IBM color graphics standard (like Lotus 1-2-3, Symphony, Framework and Dollars & Sense, just to name a few). A built-in parallel port. Color printing capability with a compatible printer or plotter. And the ability to add serial and parallel ports, extra memory and a clock/calendar whenever you want.

So don't let missed information become misinformation. Get the business graphics card designed for business graphics on a monochrome monitor. See the Paradise Modular Graphics Card at better PC dealers. For more information call toll-free: (800) 527-7977, ext. In California, (800) 822-2020, ext. We'll be happy to let you see what you've been missing.

PARADISE

SYSTEMS INC

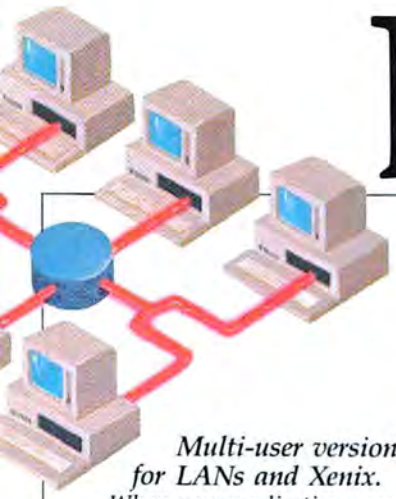
The Video Technology Company



Trademarks: Paradise and Modular Graphics Card— Paradise Systems, Inc.; Lotus 1-2-3 and Symphony— Lotus Development Corporation; Framework— Ashton-Tate, Inc.; Dollars & Sense—Monogram. Registered trademark: IBM—International Business Machines Corp. © 1986 Paradise Systems, Inc.

Btrieve®

The Programmer's Choice.



Multi-user versions for LANs and Xenix. *When your applications need to network, Btrieve's multi-user versions connect you to the industry's most popular LANs: IBM PC Network, Novell Advanced Netware, or any DOS 3 network. Btrieve is also available for Xenix and multitasking operating systems such as MultiLink Advanced, Microsoft Windows and IBM Topview.*

Help is just a phone call away. *Need technical support? You've got it! Btrieve users receive 30 days of unlimited phone support at no charge. This "Direct Connect" policy is renewable for a full year at low cost. And try SoftCraft's free bulletin board for technical tips, seven days a week.*

Thorough documentation, easy implementation. *Getting started with Btrieve is easy: the manual is packed with step-by-step instructions and examples of every Btrieve function in BASIC, Pascal, COBOL and C.*

Whether you're a programming pro or just beginning, there's one thing to remember when developing applications: Btrieve.

The Btrieve file manager is an alternative to all those DBMSs that promise ease of use—but deliver something far different. Like languages that take weeks to master. Performance that fizzles instead of sizzles. Programs that won't network. Of course you can write applications with these "revolutionary" packages. But someday you'll wish you hadn't.

If you know a programming language, you already have what it takes to build better applications. All you need is Btrieve.

Btrieve is the programmer's choice for file management. But you don't have to be a professional programmer to use it. With Btrieve loaded in your PC, your programs can use simple subroutine calls to retrieve, store and update records.

Btrieve has built-in security features and the ability to handle four billion byte files. ***And there are no royalties on Btrieve applications.***

SoftCraft

P.O. Box 9802 #917
Austin, Texas 78766
(512) 346-8380 Telex 358 200

Suggested retail prices: Btrieve, $245; multi-user Btrieve, $595; Xtrieve, $245; multi-user Xtrieve, $595 (for report generation, add $145 single-user and $345 multi-user). Available from SoftCraft and selected distributors. Requires PC-DOS or MS-DOS 2.X, 3.X. Xenix. Btrieve is a registered trademark and Xtrieve is a trademark of SoftCraft Inc.

B-tree based for high performance. *Performance is all-important, especially as your database grows. That's why Btrieve implements the b-tree file structure—the most efficient data access method known. With Btrieve your applications run* fast.

Database queries, report writing. *Add Xtrieve™ to your Btrieve applications for a fully-relational DBMS. Xtrieve's menu-driven interface lets you look up information easily—without programming. Add our report writer option to produce custom reports and forms.*

Interfaces to C, BASIC, Pascal, COBOL. *Don't waste time learning a proprietary language! With Btrieve you can use the language you know best—and immediately begin programming the right way. Over 15 language interfaces are available.*

Fault tolerant. *Btrieve insures against database disasters. Two levels of fault tolerance guarantee data integrity during accidents or power failures—no extra programming required.*

Circle 173 on reader service card

Control/Center
Real Time Productivity

Introducing Control/Center Software, an outstanding new IBM-PC compatible software system.

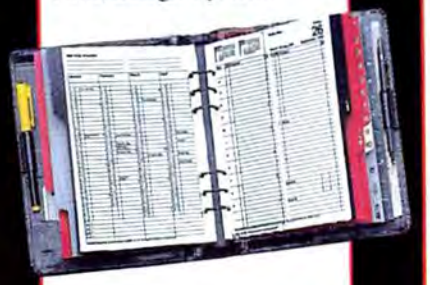
The Big Picture
Control/Center is a Word Processor and Data Base Manager. It effectively organizes extensive and complex information. Its unique format helps you to focus on the specific details of any job while keeping a clear overview of the bigger picture. And it can handle any job, from project development and production tracking schedules to in-depth reports. How?

Connectivity
Control/Center stores your information according to increasing levels of detail. At each level you can store as much information as you wish. Using only two function keys, you can instantly create new levels or develop existing ones. This provides extraordinary connectivity and clarity in information management. It frees you to move on to new levels of productivity and creativity.

Functional Features
Control/Center supports your work with a range of useful operations, including:

- **Calendar** — Daily, Weekly, Monthly, Annual
- **Import and Export Text**
- **Find Function**
- **Index**
- **Macros**
- **Gantt Charts**
- **Notes Pad**

The Pencil and the PC: Partners in Productivity
Control/Center is the only software system that can be used specifically in conjunction with the Time/Design System.



The Time/Design System is an award-winning organizer used in diverse and demanding management environments. With printouts on Time/Design computer paper, information from Control/Center can be inserted directly into your Time/Design System and taken with you everywhere. Using the Time/Design System as a portable component of Control/Center provides unparalleled information management power.

Control/Center. Step up to the next level.

Control/Center – $175.00
Control/Center + Time/Design – $275.00
(Copy Protected)

To order call toll-free: 1(800) 637-9942

Distributed by: Time/Design™
2101 Wilshire Blvd.
Santa Monica, CA 90403
(213) 828-4755

System Requirements:
IBM, PC, XT, AT or compatibles. 256 K Bytes minimum memory; 512 K Bytes recommended. MS-DOS (PC-DOS) version 2.0 or higher. One double-sided 5 1/4" diskette drive. Color or Monochrome monitor. Any character printer. Hayes Smartmodem 300 or 1200 baud or compatible.

Control/Center is a trademark of Viable Technology, Inc. Time/Design is a trademark of Time/system International. IBM is a registered trademark of International Business Machines Corp. MS-DOS is a registered trademark of Microsoft Corporation; Hayes Smartmodem is a registered trademark of Hayes Microcomputer Products, Inc.

Circle 759 on reader service card

MAINFRAME EDITING POWER FOR THE PC

SPF/PC

Don't settle for a bare-bones line editor like EDLIN or a text editor without the muscle for big work and big files.

SPF/PC, a powerful PC version of the mainframe text editor ISPF, brings big system editing and utility to IBM PC users. With SPF/PC's virtual memory, files as large as the computer's memory may be edited whether using conventional memory, hard disk or the new extended or expanded memory boards.

In addition to speed and reliability, SPF/PC offers many convenience features such as a USER menu for accessing frequently used programs, a menu for evoking compilers and a program for communicating with other PCs or bulletin boards.

And, SPF/PC blends well into most any environment, including compatibility with both IBM or Novell Networks, TopView, DESQview and all Lotus/Intel standard memory boards.

PC users, move up to life in the fast lane. Rev up with SPF/PC, THE Text editor for your PC.

SPF/PC, $195.00

CTC

Command Technology Corporation

1900 Mountain Blvd.
Oakland, CA 94611
telephone: (415) 339-3530
telex: 509330 COMMAND TECH

OTHER PRODUCTS:
LaserScript, desktop publisher

Circle 879 on reader service card

PC World Creates a Long Buy-Line for You

Queue up! *PC World* readers mean big business–for you. Call your Account Manager to reserve your advertising space today–please see page 4 for phone numbers.

the PC's 16 colors are produced by adding an intensity signal to the first 8 colors, I reasoned that in this case the intensity signal was absent. A quick check showed that the video signal cable was properly attached and the monitor's color setting switches were correctly set.

I thought about the display problems I had encountered with the IBM Monochrome Display. There was the time a coworker turned on his PC, but nothing appeared on the screen. It too was properly connected and installed–but the brightness was turned off. Then there was the Monochrome Display that showed normal and bright characters in the same intensity. In that case, the contrast was out of adjustment. Intensity? Contrast?

I reached atop the NEC MultiSync and turned the contrast knob. The colors in my test pattern leapt from the screen. It was embarrassing that such a perplexing problem had such a simple solution. Because the NEC MultiSync can be driven by a variety of video adapters, it requires that the contrast, vertical height, and horizontal positioning settings be adjusted for the video adapter of the moment.

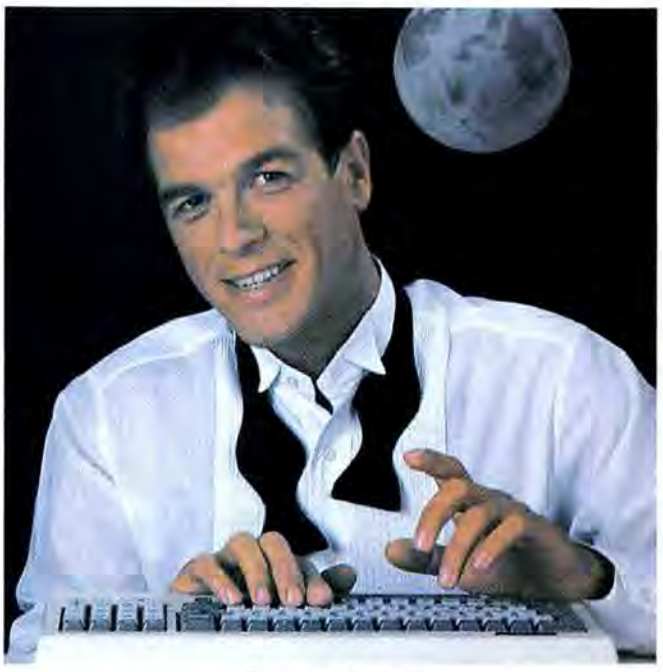
The lesson? When things go awry, check the simple stuff first. To facilitate adjusting the video image of a Color or Enhanced Color Display (or compatible), use the test pattern program shown in Listing 1.

(continues)

"Computing at night bit into my budget..."

$10.00+ per hour

"With GEnie™ I get more bytes online for less."



$5 per hour

Most online information networks can drain your resources faster than you can say *"Vampire."* Not with GEnie, the General Electric Network for Information Exchange. As part of the world's largest commercially available teleprocessing network of General Electric Information Services Company, GEnie won't bite into your budget.

Evenings, weekends, holidays. Just $5 per hour.

With GEnie, you can make friends, schedule meetings, gather facts and figures, set up travel reservations, get the news, be entertained, even shop for a fraction of what other information services charge.

And you get a lot more for your money.

With GEnie's IBM† ***RoundTable™ Special Interest Group*** you can discuss the latest in IBM PC products and accessories; download hundreds of public domain software programs, and participate in exciting and informative online conferences. And, uploads are FREE on GEnie!

There's more!

Meet friends old and new with GEnie's ***LiveWire™*** CB simulator or exchange messages with ***electronic mail*** service. Schedule a trip with the ***online travel service.*** Fun and learning for the whole family with ***Grolier's*** electronic encyclopedia.

Play multiplayer and classic games in GEnie's ***Game Room.*** Get the latest in domestic and international ***computing news.*** All this and there's more to come. New services are being added each and every month!

Only $18 to register! Save up to 60%!

Check out the chart. Compare the savings for yourself. You'll find GEnie delivers all of your favorite services for an incomparable price, at incomparable savings.

Compare & Save	Services						Pricing			
	Travel & Shopping	*SIGs/User Groups*	*Electronic Mail*	*CB Simulator*	*News*	*Games*	*Registration Fee*	*Monthly Minimum*	*Non-prime time rates*	
									300 baud	*1200 baud*
The Source	X	X	X	no	X	X	$49.95	$10.00	$8.40	$10.80
CompuServe	X	X	X	X	X	X	$39.95	none	$6.00	$12.50
GEnie*	**X**	**X**	**X**	**X**	**X**	**X**	**$18.00**	**none**	**$5.00**	**$5.00**

**Rates and Services shown in effect 6/86. Non-prime time applies Mon.–Fri. 6pm–8am local time, all day Sat., Sun., and nat'l holidays. Subject to service availability. Additional surcharge applies for 2400 baud service.*

With services and savings like these, now you can get more bytes online without incurring blood-curdling costs. Get online with GEnie. Sign up today!

Sign up from your keyboard today.
4 Easy Steps:

1. Have your Visa, MasterCard or checking account number ready.
2. Set your modem for local echo (half duplex)—300 or 1200 baud.
3. Dial **1-800-638-8369.** When connected, enter HHH
4. At the U#= prompt enter **XJM11933,GEnie** then RETURN.

Need help or more information? No modem yet? We can help. Call **1-800-638-9636.**

GEnie™

Stay online longer, for less.

INFORMATION SERVICES

General Electric Information Services Company, USA

GEnie rates and services subject to change. Uploads are free during non-prime hours at 300 or 1200 baud. Third party services offered on GEnie may include additional charges.

† IBM is a registered trademark of International Business Machines.

C&C Computers and Communications

Your first color monitor should be good enough to be your last.

NEC introduces the only color monitor you need. Superb resolution plus MultiSync for across-the-board compatibility with all three PC graphics boards made by IBM,® for business graphics, CAD/CAM, computer art, and text.

Now there's one high resolution color monitor that does things your way. The MultiSync™ monitor from NEC.

It gives you the best color resolution available at the price.

- Compatibility with the IBM Professional Graphics Adapter, the IBM Enhanced Graphics Adapter, and the IBM Color Graphics Adapter.

Compatibility with the IBM® Enhanced Graphics Adapter Board

- MultiSync, the NEC feature that automatically adjusts to color adapter board scanning frequencies from 15.75 KHz to 35 KHz—suggesting the possibility that the MultiSync monitor might be compatible with *all* color graphics boards that are fully compatible with the IBM PC, PC/XT, and PC/AT, now and in the future.
- Full implementation of high resolution graphics software for business and other applications, now and in the future.
- And color capability limited only by the board being used.

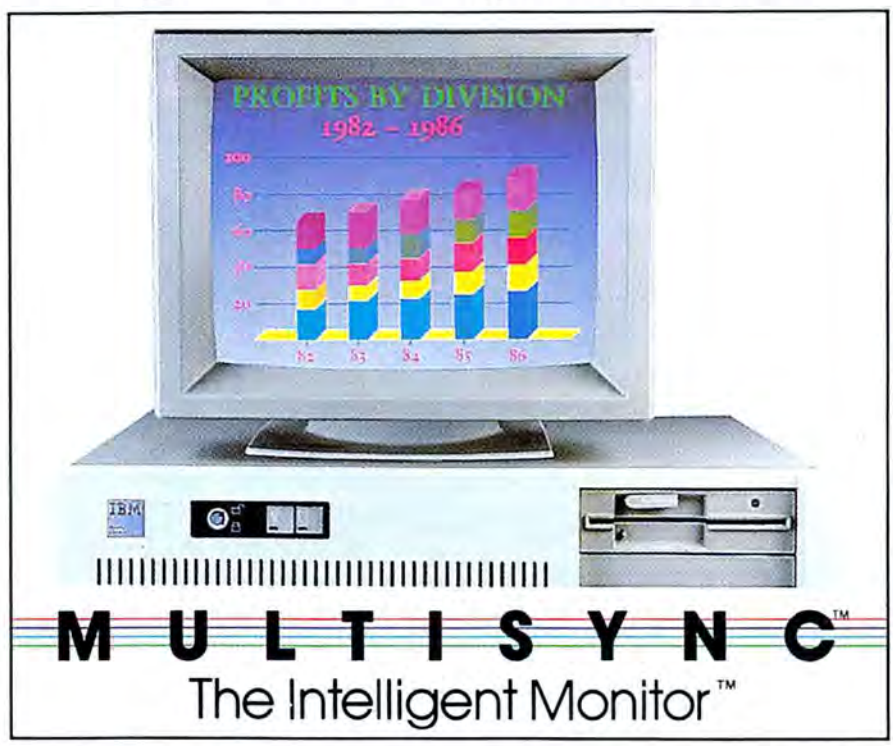
See Things Our Way

Until now, you had to choose different color monitors for compatibility with all three PC color graphics boards made by IBM. With so many board and monitor configurations, folks didn't know which way to look.

The new MultiSync color monitor gives you unique compatibility. As well as TTL and analog color. With 7 switchable text colors. And resolution up to maximum 800 horizontal dots and maximum 560 vertical lines, on a large, 13″ diagonal viewing area.

All from NEC, a name respected around the world for advanced, reliable products backed by nationwide service.

Compatibility with the IBM® Professional Graphics Adapter Board



It's the one color monitor that does everything your way.

Compatibility with the IBM® Color Graphics Adapter Board

But why talk more about it? Visit your nearest dealer and see a graphic demonstration of the new NEC MultiSync monitor's capabilities. Then draw your own conclusions.

For information dial

1-800-447-4700

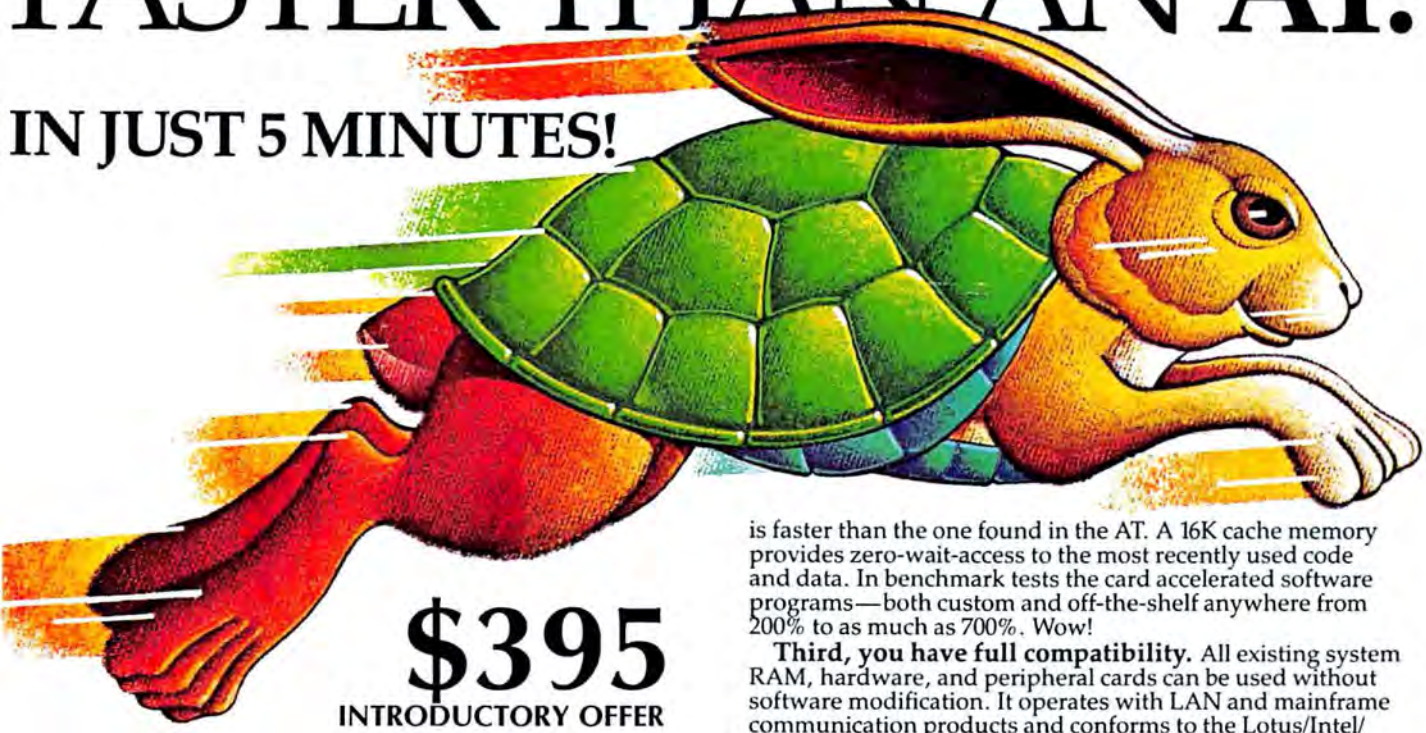
NEC HOME ELECTRONICS (U.S.A.) Inc.
Computer Products Division
1255 Michael Drive
Wood Dale, IL 60191-1094

NEC

Circle 194 on reader service card

MAKE YOUR IBM PC FASTER THAN AN AT.

IN JUST 5 MINUTES!



$395
INTRODUCTORY OFFER

DON'T TAKE OUR WORD FOR IT. USE IT FOR 60 DAYS. IF YOU ARE NOT TOTALLY SATISFIED RETURN IT FOR A FULL REFUND.

It sounds great; the idea of a speedup board that you can just plug right in as easily as putting bread in a toaster. How wonderful to be able to convert a PC or XT to a $4000 AT without the expense. But even when you get ready to spend $595.00 you want to be sure your choice is the very best.

Here at PCSG we sell our IBM PC disk access speedup software by the thousands. But software doesn't do anything about speeding up the microprocessor (or CPU) speed. As you know the microprocessor is the brain of the computer that controls all the operations like screen updates and calculations like a spreadsheet makes.

Faster and smarter than an AT – PCSG guarantees it.

We wanted to offer a speedup card that would be the compliment to our disk speedup software, (incidentally included at no extra charge.) We wanted it to be literally the most advanced, fastest, most feature rich board available today. We could only be satisfied with a board that was the finest example of the engineering art.

There is no question we have met our every objective by developing and manufacturing the *BREAKTHRU 286* card. This is the best designed and most functional speed up card available today. We guarantee it.

HERE IS WHAT MAKES IT SO SPECIAL.

First, it installs so easily. It is a half slot card, only five inches in length. You don't even have to give up a full slot. What's more, unlike competing products it works in the Compaq and most clones. The instructions are so simple we considered showing a picture of a child putting it in. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, it is advanced. The *BREAKTHRU 286* replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. A 16K cache memory provides zero-wait-access to the most recently used code and data. In benchmark tests the card accelerated software programs—both custom and off-the-shelf anywhere from 200% to as much as 700%. Wow!

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. It operates with LAN and mainframe communication products and conforms to the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). Software compatibility is virtually universal.

Fourth, it is the best there is. There are several other boards on the market. Some are priced about the same as the *BREAKTHRU 286* and some are cheaper. We at PCSG have compared them all, but there simply was no comparison. What we discovered is that many cards being sold offer only a marginal speed up in spite of their claims. We found some to be merely versions of the obsolete 8088 or 8086, and others to be just poorly engineered. The 8MHz *BREAKTHRU 286* is unequivocally the best executed and most completely reliable speedup board manufactured today.

PCSG has since early 1983 dominated the lap portable market with ROM software such a Lucid spreadsheet and Write ROM that reviewers rated as excellent. We were proud to successfully enter the IBM PC market last year with disk access speedup software. Now we are so pleased with the *BREAKTHRU* speedup card. We use them on our own PC's to make them faster than AT's. We are really excited about this product.

PCSG makes the unabashed statement that the *BREAKTHRU 286* card represents more advanced technology than boards by Orchid, Quadram, Victor, Mountain, P.C. Technologies, Phoenix . . . we could go on.

But an ad can't let you experience it for yourself. That's why we sell the *BREAKTHRU 286* on a 60 day trial. If you aren't completely satisfied return it within 60 days for a full refund. It is priced at $595. Call today with your MasterCard, Visa, American Express or COD instructions and we will ship your card the very next day.

PCSG

PERSONAL COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd. #207 • Dallas, Texas 75229

214-351-0564

MasterCard VISA

Circle 604 on reader service card

RACORE
gives your PCjr a powerful new boost ...even networking.

add PC performance to your PCjr.

Drive Two Plus™ gives the IBM PCjr the performance capabilities of a PC by adding a second drive plus enhancements. Your PCjr can now run PC software.

The unit includes a parallel port, a second 360K disk drive, a clock calendar with battery back-up, additional power to the side bus and a memory expansion slot.

Drive Two Plus With DMA $345. **$295.00**

Expand PCjr Memory to 640K

RACORE's expansion board boosts PCjr memory in 256K increments up to 640K. This plug-in board installs in the Drive Two Plus, or the 10/20 MB expansion units.

Memory Expansion Board

256K **$105.00** 512K **$135.00**

Choose from 3 popular keyboards for your PCjr.

Keyboard packages come complete with adapter cables.

PC Style	**$85.00**
AT Style	**$107.00**
5151 Style	**$127.00**

Look to RACORE

Since 1983, RACORE has continued to enhance the capability of the IBM PCjr. Our most recent advance enables a RACORE enhanced PCjr to talk with, work with IBM PCs, XTs, ATs and compatibles in a local area network.

We call the product LANpac jr.

$295.00 per node.

To Order or for Information
CALL TOLL FREE:
1-800-325-1833 except CA
1-800-847-8417 except UT

BBS: (801) 363-8720

RACORE Computer Products Inc.

Corporate Offices
10 Victor Square
Scotts Valley, CA 95066

RACORE, Drive Two Plus, LANpac jr are registered trademarks of RACORE Computer Products Inc. IBM, PC, XT, AT, PCjr are registered trademarks of IBM Corporation.

Circle 937 on reader service card


```
0  '********* PColor, karl koessel, PC World ********************
10 KEY OFF : DEFINT A-Z    'KEY line off;  all variables integers
20 DEF SEG=0               'Is Monochrome Display Adapter active?
30 IF (PEEK(1040) AND 48)=48 THEN MONO=1    'If so, set flag to 1
40 DEF SEG : P=0 '----------------- Set up function keys.  First,
50 FOR X=1 TO 10                          'for each function key
60    K$(X)=""                            'create an empty variable
70    WHILE PEEK(P+1619)<>0               'and fill that variable
80      K$(X)=K$(X)+CHR$(PEEK(P+1619))    'with that key's current
90      P=P+1                             'function key assignment
100   WEND
110   K$(X)=K$(X)+CHR$(0)                 'Add 0 to end of variable
120   KEY X,""                            'Erase current assignment
130   P=X*16                              'Move to next key value
140 NEXT '---- Then, set each function key subroutine line number
150 ON KEY(1) GOSUB 400      'TEXT/GRAPHICS mode toggle
160 ON KEY(2) GOSUB 410      'Palette toggle (GRAPHICS only)
170 ON KEY(3) GOSUB 420      'Pause/Continue toggle
180 ON KEY(5) GOSUB 430      'Row foreground/background toggle
190 ON KEY(7) GOSUB 440      'WIDTH 40/WIDTH 80 toggle
200 ON KEY(9) GOSUB 450      'Standard/Blinking characters toggle
210 FIRST=1 : LAST=9 : GOSUB 460     'Activate odd function keys
220 IF MONO THEN KEY(1) OFF          'If MONO, no GRAPHICS toggle
230 FK=7 : WCOL=41 : PAL=1      'Set for WIDTH 40 text, palette 1
240 SECONDS=4                   'Set time delay, string constants
250 MODE$(0)="GRAPHICS"   : MODE$(1)="TEXT"
260 HOLD$(0)="Pause    "  : HOLD$(1)="Continue"
270 ROWD$(0)="background" : ROWD$(1)="foreground"
280 WCOL$(0)="40"         : WCOL$(1)="80"
290 CHAR$(0)="Blinking"   : CHAR$(1)="Standard"
300 '*****  MAIN LOOP  ****************************************
310 HOLDTIL#=TIMER+SECONDS   'Set border (background) cycle timer
320 WHILE PAUSE OR (TIMER<HOLDTIL#)  'Don't change border (bkgrd)
330   IF INKEY$=CHR$(27) THEN 1850   'but check for [Esc] to quit
340   ON FK GOSUB 550,590,630,580,680,580,730,580,790   'or do FK
350 WEND            'toggle routine; end when PAUSE or timer done
360 'Cycle to next background for GRAPHICS (next border for text)
370 IF GRAPHICS THEN GOSUB 1520 ELSE GOSUB 920
380 GOTO 310                          'Go through main loop again
390 '************************************************************
400 FK=1 : RETURN                'Function key subroutines simply
410 FK=2 : RETURN                          'set the variable FK
420 FK=3 : RETURN
430 FK=5 : RETURN
440 FK=7 : RETURN
450 FK=9 : RETURN '---------------------------------------------
460 FOR FK=FIRST TO LAST STEP 2      'Routine to activate a range
470   KEY(FK) ON                  'of odd (or even) function keys
480 NEXT
490 RETURN '---------------------------------------------------
500 FOR FK=FIRST TO LAST STEP 2    'Routine to deactivate a range
510   KEY(FK) OFF                 'of odd (or even) function keys
520 NEXT
530 RETURN '---------------------------------------------------
540 '*******  Toggle routines ***********************************
550 FK=0                  'Toggle between TEXT and GRAPHICS modes
560 GRAPHICS=(GRAPHICS+1) MOD 2         '0=TEXT, 1=GRAPHICS
570 ON (GRAPHICS+1) GOSUB 750, 1220     'Display TEXT or GRAPHICS
580 RETURN '---------------------------------------------------
590 FK=0           'Toggle palette (active in GRAPHICS mode only)
```

(continues)

Listing 1: PColor displays the PC's 16 colors and can be used to adjust the monitor's brightness and contrast.

(continues)

F-18 Carrier Approach

F-16 Night Flight

F-16 from Control Tower

Jet

From the author of Microsoft Flight Simulator comes a new dimension in flight simulation. Jet simulates two fast and maneuverable supersonic jet fighters, a land-based F-16 or a carrier-based F-18. The Jet simulation includes modern electronic flight instrumentation and the most advanced weaponry available. Jet's combination of simulation sophistication, excellent visual attitude references, and fast animation speed makes it truly enjoyable to fly.

Excellent aircraft control plus ballistic thrust gives you the kind of aerobatic maneuverability only a modern jet fighter can provide. The attitude indicator is easy to read no matter what your orientation. This indicator, combined with a full-screen out-the-window view, helps you get the most out of Jet's excellent flight controls. An important consideration when traveling at speeds in excess of 1300 MPH.

With Jet you can fly through either structured on non-structured environments. Engage in a deadly variety of combat missions. Explore the wargame territory, or relax by practicing precision aerobatic maneuvers. Load in scenery from optional United States Scenery Disks. You can even load in scenery off the Microsoft Flight Simulator disk.

Jet's technology incorporates our newest high-speed graphic drivers, and introduces new scenery concepts for improved viewing on non-color and RGB monitors.

Jet requires an IBM™ PC, PC jr, PC AT, Compaq™, or Tandy™ 1000-series computer, with 128K minimum memory and the Color/Graphics Monitor Adapter, Hercules™ Graphics Card, IBM Enhanced Graphics Adapter, or Sublogic High-Speed Graphics Card.

See Your Dealer . . .
or write or call for more information. For direct orders please enclose $49.95 plus $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.

SCENERY DISKS FOR MICROSOFT FLIGHT SIMULATOR AND JET ARE NOW AVAILABLE.

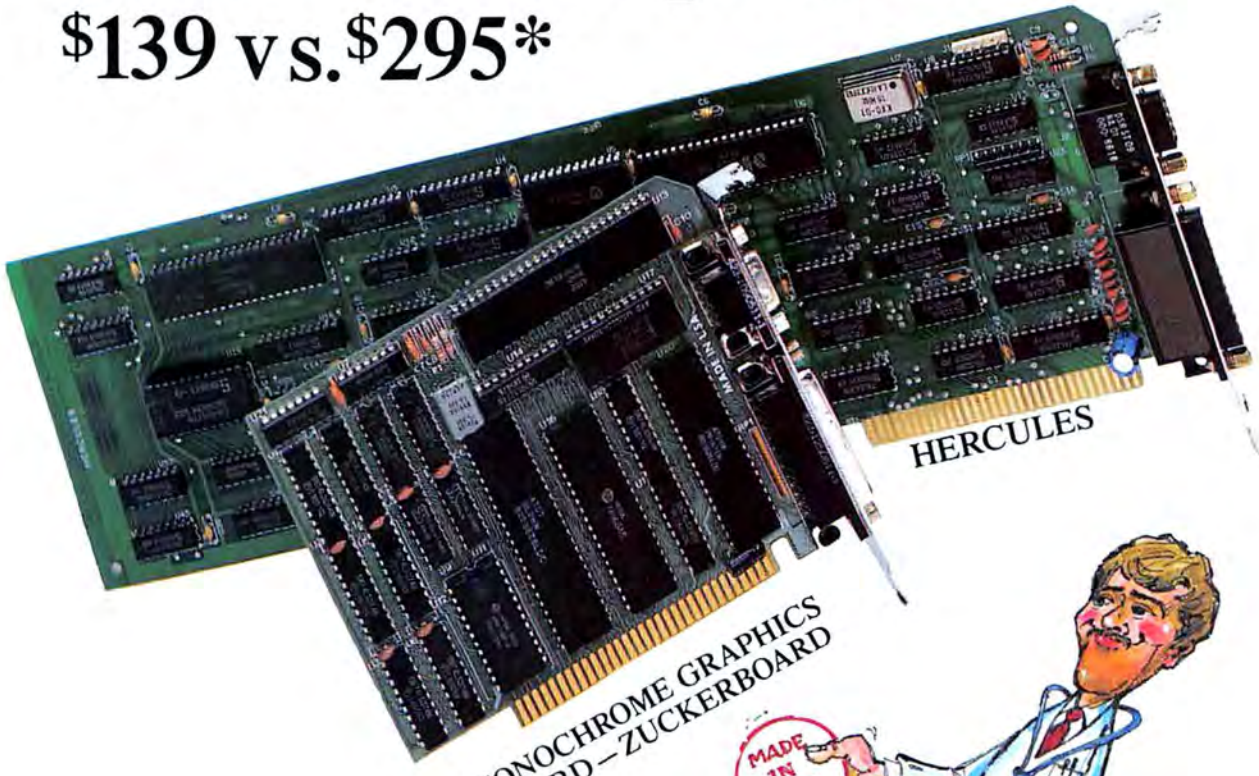
IBM is a trademark of International Business Machines Corp.
Compaq is a trademark of Compaq Computer Corp.
Tandy is a trademark of Tandy Corp.
Hercules is a trademark of Hercules Computer Technology.

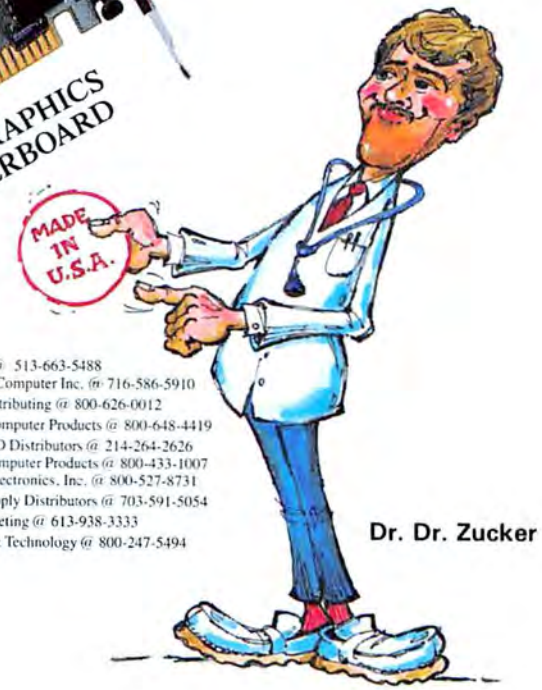
subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

Circle 308 on reader service card

½ Size, ½ Cost & Not A Clone!
Monochrome Graphics ½ Card —
$139 vs. $295*





In California Call:	Kenfil Software @ 800-662-0505		
In Colorado Call:	Micro Data Products @ 303-360-6200	In Ohio Call:	Infotel @ 513-663-5488
In Florida Call:	First Source @ 305-648-0501		Amdex Computer Inc. @ 716-586-5910
	O'Toole Interprises @ 800-558-9379	In Connecticut Call:	P.C. Distributing @ 800-626-0012
	P.C. Distributors @ 800-428-1888	In Tennessee Call:	Multi Computer Products @ 800-648-4419
In Georgia Call:	Majors Distributing @ 404-454-8281	In Texas Call:	Compu D Distributors @ 214-264-2626
	Ashford International @ 404-939-7533		Hiltz Computer Products @ 800-433-1007
In Illinois Call:	Comark, U.S.A. Flex @ 800-323-6135		Vidco Electronics, Inc. @ 800-527-8731
	P.C. Distributing @ 312-298-1400	In Virginia Call:	TCS Supply Distributors @ 703-591-5054
	State Wide @ 312-932-0890	In Canada Call:	JB Marketing @ 613-938-3333
In Massachusetts Call:	J.H. Lawrence @ 800-221-3328	In Pennsylvania Call:	People & Technology @ 800-247-5494
In New York Call:	Great Lakes Distributing @ 716-691-8981		
	KBL Marketing @ 516-434-9010		
	Manchester Equipment @ 516-435-1199		
	Micro-Buy @ 516-420-1633		

It's another
ZUCKERBOARD

235 Santa Ana Court • Sunnyvale, CA 94086
(408) 720-1942 • 1-800-458-6200 CA • 1-800-624-4920 US

Hercules is a trademark of Hercules Computer Technology, Inc.
*Average price of 400 dealers according to June 1986, survey by Store Board Inc., Dallas, Texas
ZUCKERBOARD is a registered trademark of Advanced Transducer Devices, Inc.

Circle 191 on reader service card

A lot of great software . . .

Introducing 8 EndUser\Software anthologies

Why EndUser\Software?

EndUser Software is a new concept in PC software–a way to build your software library without depleting your cash. We're the publishers of *I.B. Magazette*, the disk magazine distributed to IBM PC users since 1982. We've developed anthologies of the best, most useful programs from the thousands that our end users have tested–plus several new programs in response to users' requests.

Each EndUser Software anthology disk is literally filled with software. All programs are easy to use, with clear menus and plain-English instructions. All documentation is included on disk–you can read it on screen or print it out. Get far more productivity, learning, and fun from your PC than you ever expected–for only $29.95 per anthology. With EndUser Software, end user satisfaction is guaranteed.

Special offer–free bonus
Order at least four anthologies and get a FREE BONUS–*31 Useful Utilities*, a disk full of time-saving productivity tools for end users and programmers alike. Normally costs $29.95.

Productivity

Office Organizer #EU-101
12 programs–Increase your productivity at work. *Memobook/Tickler-File* writes and stores memos and reminds you about appointments. Maintain mailing lists and generate form letters with *Address Book/Form Letter Maker*. *Do List* prints a neatly formatted daily agenda. *Filer* is a data base system. *Tax Fax* tracks deductible expenses, then figures monthly and year-end totals. Also includes 17 more programs.

Home Organizer #EU-102
11 programs–Enjoy a more efficient household. *Financier* helps you develop personal investment strategies. *Auto* tracks car expenses. Keep a well-stocked kitchen with *Shop List*. *Job Jar* makes it fun and easy to assign household tasks. Also includes a handy label maker plus five more programs.

Teacher's Aid #EU-103
14 programs–A unique collection assembled in response to teachers' requests for productivity tools. *Gradebook* stores grades for tests and papers, then computes totals and averages (weighted and unweighted). Use *Quizmaker* and *Quizgiver* to create and print interactive true-false and multiple-choice tests, then automatically assess students' scores. Your system becomes a typewriter with *Typewriter Simulator*. Also includes *Banner Maker*, *Address Book/Form Letter Maker*, *Memobook/Tickler-File*, and nine more programs.

Learning

Try CAI #EU-104
16 programs–Try computer-assisted instruction (CAI) in nine subjects and see how easy, fun, and effective it can be. Improve reading speed and comprehension with *FASTREAD*. *Vocabulary* builds knowledge of Spanish, French, and German, or any language you choose. *Speed-Spell* tutors spelling and allows changes in word selection. Enjoy learning facts about the United States with *State Map*. Also includes *Typing Tutor*, *Graphic Locator*, *Morse Code Tutor*, *Triangle Solver*, *World Time*, and seven more programs.

BASIC Before Your Eyes #EU-105
Tutorial—BASIC has evolved into a powerful language, and whether you stay with it or go on to other languages, here is a fun, nearly effortless way to learn an important skill. Created by a veteran BASIC instructor, this entertaining, interactive tutorial is like having a personal teacher. You'll see BASIC programs work before your eyes, heightened with sound and animation. By the end you'll be programming on your own.

Sorting Made Simple #EU-106
Tutorial—An excellent tutorial on a critical and fascinating element of programming. Start by learning and observing simple, slow sorting techniques–then move on to faster, more complex methods. When done, simply adapt any of the sorting techniques to sort your own data.

Pure Fun

Supernova #EU-107
Adventure—Explore a mysterious planet. This challenging interactive adventure game provides many hours of entertainment as you attempt to locate buried wealth on a remote mining planet. Direct all the action using plain-English sentences. *Supernova* is so full of detail, it's our only program that takes up an entire disk by itself. Play as long as you like, then save to continue later.

Our Favorite Games #EU-108
9 games—These games have been chosen from hundreds as the most intriguing, challenging, and fun. Includes arcade games (*Gunner*, *Snakes*, *King of the Mountain*, *PC Downs*, and *Fireman*), card games (*Concentration* and *Solitaire*), a fantasy game (*The Caverns of Kroz*), and *MAGIE*, a Bingo-like game that also prints out game cards. Several games offer varying skill levels for increased challenge.

Hardware requirements:
IBM PC family or compatibles, 128K memory, monochrome or color monitor (no graphics board required for most programs), DOS 2.00 or higher.

A great little price: $29.95

Credit card orders call 800/222-2990

800/526-8000 in Canada
Technical assistance: Call 318/797-5991

No postage, handling, or credit card surcharges on U.S. and Canada orders!

•EndUser\Software

P.O. Box 10120
Palo Alto, CA 94303-0976

Rush me the EndUser Software anthologies indicated below.

Please indicate quantity:

_____ #EU-101 _____ #EU-104 _____ #EU-107
_____ #EU-102 _____ #EU-105 _____ #EU-108
_____ #EU-103 _____ #EU-106

Charge to my ☐ Visa ☐ MasterCard
Account number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiration date ☐☐ / ☐☐
Signature _____

For fastest service call 800/222-2990 800/526-8000 in Canada (Credit card orders only)
Technical assistance: Call 318/797-5991

Name _____
Address _____
City/State/Zip _____

I'm ordering _____ (total quantity) anthologies at $29.95 each. Total $ _____

☐ I'm ordering at least four anthologies.
Send my free EndUser Software anthology, *31 Useful Utilities*.

California residents add sales tax $ _____

No shipping, handling, or credit card surcharges in U.S. or Canada! $ _____

Orders outside U.S. and Canada only: Add $15.00

Total amount enclosed $ _____

(Check or money order in U.S. funds payable through a U.S. bank only)

POP-UP TIME & BILLING SOFTWARE FOR $99.95?

IT'S NEVER BEEN DONE BEFORE!

But now you can have the ultimate RAM resident system that does your billing and graphically shows where your assets are!

TIMESLIPS™ WILL...
- Time phone calls like a "stopwatch."
- Batch enter time/expense data.
- Generate professional bills with over 5,000 formats, aged receivables, flat fee and more.
- Produce business & financial reports.
- Export data to spreadsheets & databases.
- Track your Retainer/Trust accounts.

TIMESLIPS IS PERFECT FOR:
- Consultants
- Lawyers
- Accountants
- PR/Advertising
- Any service oriented professional

DON'T WASTE ANOTHER BILLABLE MINUTE!
GET TIMESLIPS...THE SOFTWARE THAT FITS THE BILL!

ONLY $99.95 (plus $7.00 S/H).
30-Day Money Back Guarantee.
Call (800) 225-5669 to order.
For RUSH SERVICE and additional information, call (617) 468-7358.

TIMESLIPS IS NOT COPY PROTECTED.

NEW!!
TIME-LINK: PLUS™—$49.95! Integrates TIMESLIPS with ONE-WRITE PLUS™—"The accounting software for anyone who can write a check."

ONE-WRITE PLUS is available from North Edge Software at special prices!!

timeslips™

NORTH EDGE SOFTWARE CORP.

P.O. Box 286, Hamilton, MA 01936
617-468-7358

All of the above are trademarks of third parties except TIMESLIPS which is a trademark of North Edge Software Corp.

PCW 1186

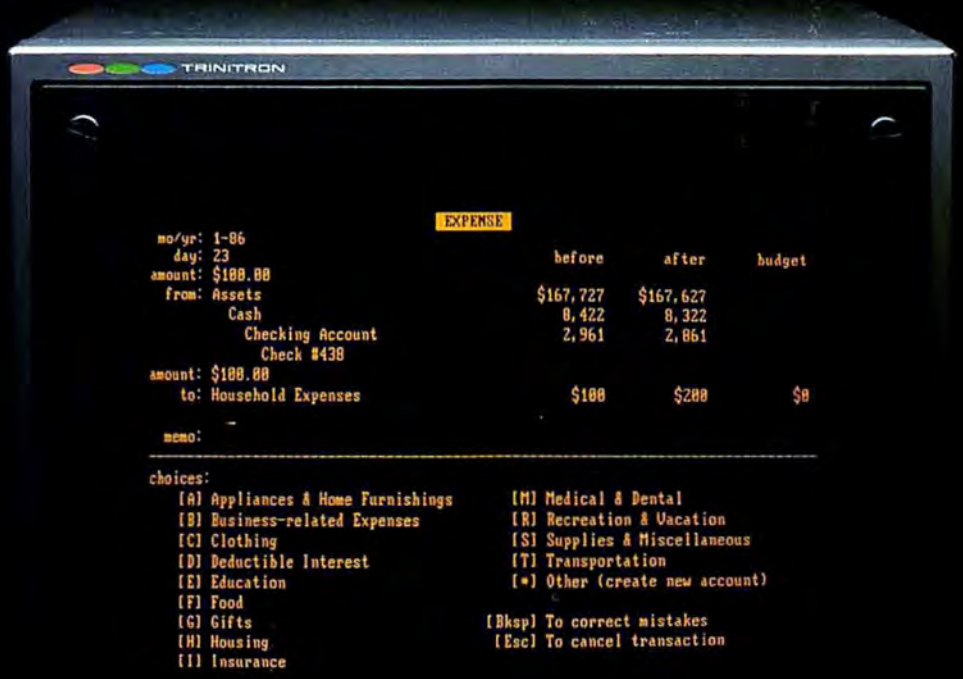
Circle 734 on reader service card


```
600 PAL=(PAL+1) MOD 2     '0=cyan-magenta-white, 1=green-red-brown
610 GOSUB 1550              'Update palette information on screen
620 RETURN '-------------------------------------------------------
630 FK=0                                    'Toggle Pause/Continue
640 PAUSE=(PAUSE+1) MOD 2                   '0=no, 1=yes
650 IF PAUSE=0 THEN HOLDTIL#=PAUSE          'Continue with next cycle
660 GOSUB 1750            'Reset [F3] definition (MODE$) on screen
670 RETURN '-------------------------------------------------------
680 FK=0         'Toggle between row foreground and row background
690 IF WCOL=41 THEN RETURN          'Skip if WIDTH 80, which has both
700 RB=(RB+1) MOD 2                 '0=Row foregrnd, 1=Row backgrnd
710 GOSUB 1790            'Reset [F5] definition (ROWD$) on screen
720 GOTO 820 '---------------------------------Print TEXT display
730 FK=0                    'Toggle between WIDTH 40 and WIDTH 80
740 WCOL=(WCOL+40) MOD 80  '1=1st column, 41=41st column for text
750 IF WCOL=1 THEN WIDTH 40:FIRSTROW=9 ELSE WIDTH 80:FIRSTROW=1
760 GOSUB 840                           'Build TEXT mode screen
770 GOSUB 950                           'Update border information
780 GOTO 820 '---------------------------------Print TEXT display
790 FK=0          'Toggle between standard and blinking characters
800 BLINK=(BLINK+1) MOD 2               '0=standard, 1=blinking
810 GOSUB 1820            'Reset [F9] definition (CHAR$) on screen
820 GOSUB 1000                                  'Print TEXT display
830 RETURN '*******************************************************
840 KEY(2) OFF                      'No palette toggle in TEXT mode
850 FIRST=5 : LAST=9 : GOSUB 460   'Activate [F5], [F7], and [F9]
860 SCREEN 0,1,0,0 : COLOR ,0 : CLS        'Build TEXT mode screen
870 LOCATE ,8,0 : COLOR 15,0   'Center screen title, print bright
880 PRINT "COLOR TEXT (SCREEN 0,1,,)"
890 PRINT : COLOR 7,0         'Print blank line, set text to normal
900 GOSUB 1620                      'Print function key definitions
910 RETURN '-------------------------------------------------------
920 BORDER=(BORDER+1) MOD 16                    'Cycle border color
930 GOSUB 950                           'Update border information
940 RETURN '-------------------------------------------------------
950 LOCATE 25,9+WCOL/2                  'Update border information
960 COLOR BORDER,0,BORDER              'Set text color to border's
970 IF BORDER MOD 8=0 THEN COLOR ,7     'If invisible, white back
980 PRINT USING " Border is COLOR _,_,## ";BORDER;
990 RETURN '-------------------------------------------------------
1000 LOCATE FIRSTROW,1                  'Print TEXT mode display
1010 IF RB=1 AND WCOL=1 THEN 1090       'Skip to row background
1020 FOR F=0 TO 15                      'Row foreground starts
1030    LOCATE ,WCOL                    'at column WCOL (41 for
1040    FOR B=0 TO 7                   'WIDTH 80, 1 for WIDTH 40)
1050       GOSUB 1170                                'Print text
1060 NEXT B,F
1070 IF WCOL=1 THEN 1130                        'Skip if WIDTH 40
1080 PRINT " ";
1090 FOR B=0 TO 7                               'Row background
1100    FOR F=0 TO 15
1110       GOSUB 1170                                'Print text
1120 NEXT F,B
1130 IF MONO THEN RETURN      'If MONO, all done; else need white
1140 DEF SEG=&HB800'space in last column of 24th CGA monitor line
1150 POKE 80*24*(1-1*(WCOL=41))-1,64+32+16   'Doesn't work on EGA
1160 RETURN '-------------------------------------------------------
1170 FG=F+16*BLINK                          'Text printing routine
1180 COLOR FG,B                'Set new foreground and background
1190 IF F=15 AND B=7 THEN PRINT "15,7"; : GOTO 1210 'Avoid scroll
1200 PRINT USING "##_,# ";FG;B;
1210 RETURN '******************************************************
1220 SCREEN 1,0,0,0       'Medium resolution GRAPHICS mode display
1230 GOSUB 1550                  'Update palette information
1240 FIRST=5:LAST=9:GOSUB 500    'Deactivate [F5], [F7], and [F9]
1250 KEY(2) ON                   'Activate [F2], palette toggle
```

(continues)

Listing 1 *(continued)*

OUTSTANDING



If slow and cumbersome program operation has kept you laughing (and frustrated) about using a personal computer for home accounting ... Finally, an Outstanding Home-Accounting System! CashTrack™ CashTrack redefines home accounting with an easy-flowing yet versatile accounting structure, a beautiful concept for presenting unaccounted-for-outflow, and an execution speed that makes other "home-accounting" packages obsolete.

Take CashTrack for a Test Drive at your dealer. You will be convinced; CashTrack has no competition.

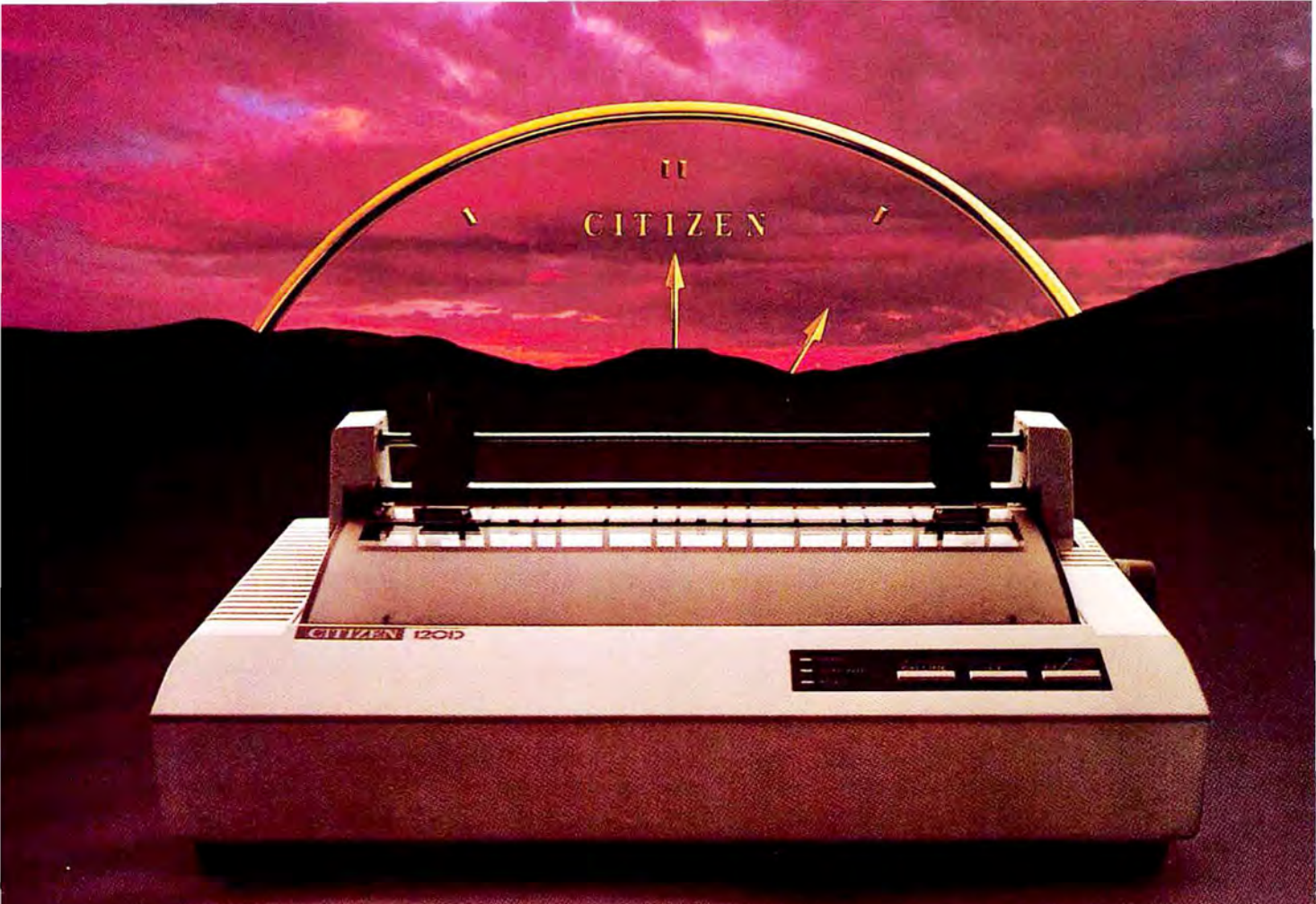
Now Hard Disk Compatible!

See Your Dealer. Most dealers have been set up with special hands-on instructions to guide you through all aspects of program use in thirty minutes or less. If your dealer doesn't have these instructions, write or call SubLOGIC for more information. For direct orders, please enclose $149.00 plus $4.50 for shipping and specify whether you want UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club accepted.

CashTrack

Circle 308 on reader service card

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995
ORDER LINE: (800) 637-4983
(except in Illinois, Alaska and Hawaii)
Open 7 AM to 9 PM Central Time



FOR PEOPLE WHO WANT MORE, BUT AREN'T WILLING TO PAY THE PRICE.

Citizen™ just took all the features of a high-end printer and made a small change.

We put them into a low-end printer. The Citizen 120D.

We created a dot matrix printer with more features and a lower price than any other printer in its class. One that produces clean, precise letters at a draft speed of 120 cps, with superior correspondence quality at 25 cps.

We added little extras, like a 4K-byte buffer, proportionally spaced printing, full graphics capabilities, and a unique paper loading system that's a small wonder. And we gave it the ability to survive the long run with most leading computer systems.

Because after 50 years of placing a world of precision on your wrist, we've come to realize something. Good things do come in small packages.

For more information, call 1-800-556-1234 Ext. 34. Or in California, call 1-800-441-2345 Ext. 34.

The Citizen 120D. Never has so much been offered to so many for so little.

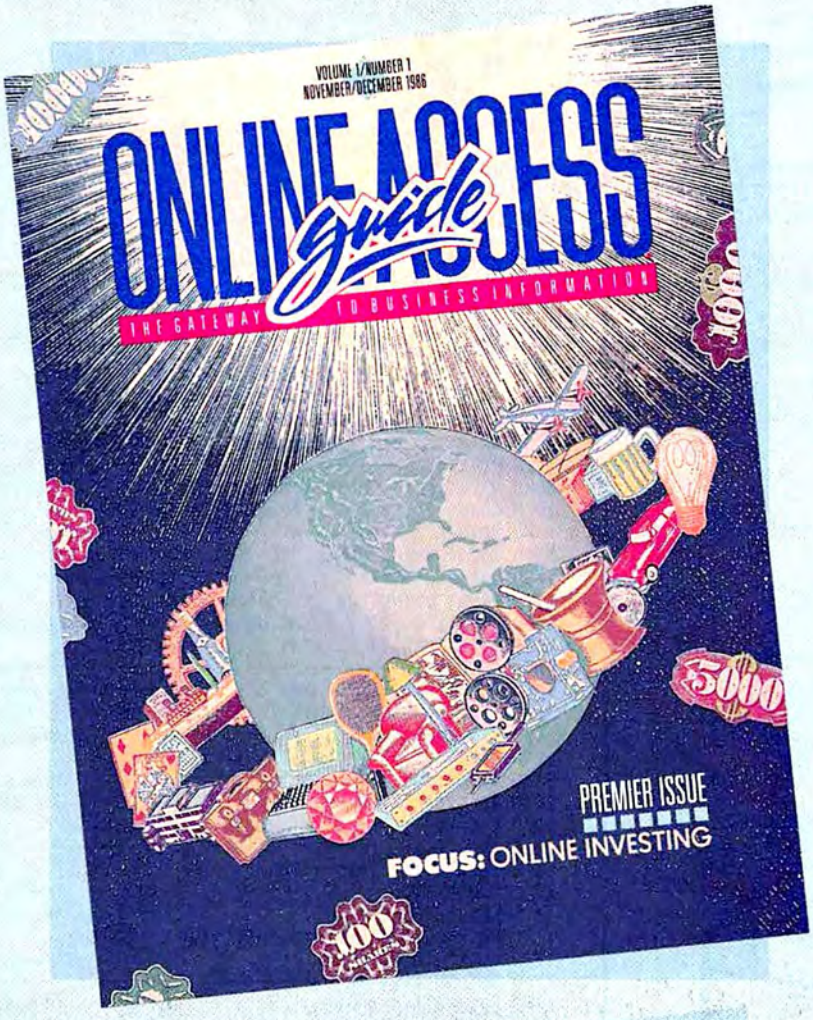
©1986 Citizen America Corporation. Citizen and the Citizen logo are trademarks of Citizen Watch Company, Ltd.

CITIZEN™

Printers that run like clockwork.

First the telephone. Then the computer.

Now the magazine.



Welcome to the online world.

For too long, business people have been in the dark about information and services available online. But for the 2 million business professionals who will enter the online world in 1987, Online Access Guide will show you the way. Don't miss out—if you want to find out about online investing, business research, travel planning, search strategies, international finance, job hunting, patents and profits—you're only a magazine away.

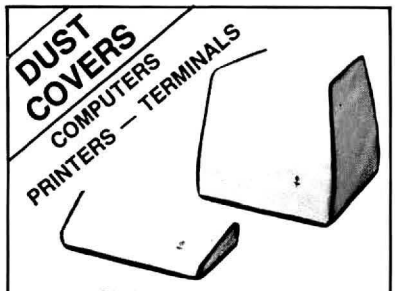
The premier issue is on newsstands now, and contains hundreds of listings of online services and articles by top writers in the field.

ONLINE ACCESS Guide

THE GATEWAY TO BUSINESS INFORMATION®

Call 800-922-9232 or mail the attached postcard and step into the online world

Circle 861 on reader service card



- 100% Cotton Canvas
- Static-Free/Breathable
- Beige with Grey Trim
- Embroidered Emblem

For: IBM PC, PC-AT, Compaq, AT&T Leading Edge "D", Epson Equity

Printers: OKIDATA, EPSON, IBM, NEC.

Contemporary ComputerWear
1320-36th Avenue/San Francisco, CA 94122
(800) 826-5761
Dealers Please Inquire. CA: (415) 759-1466

Circle 276 on reader service card

EMULATE *HP* TERMINALS WITH YOUR IBM PC

Now your IBM Personal Computer can be used as a Hewlett-Packard 26XX family terminal. Instead of just a terminal, you'll have a general purpose microcomputer. **VDTE 2.1** is the powerful, easy to use terminal emulation program that provides the features you need!

HP2624, HP2648 and DEC VT52 modes
Block/format mode
Eight displayed softkeys (program controlled)
Subset of HP2648 vector graphics
Supports both serial ports simultaneously
Fourteen pages of off-screen scrolling memory
Ten speeds include 300, 1200 and 9600 baud
ASCII file transfer between PC and host

Price: $200. Visa and MasterCard welcome.

Inner Loop

Inner Loop Software
5456 McConnell, Ste 120
Los Angeles, CA 90066
(213) 822-2800

Circle 624 on reader service card

Why waste time!
ACCELERATE with VCACHE

HARD DISK ACCELERATOR

- Caching eliminates repetitive disk accesses
- Use up to 15 Mb of extended/expanded or 500 Kb of standard memory

DISKETTE ACCELERATOR
SCREEN ACCELERATOR
FAST — FRIENDLY — SAFE
VCACHE
GOLDEN BOW SYSTEMS

$65
Add $3 for shipping/handling
California residents add 6% sales tax

2870 Fifth Avenue
Suite 201
San Diego, CA 92103
619/298-9349

Circle 637 on reader service card


```
1260 LOCATE 1,5,0                'Center and print title lines
1270 PRINT "MEDIUM RESOLUTION COLOR GRAPHICS"
1280 PRINT SPC(13)"(SCREEN 1,0,,)
1290 GOSUB 1620                  'Print function key descriptions
1300 LOCATE 9,1 : PRINT "Changing palettes changes"
1310 PRINT "the 4 foreground colors"
1320 PRINT "displayed at one time."
1330 FOR F=0 TO 3                              'Four boxes of color
1340    LOCATE 10+F*4,30 : PRINT F;"="  'Position and print box #
1350    TOP=65+F*32 : BOT=TOP+23          'Top and bottom of box
1360    LINE (272,TOP)-(319,BOT),3,B      'Draw box outline
1370    LINE (273,TOP+1)-(318,BOT-1),F,BF  'Fill box with color
1380 NEXT
1390 LOCATE 13,1 : PRINT "For the background and"
1400 PRINT "palette chosen by the"
1410 PRINT "statement COLOR "
1420 PRINT "a foreground number of"
1430 LOCATE 18,1 : PRINT "Text (for SCREEN 1,0,,)"
1440 PRINT "is printed in foreground"
1450 PRINT "color 3. Text is invisible"
1460 PRINT "in COLOR 6,0 and COLOR 14,0"
1470 PRINT "and COLOR 7,1 and COLOR 15,1"
1480 LOCATE 24,7  : PRINT "Background is COLOR";
1490 LOCATE 25,10 : PRINT "Palette is COLOR";
1500 DRAW"BM178,123R52ND48U48R6BM230,107R6BM230,139R6BM230,171R6"
1510 RETURN '-----------------------------------------------------
1520 BACKGROUND=(BACKGROUND+1) MOD 16    'Change background color
1530 GOSUB 1550        'Update background and palette information
1540 RETURN '-----------------------------------------------------
1550 COLOR BACKGROUND, PAL       'Update background, palette info
1560 LOCATE 15,17      'Update background and palette information
1570 PRINT USING "##_,#"; BACKGROUND, PAL
1580 LOCATE 24,27 : PRINT USING "##_, "; BACKGROUND;
1590 LOCATE 25,29 : PRINT USING "_,#"; PAL;
1600 RETURN '-----------------------------------------------------
1610 '*****  Function key descriptions ************************
1620 IF MONO THEN PRINT: GOTO 1660   'If MONO, no GRAPHICS toggle
1630 IF GRAPHICS THEN PRINT          'Add blank line to GRAPHICS
1640 PRINT "[F1] = "MODE$(GRAPHICS)" mode"
1650 GOSUB 1750                                'Key [F3] description
1660 IF GRAPHICS=0 THEN 1690                     'Skip if TEXT mode
1670 LOCATE 4,20 : PRINT "[F2] = Change Palette" : RETURN
1680 'Following for TEXT display only ----------------------------
1690 IF WCOL=41 THEN 1710                  'If WIDTH 80, skip [F5]
1700 GOSUB 1790                             'Key [F5] description
1710 LOCATE 6,1                             'Key [F7] description
1720 PRINT "[F7] = WIDTH "WCOL$(WCOL MOD 41)
1730 GOSUB 1820                             'Key [F9] description
1740 RETURN '-----------------------------------------------------
1750 LOCATE 4+GRAPHICS,1                    'Key [F3] description
1760 IF GRAPHICS=0 THEN COLOR 7,0   'If not GRAPHICS, normal text
1770 PRINT "[F3] = "HOLD$(PAUSE)
1780 RETURN '-----------------------------------------------------
1790 LOCATE 5,1:COLOR 7,0                   'Key [F5] description
1800 PRINT "[F5] = Row "ROWD$(RB)
1810 RETURN '-----------------------------------------------------
1820 LOCATE 7,1:COLOR 7,0                   'Key [F9] description
1830 PRINT "[F9] = "CHAR$(BLINK)" characters"
1840 RETURN '-----------------------------------------------------
1850 LOCATE 1,1                'CEsc] pressed, quit at upper left
1860 IF GRAPHICS=0 THEN COLOR 7,0      'Normal text for TEXT mode
1870 DEF SEG                           'Replace original function
1880 FOR X=1 TO 10                      'key assignments
1890   FOR Y=1 TO LEN(K$(X))
1900     POKE 1618+(X-1)*16+Y,ASC(MID$(K$(X),Y))
1910 NEXT Y,X
1920 END
```

(continues)

Tokyo for $19.95

東京

In the continuing evolution of scenery, SubLOGIC introduces the Japan and San Francisco Bay Area Scenery Disks for Flight Simulator and Jet.

- Tokyo to Osaka is a comfortable 240-mile flight. The natural beauty of the Japanese coastline and mountain ranges complement the standard cross-country details.

- The beautiful San Francisco Bay Area "Star" Scenery Disk is perfect for concentrated sight-seeing.

- For the cross-country adventurer, our standard Western U.S. scenery (Disks 1-6) contains major airports, nav-aids, cities, highways, rivers, lakes, and mountains.

SubLOGIC Scenery Disks are available individually for $19.95. The six-disk Western U.S. set is available for $99.95. See your dealer, or write or call SubLOGIC for more information.

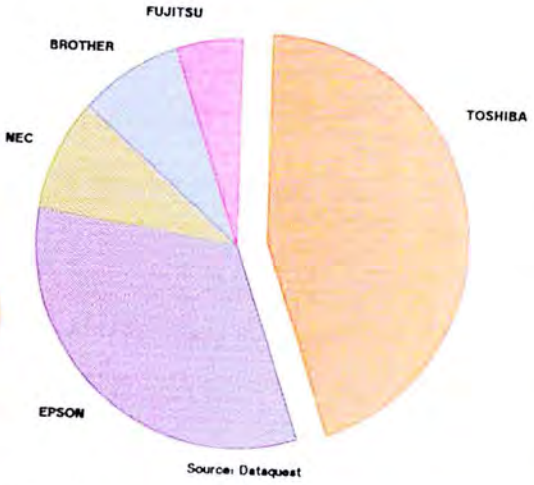
subLOGIC
Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

Circle 467 on reader service card

We Put More Printers In Business Than Anyone Else.

High Resolution 24 Pin Printer Sales, 1982 1985



Sales of 24-pin dot matrix printers have increased substantially over the past several years. Dot matrix printers account for over 60 per cent of the total printer industry sales. TOSHIBA has the largest percentage of all the industry's 24-pin print head printer sales.

There are more Toshiba 24-pin dot matrix printers installed in major corporations, as well as in medium and small companies, than any other brand.*

More than Epson.[1] More than NEC.[2] More than Brother.[3] More than Fujitsu.[4]

That's because Toshiba gives you more.

Our P351's printhead, for instance, lasts up to two times longer than anyone else's.

And during its long life it will give you letter quality printing at 100 CPS, drafts at 288 CPS and picture-perfect dot-addressable graphics.

The P351 emulates Qume Sprint 11[5] and IBM Graphics,[6] and most major software packages utilize its expanded command set. Plus, you can add over 40 downloadable type fonts on both disks and plug-in cartridges.

The P351 is compatible with the IBM PC[7] family and goes about doing its job in the quietest manner possible.

If you need color graphics capability, there's the new P351C. The 24-pin printhead we pioneered and perfected produces high-resolution presentation graphics on paper for reports and on transparencies for projection.

The P351C will also create multicolor transparencies for all software compatible with the IBM Color Printer[8] and can output graphics from Microsoft Chart.[9]

So when it comes time to select a printer for your office, why not consider the Toshiba P351 or the new P351C. They're both good for business.

For the name of the Toshiba dealer nearest you, call 1-800-457-7777.

*Installed base figures from Dataquest. 1. Epson is a registered trademark of Epson Corporation. 2. NEC is a registered trademark of Nippon Electric Corporation. 3. Brother is a registered trademark of Brother International Corporation. 4. Fujitsu is a registered trademark of Fujitsu America, Inc. 5. Qume 11 is a registered trademark of Qume Corporation. 6, 7, 8. IBM Graphics, IBM PC and IBM Color Printer are registered trademarks of International Business Machines Corporation. 9. Microsoft Chart is a registered trademark of Microsoft Corporation.

The P351 *The P351C*

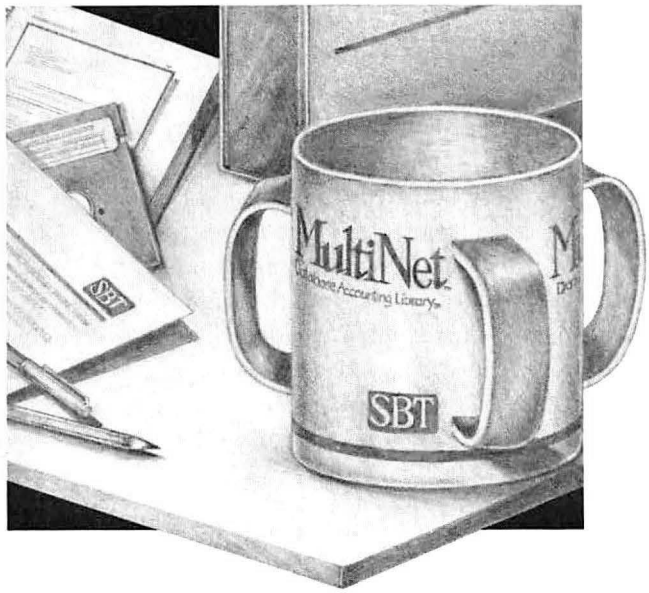
In Touch with Tomorrow

TOSHIBA

Toshiba America, Inc., Information Systems Division

Circle 732 on reader service card

Get a new handle on your business with SBT.



Now you can handle up to 254 users, all working in the same data files, with the SBT MultiNet Database Accounting Library. The accounting software written in dBASE III PLUS.

So whether your business is large or small, you can grow to the limits of the most advanced PC networks available.

When you want that special report, or your business needs something we didn't think of, you can quickly and easily modify our programs to meet your needs exactly (because our dBASE source code is included).

And if you don't have time to make the changes yourself, there's a nearby consultant who can make them for you.

So if your company has two users or two hundred and fifty, you can add customers, update records, and have as many people enter orders as it takes to keep your business growing.

Isn't it nice to know there's software you can't outgrow? The SBT MultiNet Database Accounting Library.

Now you can get a new handle on your business.

Call today for our demo disk and brochure. (415) 331-9900.

THE SBT DATABASE ACCOUNTING LIBRARY.		
dProfessional	Time & Billing	$395
dOrder	Sales Order processing	$195
dInvoice	Billing/Inventory Control	$195
dStatement	Accounts Receivable	$ 95
dPurchase	Purchase Order	$195
dPayable	Accounts Payable	$295
dPayroll	Payroll/Labor	$395
dLedger	General Ledger/Finance	$395
dAssets	Asset/Depreciation	$295
dProject	Project/Job Accounting	$395
dProperty	Tenant/Unit Management	$395
dBackup	Menu/Backup	$ 65

MultiNet versions $200 additional per module

Call today for the name of the SBT consultant in your area.

Three Harbor Drive Sausalito, CA 94965
(415) 331-9900

SBT CORPORATION

*Compiled versions also available. dBASE III and dBASE II are registered trademarks of Ashton-Tate, Inc. Copyright 1986, SBT Corporation.

Circle 431 on reader service card

Ready to wear

Q. Our PC development and support group has amassed a number of applications. Recently we've had some problems with disk wear. I haven't seen any comparative articles on disk quality or disk wear and tear. Do you have any information on this topic?

Paul Meehan
St. John's, Newfoundland, Canada

A. Some floppy disk manufacturers use thicker and/or more durable magnetic coating on their disks. Because the read/write head of a floppy disk drive presses against a disk when the drive door is closed and the disk is spinning, any disk will eventually wear out. Furthermore, the read/write head is in contact with certain parts of the disk far more frequently than with others, and those areas naturally take a beating. Your only real insurance against disk wear is to keep a backup copy of every disk you have.

The areas of the disk that wear out first are essentially victims of DOS. Look at it this way: A disk and a book store data in a somewhat similar fashion. The disk directory is like a table of contents, and each disk cluster is like a page. Because the directory (table of contents) points only to the first cluster (page) of a file, each file on the disk must start at the beginning of a disk cluster. (This is why even a 1-byte file occupies 1024 bytes of a double-sided disk.)

When a file grows beyond the size of a single cluster, the excess data is stored in the next available cluster. That cluster, however, is not necessarily an adjacent cluster on the disk. For example, say a disk contains two files, one starting on "page 11" and the other on "page 12." (The first 10 pages contain special information, including the table of contents.) If we add enough data to the first file it grows larger than a single page. But page 12 is already occupied by

Flick this switch and go beyond IBM compatibility.

the second file, so the excess data is stored on page 13. Delete the second file and add more data to the first file, and the data will fill up page 13, then page 12, then pages 14, 15, and so on.

The disk's directory points to the first cluster of a file. To keep track of clusters used by a file, DOS maintains a *file allocation table* or *FAT* on page 2 and a duplicate FAT on page 3. In this example, the FAT lists page 13 as the 11th entry in the table, page 12 as the 13th entry, 14 as the 12th, and 15 as the 14th. DOS reads the directory to find the first cluster of the file (cluster 11), then reads the 11th entry in the FAT to find the file's next cluster (cluster 13), then reads the 13th entry to find the file's third cluster, and so on.

What this boils down to is that a disk's directory and FAT are constantly read and written as DOS manages the files on a disk, and therefore those areas of the disk are the first to wear out. Although the data on the disk can be retrieved a cluster at a time, it is almost impossible to determine which clusters belong to which files or to reconstruct the proper order of those clusters. Some file recovery utilities will look at the duplicate FAT for help, but if the original FAT has worn out, the reliability of the copy is questionable. What you have is a book without a table of contents, its pages unnumbered and out of sequence.

But this is where the analogy ends. A disk is not a book: It can be readily and easily copied. Make copies.

Do you have any questions concerning the IBM PC or compatibles? Send them to The Help Screen, PC World, *501 Second St. #600, San Francisco, CA 94107, or electronically to CompuServe 74055,412, The Source STE908, or MCI Mail PCWORLD.*

The Canon A-200 II lets you choose the speed you need.

Our dual speed switch processes data at either the standard 4.77 MHz or the superfast 7.16 MHz — and that's only the beginning. With the Canon Personal Computer A-200 II Series you can custom design the perfect PC.

For starters, choose either floppy disk or 20 megabyte hard disk. Then select either the standard PC layout keyboard or our special word processing keyboard. Next, pick your ideal monitor, either monochrome, color or full-page high resolution for word processing.

And when you want to spread out, you have six PC-compatible expansion slots to work with, three for high-speed processing.

Whatever combination of Canon components you choose, you can use the thousands of programs designed for the IBM PC/XT. And your customized Canon PC will perform perfectly with Canon peripherals, including the laser beam and bubble-jet printers and our newly introduced image scanner. For more information about the Canon Personal Computer A-200 II Series call 1-800-441-2626. (In UT, 1-800-922-3131.)

Find out what lies beyond compatibility.

Canon®
PERSONAL COMPUTERS
Beyond Compatibility

Canon U.S.A., Inc., Systems Division, P.O. Box 619865, Dallas/Fort Worth Airport, TX 75261. © 1986 Canon U.S.A., Inc.

Circle 873 on reader service card

Computer Mail Order Shopping Guide

A convenient shopping guide provided as a service to our PC World readers

YOUR #1 CHOICE Technoland™

5830 E. Washington Blvd.
City of Commerce, CA 90040

We used to be PC 1,
We're still your #1 Choice!

Order Toll Free: (800) 222-3978

In California: (213) 724-2781
Technical Support: (213) 724-1684
Customer Service: (213) 724-1685

Basic System

- 8088-2 CPU — Runs at 4.77 or 7.4 MHZ
- 640K RAM
- 360K Half-Height Floppy Drive w/Controller
- Runs All Major PC-DOS Software
- AT™ Style Keyboard
- 135 Watt Power Supply
- System Manual
- MS-DOS 3.10
- Full 18 Month Warranty

$659

AT™ System

- 80286 Processor (Switchable 6/8 Mhz)
- 512K RAM (1024K Optional)
- 1.2 MB Half-Height Floppy Disk Drive
- Floppy/Hard Disk Controller Card
- Clock/Calendar w/Battery Backup
- Runs All Major PC-DOS Software
- 200 Walt Power Supply
- AT™ Style Keyboard
- System Manual
- MS-DOS 3.10
- Full 18 Month Warranty

$1259

Monochrome System

Basic System Plus . . .
- Monochrome Graphics Adapter
- 12" TTL Monochrome Monitor

XT $859
AT $1459

Color System

Basic System Plus . . .
- Color Graphics Adapter
- 13" RGB Color Monitor (640 x 200)

XT $1059
AT $1659

EGA System

Basic System Plus . . .
- Enhanced Graphics Adapter
- 13" High-Res RGB Color Monitor (640 x 350)

XT $1339
AT $1939

$99

Turbo Speed Hard Disk Controller

- 1:1 Interleave Lets Hard Drive Run at Full Speed
- Up To 6 times Faster Than Standard Controller
- No Hardware Setup Required

$475

Tiny Turbo Card

- High-Speed Accelerator for PC and PC/XT
- Replaces 8088 with 80286
- Socket for 80287 on Board
- Short Card

$148

Hayes Compatible Modem

- 300 & 1200 BPS
- Short Card
- Fully Hayes Compatible

Enhanced Keyboard — $79

- Separate Cursor & Numeric Pads
- Keys in Standard Locations
- LED Status Indicators
- Keytronic 5151 Compatible

Citizen High Speed Dot Matrix Printer

MSP-20 (80 Column) $329
MSP-25 (136 Column) $489

- 200 CPS Draft / 50 CPS NLQ
- IBM, Epson Compatible
- Centronics Parallel Interface

$169

AT Multifunction Card

- Expandable to 3 MB — 1.5 MB on Board, 1.5 MB on Piggyback Board (OK Installed)
- Supports 64K & 256K RAM Chips
- Parallel, Serial and Game Ports

AT Mini I/O Card — $89

- Parallel, Serial and Game Ports

$139

XT Multifunction Cards

- 384K RAM
- Optional FDC
- Parallel, Serial and Game Ports
- RAM Disk & Printer Spooler Software

XT Mini I/O Card — $89

- Parallel, Serial and Game Ports

$90

135 Watt Power Supply

- XT Compatible
- UL Recognized (UR)
- Extra Power for Hard Drives

Hard Disk Kit

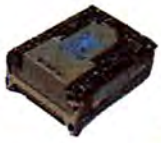
20 MB - $399

- Boots from Hard Disk
- Instruction Manual
- Cables & Mounting Hardware
- Hard Disk Controller

AT Type Hard Disk Drives

20 MB - $549
30 MB - $629
40 MB - $759

- Boot from Hard Disk
- Instruction Manual
- Cables & Mounting Rails
- Works w/AT Hard Disk Controller



Floppy Disk Drive

- Half-Height
- DS/DD — 360K
- Name Brands — TEAC, Panasonic, Mitsubishi, Sanyo, Etc.

$90

Hard Disk Card

20 MB — $408

- 3½ Hard Card
- Easy Installation
- Formatted and Tested
- Boots From Hard Disk
- IBM XT Compatible

Expansion Box — $150

- Room for 3 Half-Height Drives
- 120 Watt Power Supply
- 5 Slot Bus

Host Bus Interface Cards w/Cable — $119

Fast Tape Backup

20 MB — $449
60 MB — $725

- Easy Loading Tape Reels
- Responds to Standard DOS File Handling Commands
- Cables, Mounting Hardware and Tape Cartridge Included
- Software Included

"IBM's Brother" Monochrome Monitor — $119

- IBM Lookalike
- 12" Screen
- Amber or Green

Mono-Graphics Adapter

- Hercules™ Compatible
- Parallel Port

$99

High Resolution RGB Color Monitor — $339

- 13" Screen
- 640 x 200 Resolution
- RGB — 16 Colors

Color Graphics Adapter

- 80 x 25 Character Text Mode
- 640 x 200 Dot Graphics Mode
- Fully IBM Compatible

$89

EGA Compatible Color Monitor — $449

- 31" mm Dot Pitch
- 13" Screen
- 640 x 350 Resolution
- RGB — 16 Colors

EGA Card

- EGA, CGA, MDA & Hercules™ Compatible
- Flicker-Free Display

Short Card - Add $10

$249

Technoland's Policy:

We accept Master Card and VISA (no surcharge), money order, chashier's check, personal check (please allow 10 days to clear), company / institutional PO's and wire transfers. We pay shipping (UPS ground — faster shipping available at additional charge) in continental US. We pay applicable sales tax.

Any item bought from Technoland (including software if unopened) may be returned for a full refund within 30 days of the date it was shipped if for any reason you are not 100% satisfied. All Technoland products carry Technoland's one year limited warranty; some products also carry manufacturer's warranty. Selected Technoland products may carry additional warranties. Warranty policy requires that you submit proof of purchase and obtain an RMA number from us by telephone.

IBM, Hercules, Compaq, ATT, Panasonic, TEAC, Mitsubishi, ARC, Sanyo, Western Digital and Seagate are trademarks of their respective companies. MS-DOS is a trademark of Microsoft Corporation. IBM PC, IBM XT and IBM AT are trademarks of IBM Corporation.

Quantity Discount Available!

Ask Us About Our "Order It Today, Use It Tomorrow" Special

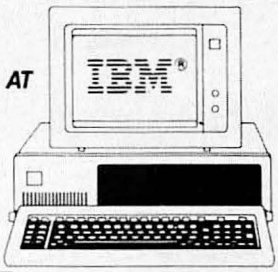
30 Day Money-Back Satisfaction Guarantee

California Residents — We'll Pay Your Sales Tax!

COMPUTER HUT

COMPARE OUR SERVICE & PRICE

IBM-PC, XT & AT CALL



COMPAQ®
Portables, Deskpros, 286 Models . . . **CALL**

FLOPPY DISK DRIVES

Tandon TM100-2 360K **$89**
TEAC FD 55-BV **$105**
IBM® half height **$139**

HARD DISKS / TAPE

MAYNARD ELECTRONICS
On board 10MB **$589**
On board 20MB **$699**
MayStream tape backup . . . . . **CALL**

PLUS DEVELOPMENT
Plus Hardcard 20MB **$689**

SEAGATE
20MB internal w/cont. 65ms **$439**
ST4026, 20MB (AT) 39ms **$529**
ST4038 30MB (AT) 39ms **$639**

IOMEGA Bernoulli Box
10+10 (A210H) **$1949**
20+20 (A220H) **$2539**
IRWIN tape backups . BEST PRICES

ADD-ON BOARDS

AST
SixPak 64K **$155**
Six Pack Premium 512K **$365**
Advantage 128K **$365**

dca IRMA board **$765**

HERCULES
Graphics boards . . . . . **LOWEST PRICES**

INTEL BOARDS
ABOVE board PC/XT 64K **$229**
ABOVE board AT 128K **$359**

INTEL CHIPS
8087 (PC & XT) **$125**
8087-2 (AT&T, Deskpro) **$169**
80287-6 . . . . . **$199**
80287-8 . . . . . **$269**

ORCHID . . . . . **CALL**

QUADRAM
Quadboard 0K **$149**
Quad EGA+ **$369**
Microfazer 64K . . . . . **CALL**

VICTOR Speed Pack 286 . . . . . **$449**

MODEMS

Hayes
SMARTMODEM
1200/1200B w-Smartcom II **$379/349**
2400/2400B w-Smartcom II **$579/539**
AST, Quadram . . . . . **CALL**

PRINTERS

EPSON
FX-85/286, LX-80, LQ-800/1000 HI-80 plotter, HS-80 ink jet, EX-800

BEST PRICES — GUARANTEED!

brother
HR-15XL . . . . . **$369** HR-25 . . . . . **$549**
HR-35 . . . . . **$749** M1509 . . . . . **$399**
Twinwriter . . . . . **CALL**

HEWLETT PACKARD . . . . **CALL**
PRINTERS & PLOTTERS

IBM
Proprinter . . . **$385** XL **$539**
Quietwriter II **$1159**

OKIDATA
182, 192, 193, 292, 293 . . . **BEST PRICES**

NEC . . . . . **CALL**

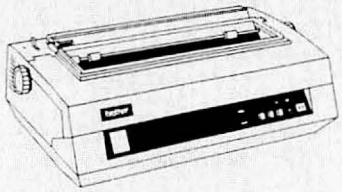
TOSHIBA
P321 P/S . . . . . **$509** P341 P/S **$795**
P351 P/S **$1059**

INPUT DEVICES

MOUSE SYSTEMS
PC Mouse w/Dr Halo **$139**

MICROSOFT
Bus Mouse or Ser Mouse **$139**

MAYNARD . . . . . **CALL**



SPECIALS

PARADISE SYSTEMS

AUTOSWITCH EGA **$349**
(EGA, CGA, MDA, Hercules Plantronics)

5-PACK 0K SP, C/C Ram disk print spooler **$99**

HI-RES GRAPHICS **$179**
(CGA, MDA, Hercules, Plantantronics)

ANY PRODUCT NOT LISTED? CALL

MONITORS

AMDEK
Video 310A . . . **$159** Color 600 . . . . **$399**

PGS
HX12 . . . . . **$445** HX-12E **$529**
MAX-12E . . . . . **$179** SR-12 . . . . . **$599**

NEC JC1401 Multisync **$549**

SOFTWARE

WORDPROCESSING
MS Word (IBM) **$239**
Multimate . . . **$229** Advantage . . . **CALL**
Volkswriter 3 . . . . . **$149**
WordStar / Propack . . . . . **$179/$289**
Wordstar 2000 / 2000+ . . . . . **$249/$299**
Word Perfect . **$229** PFS: Write **$84**

DATABASE / INTEGRATED
Lotus 1-2-3 . . . **$309** Symphony **$429**
RBase 5000 . . **$249** Reflex . . . . . **CALL**
dBase III & Framework . . . . . **In Store**
Cornerstone . . . . **$65** Multiplan **$119**
Symantec Q&A **$219**
Javelin . . . . . **$489** Pardox . . . . . **CALL**
Ability **$65**

BUSINESS / ACCT.
Microsoft Project **$239**
Harvard Total Project Mgr **$259**
PFS: File, Plan, Graph **$84**
Chart Master . . **$229** Sign Master . . . **$149**
Diagram Master **$199**
One Write Plus **$159**

UTILITIES / COMPILERS
Smartcomll (IBM) **$99**
Crosstalk XVI **$99**
Norton Utilities . . **$59** Sideways **$39**
Sidekick (NP) . . **$48** Superkey **$45**
Turbo Pascal . . . **$45** T.Pascal w/8087 . **$69**
MICROSOFT Macro Assembler **$99**
MS Basic . . . . . **$239** MS Fortran **$219**
Lattice C **$249**

OTHER
ATI Training Power Series **$49**
ATI Skill Builder Series **$39**
Flight Simulator **$39**

AND LOTS MORE

EAST COAST

COMPUTER HUT
OF NEW ENGLAND INC.
101 Elm St. Nashua, NH 03060
(603) 889-7625
For Orders Only — (800) 525 5012

MID-WEST

COMPUTER HUT INC.
524 S. Hunter
Wichita, Kansas 67207
(316) 681-2111
For Orders Only — (800) 572 3333

All products usually in stock for immediate shipment and carry full manufacturers' warranty. Price subject to change — this ad prepared two months in advance. We honor personal checks — allow 20 days to clear. COD up to $500. Visa, MasterCard add 2%. For shipping & insurance add 2% or $6.00 min. for small items and $12. min. for monitors, printers, etc. We accept company checks and P.O.'s from Fortune 1000 Companies. **All prices reflect cash discount for mail & phone orders only. In store prices may differ.**

IBM is a trademark of IBM Corp.

Return authorization and order status call information line

886

Circle 158 on reader service card

COMPUTER DISCOUNT WAREHOUSE

IBM

M XT SPECIAL
256 K 1 DRIVE $1609.53
1 FLOPPY, 256K, 30 MEG $2260.44

M PC™
1 FLOPPY, 64K ..... $ 949.40
2 FLOPPIES 64K $999.99
1 FLOPPY, 64K, 20 MEG $1398.44
Monitors & monitor adaptor card additional

WHY PAY RETAIL?

Nobody Sells For Less

COMPAQ

COMPAQ™ PORTABLE
2 DRIVE 256K $1543.69
1 DRIVE + 1 20 MEG $1999.99
PORTABLE II MODEL II $2573.93
PORTABLE II MODEL IV $3571.44

286s • PORTABLE II • DESK PROs ALL IN STOCK
CALL FOR LOWEST CUSTOM QUOTES

TM-Registered trademark of IBM and COMPAQ

HARDWARE, SOFTWARE & PERIPHERALS AT *DISCOUNT* PRICES

COMPUTERS

IBM PC/XT™ SPECIALS

M PC w/64K 1 drive	$949.40
M PC w/64K 2 drives	999.99
M PC w/64K 1 floppy 1 20 meg hard	1398.44
M PC Convertible	1479.37
M XT w/256K 1 drive	1609.53
M XT w/256K 2 drives	1707.31
M XT w/256K 1 floppy 10 meg	1999.43
M XT w/256K 1 floppy and 20 meg	2099.54
M XT w/256K 1 floppy and 30 meg	2260.44
M XT Model 286	IN STOCK

IBM AT™ SPECIALS

M AT w/256K 1.2 meg floppy	$2340.09
M AT w/256K 20 meg hard drive	2777.50
M AT w/512K 20 meg hard drive	2832.71
M AT w/512K 30 meg hard drive	2989.64
M AT w/512K 70 meg hard drive	3744.12

COMPAQ™ SPECIALS

OMPAQ portable w/256K 2 floppies	$1543.69
OMPAQ portable w/256K 1 floppy, 20 meg	1999.99
OMPAQ DeskPro w/128K 1 floppy	1532.96
OMPAQ DeskPro w/256K 2 floppies	1674.26
OMPAQ DeskPro w/640K 20 meg hard drive	1961.96
OMPAQ DeskPro w/640K 30 meg	2111.94
OMPAQ Portable II Model II	2573.93
OMPAQ Portable II Model IV	3571.44
OMPAQ "286" DeskPro w/30 meg	2995.30
OMPAQ "286" DeskPro w/30 meg 512K tape	3578.60
OMPAQ "286" Portable w/20M 640K	3860.30
OMPAQ "286" Portable w/20M 640K tape	4292.30
OMPAQ "386" Desk Pro New Model	SAVE

AT&T SPECIALS

T&T 6300 w/128K 1 drive & keyboard	$1368.50
T&T 6300 w/256K 2 drives & keyboard	1598.65
T&T 6300 w/256K 1 floppy, 20 meg hard drive & keyboard	1974.23

LEADING EDGE™ SPECIALS

Drive w/monitor model D	$1249.74
Drive 30 meg w/monitor 640K	1698.52

TOSHIBA SPECIAL

OSHIBA 3100	SAVE

SHARP SPECIAL

Drive Portable (IBM PC Compatible)	$1341.93

NEC SPECIALS

EC APC IV AT compatible 1.2 floppy 1M Memory	From $1950.00
EC APC IV 20, 40 or 70M Drive	SAVE

ZENITH SPECIALS

S-148 2 drives 256K w/DOS	$1053.41
S-158 1 drive 256K 5 slots w/DOS	1263.60
S-171 Laptop 2 drives 256K 15 lbs	1684.80
S-241 512K 1.2 meg floppy, AT Compat.	2457.00

Other Computers Available Upon Request

TERMINALS

KIMTRON

14" Green or Amber w/AT keyboard	$449.07
12" Green or Amber w/AT keyboard	399.60

QUME

119G 14" Green emulates WYSE and ADDS	$454.44
101G, 101A 14" emulates Televideo and Hazeltine	307.64

WYSE

WY-30 14" emulates ADDS and Televideo	$289.10
WY-50 14" Green emulates ADDS, Hazeltine and Televideo	429.44
WY-50+ Amber multi-unit emulation	479.20
WY-75 DEC VT-100 and Unix compatible	577.60
WY-85 DEC VT-100 & VT-220 compatible	449.20

TAPES AND DRIVES FOR IBM ATs

20 meg hard disk Seagate or Rodime	$467.50
30 meg hard disk Seagate or Rodime	559.80
70 meg hard disk	1259.00
360K floppy drive	110.12
GENOA 20 meg internal tape	588.82
GENOA 20 meg external tape	636.02

PRINTERS

CITIZEN MSP10	$269.20
CITIZEN MSP20	334.92
EPSON LX 80 80 Col 100 CPS NLQ STD	232.61
EPSON EX 1000	655.56
EPSON EX 800	466.76
EPSON FX 85	SAVE
EPSON FX 286	479.10
EPSON LQ 800	499.22
EPSON LQ 1000	698.76
EPSON LQ 2500	1018.44
EPSON RX 100	299.00
EPSON COMREX 420 132 Col. 420 CPS	999.11
IBM Pro Printer	429.40
IBM Pro Printer XL	542.67
NEC P6 80 col	449.22
NEC P7 136 col 216 cps	615.35
NEC P5 136 col 290 cps	999.67
NEC 3550 Spinwriter	797.12
NEC 8850 Spinwriter	1127.65
OKI okimate 20	117.72
OKI ML 182	221.40
OKI ML 192	299.84
OKI ML 193	499.21
OKI ML 292	424.44
OKI ML 293	568.08
TOSHIBA P321	463.25
TOSHIBA P341	SAVE
TOSHIBA P351 S/P	999.06

LASER PRINTERS

CORONA Laser Printer	$2198.50
H-P Laser Jet Printer	2289.60
H-P Laser Jet Plus	2994.20
H-P Laser Jet 500 Plus	3687.10
QUAD Laser	SAVE
AST Laser Printer	SAVE

FLOPPY & HARD DISK DRIVES

1/2 height drive	$98.00
IBM Logo Drive	99.73
TANDON full height floppy drive	109.87
SEAGATE 20 meg 1/2 height hard drive	395.00
SEAGATE 30 meg full height w/controller	670.00
GENOA 20 meg internal tape	588.82
GENOA 20 meg external tape	636.02
GENOA 60 meg tape drives	CALL
IOMEGA BERNOULLI 10+10	1798.40
IOMEGA BERNOULLI 20+20	2249.80
IRWIN 10 meg tape backup	399.00

DRIVE CARDS

MOUNTAIN 20 meg	$659.88
MOUNTAIN 30 meg	899.45
MAYNARD 20 meg	683.45
WESTERN DIGITAL 10 and 20 meg	CALL

Plus Other Drive Cards Available

MODEMS, COMMUNICATIONS & EMULATIONS

AST 5251-11 Plus	$639.04
AST 5251-12	508.60
EVEREX 1200B	108.50
HAYES 1200	392.08
HAYES 1200B	299.03
HAYES 2400	575.00
HAYES 2400B	502.16
IRMA 5250 (Smartalec)	564.84
IRMA 3278/79 Courier	749.60
US ROBOTICS Password 1200	228.85
US ROBOTICS Microlink 2400	424.15
US ROBOTICS Courier 1200	429.60
VEN-TEL 1200 Courier	314.80
VEN-TEL 1200B	314.80

MONOCHROME MONITORS

AMDEK 310A	$139.99
COMPAQ monochrome monitor (green or amber)	188.46
IBM monochrome monitor	219.84
PGS MAX 12E amber color	167.40
MAGNAVOX Green or Amber	89.95
TAXAN 121 Green	SAVE
TAXAN 122 Amber	SAVE

MONITOR INTERFACE CARDS

GENOA Spectrum (color monographic w/p)	$259.39
HERCULES color card w/p	144.16
HERCULES monographic w/p	179.84
PERSYST short port color card w/p	137.57
PERSYST short port mono card w/p	134.69
STB chauffeur w/p	237.60

COLOR GRAPHIC MONITORS

AMDEK color 600 (Hi-Res RGB)	$399.97
AMDEK color 722	499.78
IBM color monitor	528.77
MAGNAVOX 14" RGB 640 x 200	289.00
PGS HX-12 Hi-Resolution RGB	412.32
NEC Multisync	589.04
TAXAN 620-630-640's	IN STOCK

ENHANCED GRAPHICS PRODUCTS (EGA)

COMPAQ enhanced graphics monitor	SAVE
GENOA Spectra EGA 256K w/p	$287.60
IBM enhanced graphics monitor	679.41
PGS HX-12E Hi-Resolution RGB	484.32
QUADRAM EGA Card	347.73
ORCHID EGA	329.94
TAXAN 760 New EGA Model	499.00

INTERFACE CARDS & MULTI-FUNCTION CARDS

APPARAT 64/384K w/Clock	$99.89
AST 6 pack with 64K C/S/P expands to 384K	166.24
AST PREMIUM 6 pack 512K expands to 1 meg 2 ser. 1 para. game and clock	364.25
AST advantage for AT expands to 3 meg	345.00
AST I/O mini (clock/serial port)	125.28
INTEL above board for PC w/64K	279.60
INTEL above board for AT w/128K	360.24
JRAM-3 w/256K (Lotus 2.0 and Symphony compatible)	360.24
Parallel Port	69.80
QUADRAM Liberty w/64K	245.41
QUAD AT expands to 2 Meg	325.43
QUADRAM Quad Board expands to 384K w/P/S/C/G/OK	149.60
Serial Port	49.95
ZUCKERBOARD expands to 576K w/OK/c	89.95

SOFTWARE

BORLAND Sidekick (copy protected)	$29.40
dBASE III Plus	399.60
FRAMEWORK II	388.40
FUNK Sideways	35.39
LOTUS 1-2-3 New Release	299.00
LOTUS Symphony	429.30
MICROSOFT WORD 3.0	267.00
WORDPERFECT	206.20

CHIPS

4164 (64K 150 nanoseconds)	$2.00
Nine Chip Set (complete set)	9.98
128K piggy backs for AT	4.94
Nine Chip Set (complete set)	34.50
8087-2 (for COMPAQ DeskPro)	149.33
8087-3 (for PC/XT/COMPAQ portable)	121.50
80287-3 (for AT and AT Compatible)	168.30
41256K (256K chips)	4.00
Nine Chip Set (complete set)	28.12

MISC. & ACCESSORIES

A-B Switching Box (par. or serial)	$45.00
BASF D/S, D/D	12.50
BASF 3.5" Disk for MACINTOSH 10 pack	19.99
BASF Disks for AT (1.2 meg)	26.14
CH PRODUCTS game ports	37.42
KENSINGTON Masterpiece	99.99
KENSINGTON Masterpiece +	118.40
KEYTRONICS 5150	99.00
KEYTRONICS 5151 PC or AT&T	162.00
MICROSOFT Mouse (BUS Version)	119.34
QUADRAM Micro Fazers	140.40
Printer Cable for IBM	19.99
XT Power Supply	89.40

MOST ORDERS SHIPPED WITHIN 48 HOURS.

Call CDW for custom quotes on products not listed.

If you find a better price call us before you buy.

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE NOW!

SPECIAL LOTUS 123 $299.00

1-(800) 233-4426

Circle 91 on reader service card

In Illinois
(312) 498-1426

MasterCard VISA AMERICAN EXPRESS Card

HIGH VOLUME BIDS INVITED
P.O. BOX 3048
Northbrook, IL 60065

all orders under $200.00 please add $5.00 handling
All prices reflect 3% discount for cash. Allow 10 business days for shipping when paying by personal check
pricing subject to change

CDW 1186 PCW

38¢ Each is all you have to pay for the best 5.25" Double Sided, Double Density diskettes to be found!

SuperStar™ and DISK WORLD!™ do it again: super-premium diskettes at the lowest prices to be found anywhere ...without lies, fraud, hokum or crazy deals.

The "Life Is Simple" price list for first-line, top-quality diskettes:

5.25"SSDD (P/N38002).....38 ea.
5.25" DSDD(P/N38012).....38 ea.
5.25"SSDD - 96TPI(P/N38022).....68 ea.
5.25" DSDD - 96TPI(P/N38032).....71 ea.
5.25" DSDD -HD(P/N38042).....$ 1.36 ea.

3.50" SSDD(P/N38052).....$ 1.39 ea.
3.50" DSDD(P/N38062).....$ 1.45 ea.

All prices quoted are for multiples of 100 each. Add 10% for orders of 50 each. All 5.25" diskettes are supplied with Tyvec™ sleeves, user ID labels and write-protect tabs. 3.50" diskettes are supplied with user ID labels.

Don't buy junk.

DISK WORLD!™ has always been the price and quality leader in diskettes.

Our SuperStar™ diskettes are fully certified to at least 65% clipping levels, far in excess of the ANSI and IBM™ standard of 40%.

Furthermore, SuperStar™ diskettes have jackets of at least 8-mils, as opposed to the 6-mil jackets offered by other low-priced brands. (And, believe us, jacket thickness makes a big difference in whether or not you will get read/write errors on your machine.)

SuperStar™ 3.50" diskettes are all licensed by Sony™ Corporation, the inventor of the 3.50" diskette standard, and meet their exacting standards.

All SuperStar™ diskettes carry a FULL LIFETIME WARRANTY against manufacturing and material defects.

Finally, all SuperStar™ diskettes are manufactured in the United States...not in Hong Kong, Taiwan, Pago Pago or other strange and exotic places where the standards of quality might not be quite as high.

In short, SuperStar™ diskettes are equal or superior to such famous brand names as 3m™, TDK™, Fuji™, Maxell™ and just about any other brand you can name!

SuperStar™ diskettes simply cost half as much or less.

The truth about diskette prices, brand names and some other unpleasant facts of life.

There are exactly two kinds of diskettes: good and bad.

The brand name...or absence of a brand name...on a diskette doesn't mean a thing in terms of quality.

Neither does the price.

For example, let's take a hard look at 3M™ diskettes, a brand which we have carried for more than three years.

During that time, we sold more than $ 6,500,000 worth of these diskettes...and that's one hell of a lot of diskettes.

Until very recently, we were proud to market 3M™ brand diskettes. Now we don't advertise them and actively discourage people from buying them.

Why?

Well, here's a quote from the July 21, 1986 Business Week magazine (page 107): "The disks have been plagued by quality problems recently..."according to one industry expert.

And a radical change in 3M's pricing policies has resulted in exactly the same diskette being sold at prices ranging from 29 to 89 cents, depending on who you were.

Not exactly a fair deal for anyone...except 3M™ which, according to Business Week earned a mere $ 73,000,000 in profits on magnetic media in 1985...mostly at your expense and ours while "(t)he diskettes have been plagued by quality problems recently..."

Counterfeiting and The Hong Kong Connection.

If the life of a diskette purchaser weren't bad enough already, there are now two more problems to contend with.

Counterfeiting is the newest game in town for the "let's get rich quick" crowd.

At least two mail order companies are currently operating very comfortable businesses offering "famous brand name" diskettes at unbeatable prices.

The prices ought to be unbeatable, since these two companies simply take an inferior diskette and slip into a Tyvec™ sleeve which they have printed to be an exact duplicate of the "famous brand name", slap on a forged manufacturer's label to the diskette and make a very tidy profit...without regard to the harm they are causing the end user.

Finally, there is now a wave of cheap, poorly made diskettes pouring in from the Orient, mostly Hong Kong. We are not talking about reputable brands such as Sony™ or Fuji™: we are talking about diskettes which are being turned out in sweatshops on outmoded equipment with little or no regard for quality control.

They show up in this country under a variety of names at extremely attractive prices. Prices so attractive, in fact, that your savings on buying these diskettes may just about pay for the cost of replacing your drives after you use them for a while.

90,000 DISK WORLD!™ customers really tell the story.

DISK WORLD!™ serves more than 90,000 customers throughout the United States and now the world. More and more major corporations, universities and governmental bodies have switched over to our SuperStar™ brands because they recognize that SuperStar™...with DISK WORLD!'s integrity standing behind it...offer absolutely the best combination of HIGH-QUALITY and LOW PRICE.

In short, DISK WORLD!™ and SuperStar™ are unbeatable.

Over the past three years, we've sold more than 30,000,000 diskettes.

Our return rate has been less than 1/10,000th of 1%.

Those two facts speak for themselves.

When every bit counts, it's SuperStar™!

We don't have to boast of imaginary factories employing "floppy phreaks", advertise diskettes for 39¢...if you buy 10,000 of them, offer "2 for 1" replacement guaranties or engage in any of the other hokum schemes designed to part you from your money.

Nor do we have to offer you "famous brand name" diskettes at inflated prices that don't offer you any more in quality, but do manage to support fleets of corporate jet aircraft and executive retreats in Minnesota and Canada.

We simply deliver the best for less.

More than a million diskettes a month flow out of our warehouse under the SuperStar™ "non-name". As noted, fewer than 1/10,000th of 1% of these are returned for any reason.

And that should say it all: SuperStar™ means far more for far less.

HOW TO ORDER:

ORDERS ONLY:
1-800-621-6827

(In Illinois: 1-312-256-7140)

INQUIRIES:
1-312-256-7140

FOR FASTEST SERVICE, USE NO -COST MCI MAIL. Our address is DISKORDER. It's a FREE ,MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5.25" & 3.50" DISKETTES-Add $ 3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add $ 5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except as shown above. **TAXES:** Illinois residents add 7% sales tax.

DISK WORLD!, Inc.

629 Green Bay Road
Wilmette, Illinois 60091

Circle 780 on reader service card

COMPUTER DISCOUNT WAREHOUSE

OVER A MILLION DOLLAR INVENTORY

EPSON® **Printers in Stock for Immediate Shipment**

WHY PAY RETAIL?

Nobody Sells EPSON® For Less

from **$232****

ALL EPSON® MODELS READY TO SELL AT LOWEST EVER *DISCOUNT* PRICES

EPSON®, Quality computer products that deliver outstanding performance and value. . .

All new Epson printers

LQ-2500

- 324 cps print (Elite 12 CPI) in draft mode
- 405 cps (Elite 15 CPI) in ultra-high speed mode
- 108 cps (Elite 12 CPI) in Letter Quality mode
- 8K internal buffer

Options
- Single and Dual Bin Cut-Sheet Feeders
- 32K buffer

EX-1000

- 300 cps (Elite 12 CPI) in draft mode
- 54 cps (Elite 12 CPI) in Near Letter Quality mode
- Paper up to 16-inches wide

Options
- Color Option Kit
- Single and Double Bin Cut Sheet Feeders
- 32K buffer

EX-800

- 300 cps (Elite 12 CPI) in draft mode
- 54 cps (Elite 12 CPI) in Near Letter Quality mode
- 8K internal buffer

Options
- Color enhancement
- 32K buffer

One year warranty on all printers

LQ-1000

- 180 cps in draft mode
- 60 cps in Letter Quality mode
- 7K internal buffer

Options
- Tractor Feed
- Cut Sheet Feeder

FX-85

- 160 cps in draft mode
- 32 cps in Near Letter Quality mode
- 8K buffer

Options
- 32K buffer
- Cut Sheet Feeder
- Tractor Feeder

LX-86

- 120 cps (Pica 10 CPI) in draft mode
- 16 cps in Near Letter Quality mode

Options
- Cut Sheet Feeder
- Tractor Feed
- Interface boards for additional buffer

LQ-800

- 180 cps in draft mode
- 60 cps in Letter Quality mode
- 1K buffer for downloadable characters

Options
- Tractor Feed
- Cut Sheet Feeder

FX-286

- 200 cps in the high speed draft mode
- 40 cps in Near Letter Quality mode
- 8K internal buffer

Options
- 32K buffer
- Customize for special tasks

RX-100

- 100 cpx
- 132 columns
- Epson Graphics
- Tractor Feed

Options
- 32K buffer
- Serial Interface

****LX-80**

- 100 cps
- Near Letter Quality mode
- Friction Feed
- Front Panel Font Selector
- 80 column

Options
- Tractor Feed
- Cut Sheet Feeded

. . .at prices only Computer Discount Warehouse can offer!

MOST ORDERS SHIPPED WITHIN 48 HOURS. | **Call CDW for custom quotes on EPSON's* entire line of products.** | **If you find a better price call us before you buy.**

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE NOW!

CDW stocks a full line of products to support every computer need.

1-(800) 233-4426

In Illinois
(312) 498-1426

MasterCard VISA AMERICAN EXPRESS Card

AUTHORIZED EPSON* DEALER

Circle 847 on reader service card

★FREE★
Media-Mate Diskette Holder
($15.00 value) with purchase of
Each 100 Diskettes from this ad
(Brand Names Included)

Presenting our own Brand

the Best Diskette

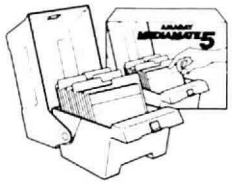
Produced by a major manufacturer
Millions have been sold— 100% Guaranteed
(You may be using them now without knowing)
... So Why Pay More?

Best 5¼" Diskettes

DS/DD ..... **.43 EA.**
DS/HD for AT ..... **1.39 EA.**
Order in multiples of 100 only!
All Best 5¼" Diskettes are poly bagged in 20's with tyvec sleeves, write-protect tabs and user ID labels.

Best 3½" Diskettes

SS/DD ..... **1.19 EA.**
DS/DD ..... **1.59 EA.**
Order in multiples of 100 only!
All Best 3½" Diskettes include user ID labels.



Holds 50 5¼"

A $15.00 Value
★ FREE ★
with Each 100 Diskettes
or purchase separately
for **$8.88**
U.S. made– Highest quality
Why pay more and settle for less?

Holds 30 3½"

Best COMPUTER SUPPLIES

2148-A Bering Dr.
San Jose, CA 95131
(408) 435-3866

TO ORDER, CALL TOLL FREE
1-800-351-BEST (2378)
1-800-451-BEST (in California)

Visa, Mastercard, C.O.D. or Prepaid. Corporations rated 3A2 or better, government agencies and schools may send in purchase orders on a net 30 basis. Minimum order $25.00. Shipping charges are $3.00 per 100 diskettes (Minimum shipping order $3.00) (within the continental U.S.). APO, FPO, AK, HI, PR and Canada Orders add 10% to cover PAL and Insurance. All other countries add 20%. C.O.D. Orders Add $4.00. No Sales Tax outside California.

Satisfaction guaranteed on all products.

maxell

Boxed in tens

5¼" SS/DD.... **.89 Ea.**
5¼" DS/DD ... **1.09 Ea.**
5¼" DS/HD... **2.19 Ea.**
3½" SS/DD... **1.39 Ea.**
3½" DS/DD.... **2.09 Ea.**
(Minimum order 20)
Free Media-Mate with each 100

Verbatim

Boxed in tens

5¼" SS/DD .... **.89 Ea.**
5¼" DS/DD... **1.09 Ea.**
5¼" DS/HD... **2.19 Ea.**
3½" SS/DD... **1.39 Ea.**
3½" DS/DD... **2.09 Ea.**
(Minium order 20)
Free Media-Mate with each 100

Nashua

Boxed in tens

5¼" SS/DD.... **.69 Ea.**
5¼" DS/DD.... **.75 Ea.**
5¼" DS/HD... **1.79 Ea.**
3½" SS/DD... **1.29 Ea.**
3½" DS/DD... **1.89 Ea.**
(Minimum order 20)
Free Media-Mate with each 100

BONUS

Boxed in tens

5¼" SS/DD– **.59 Ea.**
5¼" DS/DD– **.65 Ea.**
(Minimum order 20)
Free Media-Mate with each 100

Circle 340 on reader service card

NEC AND CDW BRING YOU

OVER A MILLION DOLLAR INVENTORY

NEC Products in Stock for Immediate Shipment

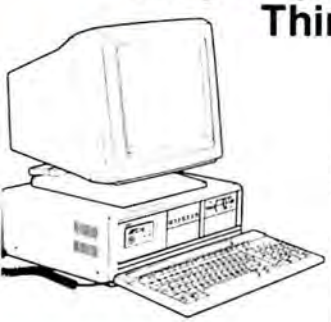
WHY PAY RETAIL?

Nobody Sells NEC For Less

NEC Multisync PC Magazine Editor's Choice of High Resolution Monitors

ALL NEC COMPUTER PRODUCTS AT LOWEST EVER DISCOUNT PRICES

Why Buy a No-Name Clone, When NEC is the World's Third Largest Maker of Personal Computers.

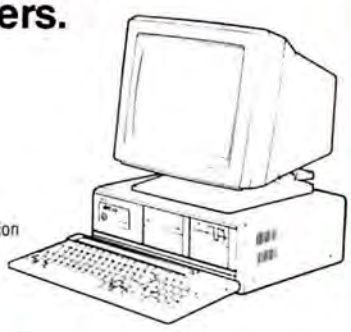


The NEC Advanced Personal Computer IV.™
6/8 MHz No Wait State Compatible

Standard Configuration
- 640K on the Mother Board
- 1 parallel, 2 serial ports
- 1.2 Meg Floppy Drive
- Floppy/Hard Drive Controller
- AT Style Keyboard
- 8 full size expansion slots
- MS-DOS 3.1, G-W Basic

from
$1950.00
Compare it to IBM AT Over $4500.00 List

Options/Expansions
- 20, 40 or 70 M Byte Hard Drives
- Expands to 10.5 Meg Memory
- Advanced Graphics 800 x 560 Resolution
- Power Graphics 1120 x 750 Resolution
- 80287-3 Math Coprocessor
- Second floppy



SPINWRITER 8850

- Up to 128 Character Daisy-Wheel Printer
- 55 cps—12 Pitch Text
- Bidirectional Printing
- Bidirectional Paper Feed
- 13.6 Inch Line Width
- Parallel and Serial Interface

Options
- Single and Dual Bin Sheet Feeders
- Forms Tractors
- Envelope Adapter

SPINWRITER 3550

- Up to 128 Character Daisy-Wheel Printer
- 30 cps—12 Pitch Text
- Bidirectional Printing
- Bidirectional Paper Feed
- 13.6 Inch Line Width
- Parallel and Serial Interface

Options:
- Single and Dual Bin Sheet Feeders
- Forms Tractors
- Envelope Adapter

PINWRITER P5

- 24 Pin Dot Matrix Printer
- 290 cps Draft
- 100 cps Letter Quality
- Epson and Diablo Compatible
- 8K Buffer
- 16 Resident Fonts

Options:
- Font and Memory Cartridges
- Bidirectional Tractor Feed
- Single and Dual Bin Sheet Feeders

NEC MULTISYNC

The Intelligent Monitor
CGA, EGA, Professional Graphics and Hercules Compatible. 800 by 560 resolution. Autoscan frequencies between 15.5 and 35 kHz. TTL and Analog Inputs. Text switch with choice of 7 colors.

SPINWRITER e.l.f.

- Up to 128 Character Daisy-Wheel Printer
- 19 cps—12 Pitch Text
- Bidirectional Printing
- Bidirectional Paper Feed
- 11 Inch Line Width
- 3K Buffer

Options:
- Unidirectional Tractor Feed

PINWRITER P6

- 24 Pin Dot Matrix Printer
- 216 cps Draft
- 65 cps Letter Quality
- 10 Inch Paper Width
- 10K Buffer (Serial)
- 20 Resident Fonts

Options:
- Font and Memory Cartridges
- Bidirectional Tractor Feed
- Single and Dual Bin Sheet Feeders

PINWRITER P7

- 24 Pin Dot Matrix Printer
- 216 cps Draft
- 65 cps Letter Quality
- 16 Inch paper Width
- 10K Buffer (Serial)
- 20 Resident Fonts

Options:
- Font and Memory Cartridges
- Bidirectional Tractor Feed
- Single and Dual Bin Sheet Feeders

PINWRITER P560XL

- 24 Pin Dot Matrix Printer
- 290 cps Draft
- 100 cps Letter Quality
- Epson Parallel Interface
- 8K Buffer
- 16 Inch Paper Width
- 16 Resident Fonts

Options:
- 24K or 40K Buffer
- Font and Memory Cartridges
- Bidirectional Tractor Feed
- Single and Dual Bin Sheet Feeders

. . .at prices only CDW can offer!

MOST ORDERS SHIPPED WITHIN 48 HOURS.

Call CDW for custom quotes on NEC Products not listed.

If you find a better price call us before you buy.

WHY WAIT? CALL CDW NOW!

Circle 848 on reader service card

CDW stocks a full line of products to support every computer need.

1-(800) 233-4426

In Illinois
(312) 498-1426

MasterCard VISA AMERICAN EXPRESS Card

NEC AUTHORIZED DEALER

MORE OF THE BEST FROM MICRO MART

AMERICA'S PC SPECIALIST!

Proline 286

- 80286 processor
- 10 MHZ
- 256K standard (up to 1MB)
- video graphics card
- AT-style keyboard
- BIOS guaranteed
- 8 total expansion slots
- FCC licensed & UL approved

Color Graphics System $1,449.00
Mono Graphics System $1,495.00

Proline AT

- 80286 processor
- 8 MHZ
- 360K floppy drive
- 512K standard (up to 1MB)
- video graphics card
- 12 total expansion slots
- BIOS guaranteed
- FCC licensed & UL approved

Color Graphics System $1,925.00
Mono Graphics System $1,975.00

Proline XT

- 8088-2 processor
- 4.77 MHZ - 8 MHZ
- 256K standard (up to 640K)
- AT-style keyboard
- video graphics card
- 8 total expansion slots
- BIOS guaranteed
- FCC licensed & UL approved

Color Graphics System $549.00
Mono Graphics System $599.00

Monitor not included with PROLINE desk top systems, but we'll be glad to configure any system to your specific needs!!

MULTIFUNCTION BOARDS

We have a complete line of Multifunction Boards compatible with the PC, XT & AT and all compatibles.

AST SIX PAK, loaded w/384K $209
AST I/O MINI, short bd, serial, parallel, clock ..... CALL
QUADRAM Gold Quadboard, 384K, optional 2nd serial & parallel ports $439
TALLTREE J-RAM II and III ..... From $125
INTEL ABOVE BOARD, PC & AT, NEW! ..... From $235
THESYS FASTCARD up to 1 MB, Password Security for PC ..... From $219

GRAPHICS CARDS

AST Preview, Hercules mono compatible ..... CALL
HERCULES Mono & Color Graphics Card ..... New Low Price!
TECMAR Graphics Master, HiRes Color & Mono supports Lotus ..... CALL
QUADRAM Quadcolor I & II color cards $359
QUADRAM EGA, Includes 256K display buffer $359
STB EGA + with 256K display buffer $319
STB Mono & Graphics Cards available $99
Generic monographic cards ..... New Low Price!
SIGMA Color 400 for PGS SR-12 ..... $195
PARADISE Multidisplay, mono & color, parallel $309
VIDEO 7 Vega EGA, best enhanced color graphics buy ..... From $99

FLOPPY DISK DRIVES

1/2 HEIGHT Disk Drives from Toshiba, Mitsubishi, & Teac; 360K & 1.2 Meg drives, PC, XT, & AT & compatibles ..... From $99

HARD DISCS

IRWIN 10MB internal tape back-up $429
IRWIN 20MB internal tape back-up $529
SYSGEN Complete line ..... Call for our special Sysgen pricing!
BERNOULLI TECHNOLOGY Hd disc Subsystems (20 & 40 MB) ..... From $2095
SEAGATE 20 & 30 Meg. for PC/XT & PC/AT ..... CALL
PRIAM 40MB voice coil superfast hard drive $1249
PRIAM 60MB voice coil superfast hard drive $1595
TALLGRASS 25 through 80 MB Hard drive subsystems, including 60MB tape back-up ..... CALL
WESTERN DIGITAL 10MB File card $539
WESTERN DIGITAL 20MB File card $629

SOFTWARE

ACCOUNTING

SORCIM/IUS Complete line including windows ..... From $295 each

SPREADSHEETS & INTEGRATED PACKAGES

SORCIM/IUS SuperCALC 3, Vers. 2.1 ..... $209
SORCIM/IUS SuperCALC 4 ..... NEW

ENHANCEMENTS & UTILITIES

NORTON Utilities 3.1 ..... $50
ROSESOFT ProKey 3.0 ..... $79
COPY II PC $22
SOFTSTYLE Set FX + and Printworks, printer control $35
SIDEWAYS Inverts printout $32
BORLAND SideKick $42
BORLAND Superkey $59
BORLAND Lightning $96
FIFTH GENERATION Fastback $96

COMPILERS & LANGUAGE TOOLS

LATTICE C-Compiler $249
MICROSOFT Complete line ..... CALL
MICROSOFT Quick-Basic $65
BORLAND Turbo Pascal, Toolbox & more ..... From $35/each

GRAPHICS

Z-SOFT PC Paintbrush, mouse graphics $69
DECISION RESOURCES Diagram Master ..... CALL
DECISION RESOURCES Sign Master $149
DECISION RESOURCES Chart Master $219
DECISION RESOURCES Map Master $239
MICROSOFT Chart $189
MICROSOFT Windows $65

COMMUNICATIONS

MICROSTUF Crosstalk XVI, Latest version $95
HAYES Smartcom II $85
MICROSOFT Access with windows $159

WORD PROCESSING

MULTIMATE Advantage $279
MICROSOFT Word, version 3.0 ..... $295
VOLKSWRITER, ver 3.0 ..... $159
SSI WordPerfect, version 4.1 ..... $229
MICROPRO Wordstar Professional $229
MICROPRO Wordstar 2000 ..... $229
MICROPRO Wordstar 2000 Plus $279

OFFICE & PLANNING

HARVARD Total Project Manager ..... CALL
SORCIM/IUS Super Project $212
MICROSOFT Project, vers. 2.0 ..... CALL

DATA BASE MANAGERS

Call For Unadvertised Data Base Managers
MICRORIM Report Writer & Clout ..... CALL
MICRORIM R-BASE 5000 ..... $379
MICRORIM R-BASE System 5 ..... CALL
MICROSTUF Infoscope $99
D BASE III PLUS ..... CALL!
BORLAND Reflex $75

PROTOCOL CONVERSION

SNA & BISYNC 3780, 5251, Mod 11 & 12, 3274, 3278 ..... In Stock!
IRMA Complete line ..... From $825

NETWORKING

QUADNET IX complete line ..... AVAILABLE

PRINTERS

DOT MATRIX

Complete line of EPSON printers ..... Special!
EPSON FX-85 ..... $389
OKIDATA 192, 193, Pacemark 2410 ..... CALL
OKIDATA 292 ..... $449
OKIDATA 293 ..... $579
OKIDATA 294 ..... $1019
TOSHIBA P-341 ..... $789
TOSHIBA P-351 ..... $1019
NEC P-5, P-6, & P-7 ..... New Low Prices

LETTER QUALITY

NEC Spinwriters 2050 ..... $619
NEC Spinwriters 3550 ..... $729
NEC Spinwriters 8850 ..... $1049
EPSON DX-35 ..... $639
LQ Laser printers available ..... CALL
We carry a full range of form handling options.

CHIPS

All our chips are tested and priced for quick sale. Call us!

INTEL 8087-2, 8087-3, 80287 ..... From $112
64K RAM CHIPS ..... Call for Market Price.
128K RAM CHIPS ..... Call for Market Price.
256K RAM CHIPS ..... Call for Market Price.

MODEMS

HAYES Smartmodem 300, 1200, 1200B & 2400. We have the best stock in the USA ..... CALL!
PEACHTREE TECHNOLOGIES P-1200 (Hayes compatible external) $239
ANCHOR Signalman Express (300-1200 baud external) $249

MONITORS

PGS Max 12(E), HX12, HX12(E), & SR-12 ..... Low Price
AMDEK Color 600, 640 x 200, IBM standard res. $389
AMDEK Color 722 ..... $499
AMDEK 310A amber monochrome ..... CALL
MAGNAVOX amber monochrome $99
SONY 9" portable color $399
SONY 12" & 13" (RGB/TV) ..... In stock

MISCELLANEOUS

MOUSE SYSTEMS Mouse, optical mouse $125
MICROSOFT Mouse, bus or serial $135
KEYTRONICS 5151 Keybds for IBM & AT&T $169
QUADRAM Microfazer print buffer, 8-128K ..... From $125
GRAVIS Joystick $35

We have a full line of accessories, ribbons, diskettes, dust covers, flip 'n' files, printer stands, switch boxes, and surge protectors in stock!!!

Due to continuing market fluctuations, pricing may drop daily. Call for most current prices!!

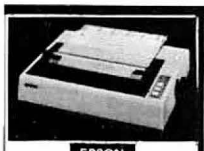
(404) 449-8089 Orders Only 1-800-241-8149

MICRO MART

America's PC Specialist

© Copyright 1986, Micro Mart, Inc. Technology Corporate Campus 3159 Campus Drive, Norcross, GA 30071
Prices and availability are subject to change without notice and are similar, but may vary at Micro Mart Retail Stores.

Circle 112 on reader service card



EPSON

Epson FX-85 – 160cps, NLQ . . $Call
FX-286 –Emulates IBM ProPrinter $Call
LX-80 – 80 col., NLQ mode . . $Call
LQ-800 – 80 col., 24-pin head . $Call
LQ-1000 – 132 col., 24-pin head $Call
EX-800 – 80 col., 300cps . . . . $Call
EX-1000, 132 col., 300 cps . . . $Call
LQ-2500 –24-pin, 324cps . . . . $Call

OKIDATA

182P, 120 cps, 80 Col., Parallel . $239
192+ 160 cps, 80 col, Parallel . . $389
193+ 160 cps, 136 col, Parallel. . $595
293E, 240cps, 136 col . . . . . $Call
294, 400cps, 136 col . . . . . $Call
2410P, 350 cps, 136 col. Parallel $1895

IBM

IBM ProPrinter – 200cps, 80 col. $385
Proprinter XL – above but 132 cc $599
IBM Color Jet – 80 column . . . $645
IBM QuietWriter II- 60cps, 132 $1,295
IBM Wheel Printer – 25cps, 132 $1,295

DIABLO

Diablo 630 API, 40 cps daisywheel printer . . . . . *Sale Price* $1,250

TOSHIBA

P321 – 180cps, 24-pin head. . . $475
P341 – 220cps, 24-pin head. . . $799
P351 – 288cps, 24-pin head. . . $999

RICOH

RP1500Q – 40cps daisywheel printer $1,495 value. *Special purchase* $695

CITIZEN

MSP-10 – 80 column. . . . . .$Call
MSP-15 – 132 column . . . . . $Call
MSP-20 – 80 column. . . . . .$Call
MSP-25 – 132 column . . . . . $Call
Premium 35 . . . . . $Call

STAR GEMINI

SB-10, 24-pin, 80 column $450

NEC

3550 - 33 CPS, 203 col., proportional space, bi-directional, parallel. $795
2050 Similar to 3550 but 19 cps $595
P6 – 216cps, 24-pin,80 column. $499
P7 – above but 132 column. . . .$699

GENICOM

High speed, heavy duty, 18-pin dot matrix printers for business use.
3404 – 400cps, serial interface . . Call

HEWLETT PACKARD

H-P ThinkJet Ink Jet Printer
150cps, 80 col., 11x12-dot text. $399

H-P LASERJET PRINTER
300cps, quiet operation, serial. $2,325
H-P Laserjet Plus, Model 300 . $3,135
H-P Laserjet 500 w/tray $3,995

BROTHER

M-1109 – 100cps, 25cps NLQ, 80 col. 2K buffer, dual interface. . . $199
M-1509 – 180 cps, (45cps NLQ), 132 col., friction feed and the new push type pin-tractor so first form won't be wasted. IBM and Epson FX-100+ compatible. Very quiet operation. Dual interface $385
Sheet Feeder SF-40 for M-1509. . Call

HR-15XL – 17cps daisywheel printer, 3K buffer, two color printing, can be used as a typewriter w/optional keyboard. Parallel . . *Sale* $315
Keyboard for HR-15 . . . . . $149
Tractor for HR-15 . . . . . $119
Cutsheet feeder for HR-15. . . $189

2024L – 160cps, 24-pin head letter quality dot matrix printer, 136 col. w/tractor, parallel $845
TwinWriter – Two heads are better than one! 160cps dot matrix and 36 cps daisywheel combined into one printer. Parallel interface . .$985
HR-25 – 23cps daisywheel, para .$480
HR-35 – 36cps daisywheel, para .$725
DM-40 – 160cps, 24-pin dot matrix, 136 col., with tractor, para . . . $899

FORTIS – *by Brother*

Fortis 15XL – 17cps daisywheel printer w/3K buffer, Parallel . .$SALE!
Fortis DM-20 – 160 cps dot matrix, 136 col., NLQ mode, both parallel and serial interfaces. $525
Fortis DX-25 – 25cps daisywheel, 132 column, 7K buffer, quiet operation, built-in parallel & serial. $480
Fortis DM45 – Dual head printer, 160 cps dot matrix, 36 cps daisywheel, Epson, Diablo compatible . . .$985
Tractor for 15XL/HR-25. . . . . $119
Keyboard for 15XL. $149
Cutsheet Feeder for HR-15/25 . $189
SF-200 Feeder for DM-40/2024L $275

PANASONIC

KX-P1091, 120 cps, 80 columns, with near letter quality mode . . . $Call
KX-P1092 . . . . . $Call
KX-P1093 . . . . . $Call
KX-P3151 . . . . . $Call

HARD DISK SALE!

New Low Prices!

- Half height internal hard disks for IBM-PC, XT and Compatibles.
- Boots directly from had disk
- Low power consumption
- Complete with cables and mounting hardware

20-MB	30-MB
$379	$539

HARD DISKS FOR IBM-AT
High performance full height hard disks. Complete with cable and mounting rails.
20-MB Disctron. $395
20-MB Seagate $539
30-MB Seagate $629
40-MB Seagate $795

EVEREX

20-MB TEAC TAPE BACKUP
EVEREX 20-MB Internal Tape Back-Up for PC and XT, 4 MB/minute transfer rate. Complete w/control card, cable and manual $575
EVEREX 60-MB Internal Tape Back-Up for AT. Complete with controller, cable and manual. . .$885
EVEREX 60-MB External Tape Back-Up for At. $995

IRWIN 10-MB TAPE BACKUP
Internal half height unit. Direct connects to floppy controller card without taking up a slot. Complete w/$30 tape, software and instruction $349
20-MB Internal Tape back-Up . .$449

HARD DISK CARDS
PLUS System, 10-MB, slim design $595
MOUNTAIN, 20-MB $750
Tandon 21-MB on a card $475

MEGA

BERNOULLI BOX
10+10-MB . $1,950
20+20-MB . $2,450
Non-bootable interface card . . . $175
Bootable interface card. $235

Teac 55-B, 360K drive for PC, XT $99
Panasonic Drive, 360K for PC, XT $99
Toshiba 360K drive for PC, XT . .$99

$105 ea.
360K DRIVE FOR IBM-AT

AST

Cards for IBM PC and XT w/Free SIDEKICK & DESQ VIEW SOFTWARE

SixPakPlus Cards

Memory installed on card ———	64K	256K	384K
with parallel, serial ports & clock	$165	$185	$195
above plus game port ———	$200	$220	$230

Advantage Card for IBM-AT *128K* - $345 *256K* - $385 *384K* $425
512K - $465 *1-MB* - $515 *1.5-MB* - $545
PIGGYBACK *512K* - $199 *1-MB* - $255 *1.5-MB* - $295
ADVANTAGE PREMIUM *512K* — $535 *1-MB* —— $585
512K piggyback — $299 *1-MB Piggyback* — $355
RAMpage Card for IBM-PC/XT ——— *256K* - $259 *2-MB* - $525
RAMpage Card for IBM-AT ——— *512K* - $445 *2-MB* - $615

6-PAK PREMIUM CARDS with Parallel & Serial Ports
512K ——— $369 1-MB ——— $455
Daughter Board 512K —— $195 1-MB —— $395

MULTI-FUNCTION MEMORY CARD

Fully compatible with IBM-PC and XT. Comes with Ram disk and print spooler software.
Memory installed on card ——— *0K* *256K* *384K*
w/parallel,serial,game ports,clock-- $85 $125 $145

intel Above Boards

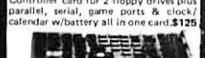
FOR IBM-PC/XT ** $325 $399 $699
128K *512K* *2-MB*
$495 $595 $895

INTERFACE CARDS

Hercules Graphic Card $289
Hercules Color Card – short card .$145
Paradise Multi-Display Card . . . $275
Paradise Modular Display Card . . $245
Paradise Color/Mono Card. $195
AST Preview graphics w/para . . . $249
AST 3-G Card with Parallel port .$385

Sigma 400H Color for PGS SR-12 $455
Sigma 400L Color for Taxan 440/630/640 monitors $455
Taxan 595 Hi res. color card. . . . $225
Persist BOB Board – Ultra hi res. color card. Ideal for Taxan 630/640 $389
Everex The Edge $275
Everex Graphic Edge $295
PC Peacock Color Card. $279
Ultra Pak by Tzeng Lab $485
Tecmar Graphic Master. $465
Tall Tree J-Diskette Controller to hook up 1.2-MB drives in PC/XT . .$229
RS-232 Serial Card $49

MINI I/O & FLOPPY CONTROLLER
Controller card for 2 floppy drives plus parallel, serial, game ports & clock/calendar w/battery all in one card.$125



COLOR GRAPHICS CARD
Compatible with IBM Color Graphics card, w/parallel port . . $85

MONO GRAPHICS CARD
Hercules compatible, with parallel port $89

250-WATT BACK-UP POWER SUPPLY
Instant battery back-up system guards against black-out, brown-out and voltage surges. Back-up time 5 to 20 minutes with audio & visual warnings. Compact design.
Special $199.00

ENTERPRISE

ENTERPRISE XT-Plus (4.77-8 MHZ)

- Fully IBM PC/XT Compatible
- Full one-year Warranty
- 640K on mother board
- 150-watt power supply
- 8 Expansion Slots
- AT style Keyboard w/LED
- Parallel Port
- Serial Port
- Game Port
- Clock/Calendar w/battery
- Floppy Disk Controller
- Compatible w/EGA Color Card & Net working systems
- Made in U.S.A.

$559	$759	$1159	$1849
640K memory No Drive	2-360K drives	2-360K and 20-MB Drives	2-360K, 20-MB and Tape B/U

ENTERPRISE AT (6-8 MHZ)

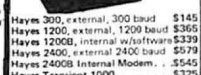
- 640K – expandable to 1-MB
- Fully IBM AT compatible
- 80286 6/8 MHz microprocessor
- CAD, LAN, EGA ready
- W.D. Hard Disk / Floppy Drive Controller
- 1.2-MB Floppy Drive
- Phoenix BIOS
- Full 1-year warranty
- Made in U.S.A.

$1119	$1225	$1875	$2675
640K memory 1.2-MB Drive	1.2-MB and 360K drives	360K, 1.2-MB, 20-MB drives	1.2-MB, 20-MB and Tape B/U

Modem Sale!

Hayes 300, external, 300 baud . . $145
Hayes 1200, external, 1200 baud $365
Hayes 1200B, internal w/software $339
Hayes 2400, external 2400 baud $579
Hayes 2400B Internal Modem . . $545
Hayes Transient 1000 . . . . . $325
AST Reach, 1200 baud internal $310
Watson Voice/Data Modem . . . $375
Watson VIP $275
Prometheus 1200 external $295
Prometheus 1200B internal . . . $250

300/1200 BAUD MODEM
Half size modem easily fit into desk top or portable PC. Hayes compatible.
5-yr. warranty. $125



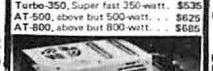
PLOTTER SALE
ROLAND
DXY-800– 8-pen, hi-speed 180mm/sec. IBM compatible, 11x17" paper . $Call
DXY-880 – Similar to 800, 8-pen, Hewlett Packard compatible. . . .$Call
DXY-980 – above but w/digital display & electro-static paper holder. . Call

HEWLETT PACKARD
7470A – 2-pen, 8½x11 paper size $899
7475A – 6-pen, 11x17 paper siz $1,395

TAXAN
710S – 6-pen color plotter, Hewlett packard compatible. *Sale* $795

DATASHIELD
Model 100, 6-plug surge & noise protector w/audio & Visual warning. $65
PC-200, 200-watt backup power supply with built-in surge protector . $379
XT-300, above but 300-watt. . . $365
Turbo-350, Super fast 350-watt . $535
AT-500, above but 500-watt. . . $625
AT-800, above but 800-watt. . . $685

Canon PC
PC-10 Copier – Manual feed, compact size . . . . . ($795) $509
PC-20 Copier – 100-sheet feeder, 1-1 copies . . . . . ($1,095) $699
PC-25 Copier – Make copies up to legal size from original as big as 10x 14. Enlarge 120%, reduce 67% or 78%. . . . . ($1,395) $925
Black toner/drum cartridge $75
Blue, brown, red cartridge $80
Legal cassette for PC-25 . . . . . $49



POWER SUPPLY
High efficiency switching power supply. Built-in EMI filter, over voltage & short current protection. 115/230VAC jumper selectable. 100% thermal cycle and burnt-in. Has additional outlet for hard disk or tape backup unit.
150-WATT ---**$69**

EGA COMBO
$699 *complete!*

IBM PC XT AT

SALE PRICES

All systems include keyboards and disk controllers. Monitors are available at big savings too.

PC
256K, One 360K drive, keyboard $1,050
256K, Two 360K drives, keyboard $1,150
256K, Two 360K drives, 20-MB hard disk. $1,595
256K, Two 360K drives, 30-MB hard disk. $1,695

XT
256K, One 360K drive, keyboard $1,625
256K, Two 360K drives, keyboard $1,769
256K, Two 360K drives,20-MB hard disk $2,149
256K, Two 360K drives, 30-MB hard disk $2,295

AT
256K, One 1.2-MB drive, keyboard .(68). . $2,595
512K, 1.2-MB drive, 20-MB hard disk $2,695
512K, 1.2-MB drive, 30-MB hard disk (339) $4,195

COMPAQ

Compaq Portable,256K, 2 drives $1,575
Compaq Portable II. . . . . Call
Portable 286, 256K,1 drive . . $2,975
Portable 286, 640K, 1.2-MB drive, 22-MB harddsk $3,995
Portable 286, 640K, 1.2-MB drive, 22-MB harddsk, 10-MB tape . $4,325
DeskPro w/256K, 2 drives . . . $1,735
DeskPro w/640K, 1 drive, a 20-MB hard disk, a 10-MB tape backup $2,495
DeskPro 286, 256K, 1.2-MB dr. $2,895
DeskPro 286, 512K, 1.2-MB drive, 30-MB harddisk $3,595
DeskPro 286, 512K, 1.2-MB drive, 30-MB harddisk, 10-MB tape . $4,095
Compaq amber monitor $239
Compaq DOS (needed for DeskPro) $60

AT&T 6300 COMPUTER

640K memory, 1 floppy drive, serial & parallel ports, clock, Monochrome and RGB color ports, keyboard . . .$1550
Above with two 360K drives..... $1650
640K memory, 1 floppy drive, 20-MB hard disk, serial, parallel ports, clock, mono & RGB ports, keyboard. $1995
AT&T Green Monitor $259
D.O.S. $65

TOSHIBA LAP-TOP
T1100 – 512K memory, 1-720K 3½" drive, 80 charater x 25 line green LCD screen w/640x200 dot resolution. Only 9 lb. . . . . $Call
T1100-PLUS – 640K, 2-720K drives, green LCD screen . . . . . $Call
T3100 – 640K, 1-720K drive, 10-MB hard disk, high resolution amber gas plasma screen .115 V. $Call

MONITOR SALE

Sale **$85**

SAMSUNG MONITORS
Monochrome TTL monitor, 12" high resolution, 720x350 dots, non-glare screen. Available in green or amber.

****** RGB COLOR ******
IBM RGB Color Monitor. $545
IBM Enhanced RGB Monitor . . .$689
NEC Multi-sync RGB monitor –13", 800x560 line, compatible w/IBM EGA, PGA and color graphic cards. *Sale* $599
SONY KV-1311CR – RGB Color Monitor, 680-line resolution, also a Trinitron Color TV with remote control . . *A Fantastic Buy* $495
PGS HX12, 12" RGB color . . .$425
PGS SR-12 – Super RGB Color .$595
Quimax PX-4V – 13" RGB, 720x240 line. Has green switch, tilt & swivel base $445
Taxan 620 RGB Color Monitor . .$369
Taxan 630 RGB Hi Res. monitor $429
Taxan 640 RGB Hi Res. monitor .$479

***** GREEN SCREEN *****
IBM Monochrome, 12", 720-dot $255
Quimax DM-14G – 13" green TTL, 750x350 resolution, tilt & swivel base included. 1 yr. warranty $155
Taxan 115, 12" green composite .$125
Taxan 121, 12" green, 1000x360 dots, TTL monochrome $155

***** AMBER SCREEN *****
Amdek 300A, 12" amber $149
Amdek 310A, 12" amber $169
Quimax DM-14A – 13" amber TTL, 750x350 resolution. Tilt & swivel base included. 1 yr warranty. $159
Princeton MAX-12, 12" amber. $169
Taxan 116, 12" amber composite $129
Taxan 122, 12" amber, 1000x360 dots, TTL monochrome $159

***** BLACK & WHITE *****
Roland MB-142, 14" reversible black & white TTL monochrome monitor w/ super hi res. 720x350 dots. . $269

SOFTWARE

Lotus 1-2-3 Ver. 2. . . .$280
Lotus 1-2-3 Ver. 2.01 5¼" Disk.$319
Lotus 1-2-3 Ver. 2.01 3½" Disk.$319
SYMPHONY $419
WORDSTAR PROPAK$279
WORDSTAR 2000+ . .$299
dBASE III-Plus $445
XTREE $45
MULTIMATE $239
WORD PERFECT $199
SIDE KICK $49
MS DOS 3.2 w/GW Basic. $85

The POWER DIRECTORS
P-22 – A unique control center & surge protector w/4 lighted and a master switches for computer, printer and accessories. It also filters out EMI & RFI interferences $79
P-2 – like P-22 but w/5 switches .$109
P-12 – Has 6 switches & clock. . .$149

DYNAMIC RAM CHIPS
64K (4164) 150 ns $1.50 ea. 9 for $10
128K for IBM-AT, 200 ns . . 9 for $54
256K (41256) 150 or 200 ns 9 for $45

8087 CHIP
Intel 8087-3 high speed math co-processor $135
8087-2 chip for Compaq DeskPro $175
80287-3 chip for IBM-AT $215

SPEED UP YOUR PC/XT
with NEC V-20 processor chip. Direct replacement of the 8088-3 chip. *Now* $39

All goods are brand new and guaranteed. All advertised prices already include a 2% cash discount for full payment by cashier's check, money order or cash. Personal or company checks must clear 3 weeks before we ship. Add 2% for credit card purchases. COD's are accepted for UPS shipments only and require 20% paid deposit and $3 COD fee. No COD's to Canada, Puerto Rico, FPO/APO or P.O. Boxes. Shipping & insurance charges: 3% (Min. $3) of total order value by UPS ground, 5% (Min. $5) by UPS Blue & Parcel Post. P.O.'s accepted from government agencies, Fortune 1000 firms and major institutions. Calif. buyers add sales tax. Prices subject to quantity available, correction or change without notice. You may call for the latest prices.

IBM PC, XT, AT are registered trademarks of International Business Machines Corp.

EASTERN ENTERPRISES, INC.
Mass Merchandising Since 1969
6001 BANDINI BLVD., LOS ANGELES, CA 90040
COME VISIT OUR GIGANTIC SHOWROOM & STORE

VISA MasterCard American Express Discover

TOLL-FREE (ORDERS ONLY) **(800)392-7081**
Hours: Monday to Friday 8:30am – 5:00pm Pacific Time
Calif., Alaska & all info *Call* (213)725-3080
FAX: 213-838-5301

Circle 510 on reader service card

MAGITRONIC

CHASSIS

- C-600-A AT Jr. Case $39
  XT Size, AT Style, Open Top
- C-600 XT Case $29
  For **IBM** XT Boards & 5-1/4" Disk Drives, Open Top/Slide Off
- C-700 AT Case $99
  For **IBM** AT Boards, With Lock Key For Extra Security

POWER SUPPLY

- P-150 Switching Power Supply $65
  150 Watt Output
- P-200 Switching Power Supply for **IBM** PC/AT $115
  Max. 200 Watt Output
- Power Center $40
  100% Burn-In Test. Short Circuit Protection. Meets **UL/CSA/VDE** standards

DRIVES

- Fujitsu 360K Drive $85
- Teac 360K Drive $90
- Teac 1.2MB Drive $135
- Mitsubishi 1.2 MB Drive $125
- 20 Meg Hard-drive Seagate w/ Controller $399
- 30 Meg Hard-drive Seagate ..... Call
- 40 Meg Hard-drive Seagate ..... Call

KEYBOARDS

- K-139 AT/XT Keyboard $75
  Large Return Key, 12 Function Key, Enhanced Keyboard
- K-136 AT/XT Keyboard $65
  Software Switchable, Large Return Key
- K-135 XT Keyboard $70
  Features Separate Num. & Cursor Pads/LED Cap Lock & Num. Lock w/Large Return

SAMSUNG MONITORS

- MD-1252G Amber or Green $79
  12" Monochrome Monitor TTL, Swivel Base, 720 x 350 Dot Resolution, 80 character x 25 Rows
- CD-1464W RGB $269
  16 color, 640 x 200 Dot Resolution, 80 Character x 25 Rows
- CD-1452M EGA—Hi Resolution RGB ..... CALL
  640 x 350 Dot Resolution

AT SYSTEM

PC/AT SYSTEM 1000

Mono $1549.00
Color $1739.00

- 200W Power Supply/Case
- K-136 AT/XT Keyboard
- 1024K Memory On 80286 Mother Board
- 1.2M High Capacity Floppy Drive
- AT HCD/FDC Controller
- Mono or Color Graphic Adapter
- Monitor
- Assembled and Fully Tested

PC/AT ADD ON BOARDS

MGB-201	AT Mother Board Bios	$575
MGB-202	AT 3M Multi Card	$179
MGB-205	AT 1.2M Floppy Disk Card	$82
MGB-205-1	AT 1.2M 360K Controller	$119
MGB-208	AT 2.5M RAM Card	$109
MGB-210	AT HDC/FDC Controller w Cable	$225
MGB-231	AT I/O Card	$80
MGB-109-1	AT/XT Parallel/Serial	$55
MGB-135	EGA Card	$285

CABLES

8510 Computer To Printer
6 ft. ..... $7 10 ft. $7.50
15 ft. $8
8511 RS 232 Serial Cable
DB 25
6 ft. $7
8512 Computer To Printer Centronic
36 pin c/c
6 ft. ..... $8.50 10 ft. $9.50
25 pin c/c
6 ft. ..... $7.50 10 ft. $8.50
8513 RS 232 Serial
DB 25
6 ft. ..... $7 10 ft. $8
8514 RS232 Serial
DB 25 m/m
6 ft. $7
8515 Computer To Modem
6 ft. ..... $4.50 10 ft. $5.50
8519 Computer To Modem
DB 25 M/DB 9F
6 ft. $7
8524 Gender Changer
D825 m/m $4
8525 Gender Changer
DB825 f/f $4
4 Ways Switch Box-Serial $35
4 Ways Switch Box-Parallel $37
A/B Switch-Serial $25
A/B Switch-Parallel $25
Power Outlet Strip UL $9.99
Monitor Cable $750

XT SYSTEM

Runs all major software

- Slide Off case
- Power Supply
- 640K Expandable Mother Board
- 256K Installed
- K-136 AT/XT Keyboard
- Floppy Control Card
- 360K Drive
- Mono or Color Graphic Adapter
- Monitor
- Assembled and Fully Tested

PC/XT SYSTEM 800

Mono $569.00
Color $759.00

XT TURBO SYSTEM 900

Mono $599.00
Color $789.00

PC/XT ADD ON BOARDS

MGB-101	XT Mother Board	$105
MGB-102	Multifunction Card	$78
MGB-103	Monochrome Graphic	$65
MGB-103-1	Monographic Printer	$75
MGB-104	Color Graphic	$55
MGB-105	Floppy Disk Card 1 port	$29
MGB-105-1	Floppy Disk Card 2 port	$38
MGB-106	RS 232 Card 1 port	$25
MGB-106-1	RS232 Card 2 port	$30
MGB-107	Game I/O Card	$20
MGB-108	XT512K RAM Card	$44
MGB-109	XT Parallel Printer Card	$21
MGB-110	6220 XT HD & FD Controller	$125
MGB-111	XT Color Graphic Printer Card	$66
MGB-112	Monochrome Card	$50
MGB-113	XT 640K RAM Card	$46
MGB-128	XT 640K Turbo Board	$130
MGB-129	Clock Card	$29
MGB-131	XT I/O Plus Card	$49
MGB-132	XT Multi I/O Card	$79
MGB-133	6210 XT HDC	$105

MAGITRONIC TECHNOLOGY INC.

9-02 43 Road, Long Island City, NY 11101
ORDERS ONLY: 1-800-227-5454 PLEASE CALL FOR QUANTITY PRICES
NY & West Coast Information: 718-706-7670 West Coast Shipping Available

All Orders are Shipped UPS COD Cash, Certified Check or Money Order Within 24 Hours.

IBM® PC/XT and Hayes are registered trademarks of their respective companies.

The ONE and ONLY Complete Accounting System $50

17 NEW Features Make 118 Reasons To Buy MCBS Accounting Software!

General Features

1) New automated start-up and installation procedure minimizes use of DOS commands.
2) For fixed disk, creates subdirectory and copies all files to disk.
3) Manual printing has been greatly simplified.
4) Menu Driven System
5) Integrated or Stand Alone
6) Simplified Installation
7) Complete Audit Trails
8) Data Files can be accessed by Lotus, dBase, etc.*
9) Manuals on diskettes, print them on your printer.
10) Modules can be purchased separately.
11) Accounts and transactions limited only by disk space.

NOW With Sample Data Files & Master Chart of Accounts for Faster Easier Startup

General Ledger

12) Improved budget reporting module.
13) Improved Integration with other modules including Payroll.
14) Supports multiple departments
15) Flexible chart of accounts.
16) Prints financial statements in flexible, user defined formats.
17- Prints Income Statement and
22) Balance Sheet by current month, current quarter, and 3 previous quarters.
23- Prints *Departmental* Income
28) Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
29- Prints *Budget Comparison*
30) Income Statement and Balance Sheet comparing Actual vs. Budget with variances and ratios.
31- Prints Trial Balance and Chart
32) of Accounts
33) Prior Period Adjusting Entries do not impact current results.
34) Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
35) System allows new accounts to be created during data entry.

Accounts Payable

36) Vendors may be added to system during the entry of invoices.
37) Simplified selection of vendors and invoices for payment.
38) Provides for entry, updating and deletion of vendor information.
39- Allows entry, editing and posting
40) of payables, adjustments, cancellations and prepaids.
41- Prints the Open Item & Cash
42) Requirements reports.
43) Allows partial payments.
44) Prints A/P checks
45) Prints Check register.
46) Prints the A/P distributions to the General Ledger
47) Prints the vendor anaylsis report
48) Interfaces to MCBS' General Ledger or may stand alone.

Accounts Receivable

49) Customize your own headings on Invoices and Credit Memos. No programming required.
50) Add finance charges at the rate you choose to accounts you wish to charge.

Accounts Receivable cont.

51) Provides for entry, updating and deletion of customer infomation
52) Allows entry, editing and posting of receivables, credit memos, cash payments.
53) Allows up to 99 repetitive line items for fast invoicing.
54) Prints the open item and aged receivables reports.
55- Prints Invoices, Credit Memos
57) and Statements.
58) Prints Sales Analysis.
59) Supports Partial Payments
60) Prints Invoice, Payment and Credit Memo Registers
61) Interfaces to MCBS' General Ledger or may stand alone.

Payroll
with State & Local Taxes

62) Now *Integrates* with General Ledger.
63) Now prints 1985 W-2 and 1099-MISC forms.
64) Provides for entry, updating and deletion of employee information.
65- Handles hourly, salaried or
67) commissioned employees on weekly, biweekly, semi-monthly or mothly pay periods.
68) Calculates Federal, State and Local Taxes.
69) Allows user to maintain all tax tables.
70) Maintains payroll history.
71) Calculates the payroll.
72) Prints the payroll register, check register and deductions register.
73) Prints payroll checks.
75- Prints W-2's, 1099's, 941's and
78) quarterly earnings reports.

Inventory
with Order Entry & Purchase Orders

79- Add Customers, Vendors or Items without
81) leaving the entry screen you are working with.
82) Reports allow selection by department or total.
83) WILD CARD customer feature allows creation of walk-in customer account for Point of Sale invoicing.
84) WILD CARD item allows for billing miscellaneous, non-inventory charges.
85) Uses Average Cost.
86) Provides for Inventory item entry, updating and deletion.
87) Provides for order entry and editing with inventory update during entry.
88) Stock and non-stock items.
89) Handles purchases, returns, shipments and adjustments.
90) Prints invoices, credit memos, picking tickets, purchase orders, price lists and shipping labels.**
91) Prints on preprinted forms or plain paper.
92) Prints stock status report and purchasing advice report.
93) Full back order retention.
94) Quarterly, yearly and prior year inventory history.
95) Performs book to physical analysis.
96- Over 20 management reports
116) including extensive Sales Analysis and Lost Sales Report.
117- Interfaces to MCBS' General
118) Ledger, A/R, A/P or may stand alone.

**Requires A/R & A/P for some functions.

TO ORDER CALL:

1-800-FOR-MCBS

1-800-367-6227

For More Information:

Call (713) 444-6269

—UNCONDITIONAL—
30 DAY MONEY BACK GUARANTEE

(Less Shipping Charges) There is a $10.00 restocking fee if the disk seal is broken. This guarantee applies only to products bought directly from MCBS.

All programs run on IBM, PC/XT/AT*, and most other MS DOS machines. Written In CB 86 compiled basic.

Requires 128K Ram, 2 Floppies or Fixed Disk, 80 Column Printer, MS DOS, PC DOS 2.0 or later.

**Computer & software names are trademark or registered by their respective manufacturers.*

Client Accounting Software

This system is for people doing accounting work for other people. This is version 4.0, a new release. Call or Write for more details.

Client Accounting System $150
(Does not include 5 module system)

MCBS **Micro Computer Business Services**
12703 Stuebner Airline Houston, TX 77014

Complete Package - G/L, A/P, A/R, P/R, INV QTY. ____ X $ 50.00 ea. = ____
Individual Module - G/L☐ A/P☐ A/R☐ P/R☐ INV☐ QTY. ____ X $ 15.00 ea. = ____
Client Accounting System QTY. ____ X $150.00 ea. = ____
Pay Method: Prepaid, Check Enclosed: ____ Texas Residents add 6½% = ____
MC, # ____ Shipping Charges = 5.00
VISA, # ____ If COD add $5.00 = ____
Expires: ____ Signature ____ TOTAL = ____
Company Name: ____ Contact: ____
Street/Number: ____ Phone: ____
City: ____ State: ____ Zip: ____

Circle 632 on reader service card

We pledge allegiance to low prices and superior technical service.

PCA (4.77MHz XT Compatible)
640K, 2 floppies, mono monitor and monochrome graphics card, parallel port, keyboard, one year warranty, FCC Approved..... **$775**

PCA TURBO (4/8 MHz XT Compatible)
640K, one floppy, 20MB, Parallel, Serial, Clock, Game, Keyboard, One Year Warranty, FCC Approved..... **$995**

MULTITECH 900 10/6 MHz — $1550

- *10 or 6 MHz*
- *1.2 MB Floppy*
- *Keyboard*
- *MS DOS 3.1*
- *5 Half-height internal drive slots*
- *One Year Warranty*
- *Serviced Nationwide by TRW*
- *512 to 1MB on motherboard*

Multitech Options
Softwhite monitor and monochrome graphics card **$219**
Color monitor and color graphics card **$359**
EGA monitor and EGA color graphics card **$659**
Multitech 3 MB expanded memory card OK, P/S **$219**
RAM Expansion, piggyback card **$128**

DISK DRIVES FLOPPY

Teac

FD55 B-V *(half height 5¼" 360K DS DD floppy)* **$99**
FD55 F/G-V *(half height 5¼" 1.2 MB black or grey faceplate)* **$145**

Toshiba

ND 040 *(half height 5¼" 360K black face plate)* **$109**
ND 04DEG *(half height 5¼" 360K grey face plate)* **$111**
ND 08DEG *(half height 5¼" 1.2MB grey face plate* **$149**

Control Data

Half height *5¼" 360K black face plate floppy* **$85**

HARD DISK DRIVES

Seagate

ST225 *20MB half height 65MLS with controller card* **$395**
ST225 *20MB half height 65MLS no controller card* **$345**
***NEW ST238** *30MB half height 65 MLS with controller card* **$499**
ST4026 *20MB full height 30MLS no controller* **$539**
ST4038 *30MB full height 30MLS no controller* **$629**
ST4051 *40MB full height 30MLS no controller* **$739**
Western Digital *controller card* **$125**

Control Data

9415-86 *86MB full height 30MLS no controller* **$1495**
Disk Manager Software *for formatting past DOS (33MB)* **$100**

TAPE BACKUPS

Irwin Magnetics

10MB *INTERNAL TAPE DRIVE half height unit uses floppy controller* **$499**
20MB *INTERNAL TAPE DRIVE for 286 COMPAQ and AT* **$599**

Everex

20MB *INTERNAL TAPE DRIVE half height with controller* **$573**
60MB *INTERNAL TAPE DRIVE half height with controller* **$724**

Alloy

60MB *EXTERNAL TAPE DRIVE software cables and controller* **$741**

Tape Cartidges/Scotch 3M

DC-600A *cartridge tape (up to 60MB capacity)* **$26**
DC-1000 *cartridge tape for Irwin tape drive* **$19**

MEMORY MULTIFUNCTION BOARDS

AST

SIXPACK PREMIUM *512 to 2MB* **$356**
Advantage *w/128K (expandable to 3MB S2G for AT)* **$356**
RAMPAGE PC *256 to 2MB (EMS board w/desqview windowing software)* **$234**
RAMPAGE AT *512 to 2MB (EMS board 8MHz)* **$445**

Talltree

JRAM 2 *w/0K (Parallel 2MB capacity)* **$142**
JRAM 3 *w/0K (for PC EMS board up to 2MB capacity)* **$184**
JRAM AT *w/0K (Parallel 2MB capacity)* **$190**
JRAM 3 AT *w/0K (EMS board up to 2MB capacity)* **$239**

Clone

6 PACK compatible *w/S P C G s 0K (up to 384K) w/software* **$99**

MULTIFUNCTION I/O BOARDS

DISK I/O *operates 2 floppies and G S P C* **$95**
AT I/O *Parallel Serial* **$95**

MODEMS

Hayes

SMARTMODEM 1200B *INTERNAL 1200/300 baud w/Smartcom II* **$384**
SMARTMODEM 1200 *External 1200/300 baud)* **$479**
SMARTMODEM 2400 *External (2400)* **$630**

Everex

EVERCOM Modem *(1200 300 baud w/software)* **$150**

US Robotics

COURIER 2400 *Baud Internal or External* **$491**

NETWORKS MULTI-USER

Alloy

PC-SLAVE/16 *16 BIT SLAVE BOARD 8088-2 (8MHz Processor 2 serial ports 1 Mb Ram)* **$895**

12 Slot Expansion Chassis *225 Watt power supply* **$1135**
20' RS-232 Slave Cable **$39**
ATNX *ALLOY TERMINAL NETWORK EXECUTIVE SOFTWARE* **$295**
LINK *PS 323 ASCII Terminal IBM Keyboard* **$625**

PRINTERS/DOT MATRIX

Citizen (Epson & IBM Compatible)

MSP-10 *160/40 cps dot matrix narrow carriage* **$307**
MSP-15 *160/40 cps dot matrix wide carriage* **$414**
MSP-20 *200/50 cps dot matrix narrow carriage* **$347**
MPS-25 *200/50 cps dot matrix wide carriage* **$520**

Epson

FX-85 *160 cps narrow carriage NLQ* **$434**
FX-286 *200 cps wide carriage NLQ* **$624**
LQ 1000 *24 Pin 180 cps NLQ 60 wide carriage* **$830**
LQ 800 *24 Pin 180 cps NLQ 60 narrow carriage* **$630**

IBM

Proprinter **$445**
Proprinter XL *Wide Carriage* **$661**

Okidata

ML182 *120 cps narrow carriage* **$228**
ML 192 *160 cps NLQ narrow carriage* **$327**
ML 193 *160 cps NLQ wide carriage* **$529**
ML 292 *200 cps 100 NLQ narrow carriage color* **$614**
ML 293 *Dual 9 pin 200 NLQ wide carriage color* **$803**
2410/P/IBM *350 cps 175/85/wide* **$1850**

Toshiba

P-351 *24 pin 288 cps wide carriage* **$1025**
P-341 *24 pin 216 cps wide carriage 180 NLQ* **$727**
P-321 *24 pin 216 cps narrow carriage* **$442**
P-351 *C Color printer* **$1178**

Panasonic

KXP1091 *120 cps NLQ 29 cps* **$270**
KXP1092 *180 cps NLQ 33 cps* **$348**
KX1592 *wide carriage 180 CPS NLQ 38 cps* **$480**

N E C

P-5XL24 *pin 290 cps 100 NLQ color* **$1071**
P-6, P-7, *24 pin* **$477/667**

LASER PRINTERS

Hewlett-Packard

LASER JET PROFESSIONAL *8 pages per minute* **$2357**
LASER JET PLUS *DPI graphics/S/P interface* **$3053**

PRINTERS/LETTER QUALITY

Brother

HR-15 *17 cps* **$368**
HR-25 *23 cps* **$615**
TWINWRITER *DOT MATRIX 140 cps LQ 36 cps* **$1063**
M1509 *180 cps/45 cps NLQ* **$420**

N E C

ELF *(18 cps)* **$408**
NEC 3550 *(33 cps)* **$799**

Panasonic

KXP-3131 *(17 cps)* **$286**
KX-P3151 *Wide (22 cps)* **$448**

MONOCHROME MONITORS

SAMSUNG *TTL AMBER or GREEN* **$85**
AMDEK 310A *TTL AMBER* **$159**
PRINCETON MAX 12 *800 PIXIES* **$155**
MULTITECH *Soft white, high res* **$139**

COLOR MONITORS

MULTITECH COLOR MONITOR, *Amb/Gr/640X200* **$299**
MULTITECH EGA **$430**

Princeton Graphics

PL14 EGA *14" Multisync clone* **$516**
HX-12 *31mm dot pitch, 640/240* **$442**
HX-12 E *640/350 EGA* **$539**
SR-12 *31mm dot pitch, 640/400* **$539**
SIGMA 400 H **$460**

Taxan

640 *720/400 .31 dot pitch* **$506**
555 *16 color card text/graphics* **$149**

N E C

MULTISYNC *15.75Khz to 35KHz horizontal scan* **$569**

VIDEO DISPLAY BOARDS

Hercules

GRAPHICS CARD *mono* **$194**
COLOR CARD *color w/parallel* **$151**

Clones

EVEREX EDGE *color/mono 132 column* **$239**
EVEREX GRAPHICS EDGE *color/mono 132 column* **$239**
GRAPHICS CARD *Hercules clone* **$99**
COLOR CARD *color w/parallel* **$89**
MULTITECH EGA **$241**
PARADISE EGA/AUTO SWITCH **$410**

BACK-UP POWER AND SURGE PROTECTION

Data Shield

500 W *Backup Power Supply* **$615**
800 W *Backup Power Supply* **$693**
1500 W *Backup Power Supply* **$1427**

Clone

150 W *POWER SUPPLY* **$99**
135 W *POWER SUPPLY* **$89**

Curtis

DIAMOND *(SURGE PROTECTOR 6 OUTLET wall)* **$35**
EMERALD *(SURGE PROTECTOR 6 OUTLET cord)* **$45**
RUBY *(SURGE/FILTER/6/cord)* **$58**

Kinsington

MASTERPIECE **$97**
MASTERPIECE PLUS **$131**

CHIPS

256K SET **$29**
128K SET **$40**
64K SET **$10**
8087 **$135**
8087-2 **$158**
80287 **$189**
80287-8 **$327**

TERMS: WE ACCEPT C.O.D. CASHIER CHECK, VISA, MASTER CARD, AMERICAN EXPRESS (3% EXTRA) WIRE TRANSFERS. APPROVED P.O.'S. ALL EQUIPMENT CARRIES NEW FACTORY WARRANTY. PRICES ARE SUBJECT TO CHANGE. ANY RETURN ITEM MUST BE ACCOMPANIED BY A RETURN AUTHORIZATION NUMBER AND DESCRIPTION. IBM, COMPAQ, SEAGATE IS A REGISTERED TRADEMARK OF THEIR RESPECTIVE COMPANIES.

pcAmerican Marketing, Inc
17151 Newhope St., Suite 104, Fountain Valley, CA 92708

HOURS:
MONDAY — FRIDAY
8:30 — 5:30
SATURDAY
10:00 — 2:00

1-714-557-3903
CUSTOMER SERVICE

1-800-654-5365
SALES HOTLINE

1-714-557-3904
TECHNICAL SUPPORT

Circle 742 on reader service card

* MICROSTAR - XT & AT COMPUTERS *

MICROSTAR XT
Only...$1099

Includes:

* Turbo Mother Board
* 640 K Memory
* 20 MB Hard Disk
* 360 K Floppy Drive
* AT Style Keyboard
* Mono/Graphics Card
* Software, Printer Port
* Mono Hi-Res Monitor

BEST
PC

MICROSTAR — AT
Only...$2099

Includes:

* 6 MHZ-8 MHZ Mother Board
* 1 MB Memory
* Phoenix Bios
* 30 MB (40ms) Hard Disk
* 1.2 MB/360K Floppy Drive
* Mono/Graphics Card, Software and Printer Port
* Hi-Res Monochrome Monitor

*1 Year Parts & Labor Warranty • Fully Configureted & Tested * Toll Free Support*

IBM

PC w. 256K, 2 Drives	$1099
Laptop	$1599
PC/XT 256K, 20 MB	$2299
AT Model 68	$2799
AT(68) w 30 MB	$3599
AT 339 w 30 MB	$4099

COMPAQ
SPERRY
AT & T

* CALL *

* HARD DISK *

20 MB Sub Systems	$399
30 MB Sub Systems	$499

* AT HARD DISK *

20 MB (40ms)	$ 599
30 MB (40ms)	$ 699
40 MB (40ms)	$ 899
80 MB (40ms)	$1499

PRINTERS

EPSON FX-286	$499
FX-85	$399
LQ 800	$499
LQ 1000	$699
BROTHER:	
M 1509	$429
M1109	$249
M1009	$149
TOSHIBA P 321	$469
P341/351	$749/$999
NEC P6	$549
NEC P7	$699

* BOARDS *

AST 6 pk w. 0k	$169
MFC w.384 K, C,S,P,G	$179
AST Advantage w 128K	$349
INTEL Above AT	$449
Mini I/O C,S,P,G	$ 79
RS 232 Card	$ 49
SER/PAR w Cable	$ 99
Memory Card 0K	$ 49
8087	$129
80287	$199

* MONITORS *

SAMSUN G TTL	$ 99
AMDEK 310A	$149
PGS MAX 12	$169
TATUNG COLOR	$399
TAXAN 620/630/640	$CALL

* SOFTWARE *

LOTUS 1-2-3 Ver.2.0	$319
dbase III +,FW II	$399
WORD PERFECT 4.1	$199

* BEST PRICES * BEST SERVICE * FAST DELIVERY

1-800-MIC—STAR
(312) 968-3323

Mon. — Fri. 9-7
Sat. 10-5

MICROstar

1303 Ogden Ave.
Downers Grove, IL. 60515

** All prices reflects cash discount * M/C-VISA Add 3%*
** PRICES SUBJECT TO CHANGE W/O NOTICE.*

Circle 560 on reader service card

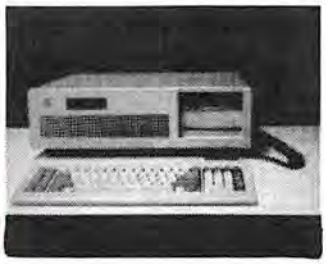
STOP

NITRO MICRO SM

FAST DELIVERY SERVICE - Before & After

ORDER TOLL FREE

800 | 323 | 8838



NITRO MICRO 286

$1395

Features: 80286 8 MHz CPU
640K RAM
Floppy/Hard Drive Controller
One 1.2MB Floppy Drive
200 Watt Power Supply
Full AT Style Keyboard

ENHANCED 286 with 30MB Harddisk **$1995**

ONE YEAR WARRANTY

FCC Approved

NITRO MICRO PCII

$695

Features: 8088-2 4.77/8 MHz CPU
640K RAM
Floppy Drive Controller
One 360K Floppy Drive
135 Watt Power Supply
Full AT Style Keyboard

ONE YEAR WARRANTY

$59

Parallel/Serial Adapter

$99

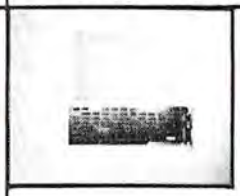
7-PAK Serial
OK-384K Clock
Parallel Game

$39

Parallel Printer Adapter

$439

Internal 20MB Harddisk with Controller



$99

Monographic Adapter with Parallel Port

$98

Color Graphics Adapter with Parallel Port

Software savings and Selection

ANSA *Paradox*	$ 424	MECA *Managing Your Money*	$ 103	NANTUCKET *Clipper*	$ 329
BORLAND *Turbo Pascal*	$ 48	MICROPRO *Easy*	$ 96	NORTON *Commander*	$ 45
BORLAND *Lightning*	$ 59	MICROPRO *Wordstar*	$ 189	NORTON *Utilities*	$ 55
BORLAND *Reflex*	$ 69	MICROPRO *Wordstar 2000+*	$ 296	PFS: *File*	$ 86
BORLAND *Superkey*	$ 48	MICROPRO *Wordstar Prof.*	$ 239	PFS: *Write*	$ 86
BORLAND *Prolog*	$ 66	MICRORIM *RBase 5000*	$ 309	PFS: *Graph*	$ 86
BORLAND *Sidekick*	$ 38	MICRORIM *CLOUT*	$ 125	PFS: *Plan*	$ 86
BRODERBUND *Printshop*	$ 39	MICROSOFT *Word 3.0*	$ 229	PFS: *Report*	$ 78
DAC *Easy Accounting*	$ 64	MICROSOFT *Windows*	$ 65	POWERBASE *Powerbase*	$ 198
DBMS *Knowledgeman*	$ 256	MICROSOFT *Chart*	$ 172	PRO *Design II*	$ 198
EMERGING TECH *Edix*	$ 109	MICROSOFT *QuickBasic*	$ 67	PYRAMID *Paragon*	$ 619
EMERGING TECH *Wordix*	$ 109	MICROSOFT *C Compiler*	$ 259	QUARTERDECK *Desqview*	$ 65
EMERGING TECH *Offix*	$ 97	MICROSOFT *Multiplan*	$ 115	SOFTSYLE *Printworks LJ*	$ 89
FIFTH GEN *Fastback*	$ 94	MICROSTUF *Crosstalk 16*	$ 99	SORCIM *Supercalc III*	$ 218
FUNK *Sideways*	$ 39	MICROSTUF *Remote*	$ 99	SPRINGBOARD *Newsroom*	$ 39
GOOD *Buy*	$ 259	MONOGRAM *Dollars & Sense*	$ 109	SSI *Word Perfect 4.1*	$ 209
GOOD *Lease*	$ 259	MULTILINK *Advanced*	$ 369	SW GROUP *Enable 1.1*	$ 348
LIFETREE *Volkswriter 3*	$ 149	MULTILINK *Multimate*	$ 215	SYMANTEC Q & A	$ 224
LIVING VIDEO *Thinktank*	$ 105	MULTIMATE *Advantage*	$ 276	T/MAKER *Clickart*	$ 109

NEED TO NETWORK?

For peripheral sharing, information control, data security, and inter-office communications, networking is the answer. Call one of our Account Representatives for a network solution tailored to your needs.

- GOOD Product Knowledge
- FREE Technical Support
- Warranty & Return Policy

800 382-3888

COMPUTERS

AT&T

6300 *128K 1 Drive* $1589
6300 *256K 2 Drives* $1699
6300 *640K 20MB* $2298
6300 *PLUS 512K 20MB* $3790
All AT&T Systems Include: CPU, Monochrome Monitor, Keyboard and MS-Dos

NITRO MICRO

PC II *640K 1 Drive 4.77/8MHz* .. $ 695
286 *640K 1.2MB Drive 8MHz* $1395
Enhanced 286 *640K 30MB* $1995

Panasonic

Business Partner *256K 1 Drive* $ 978
Business Partner *256K 2 Drives* $1098
Business Partner *286 512K* $1978
Sr. Partner *256K 1 Drive* $1098
Sr. Partner *256K 2 Drives* $1329
Sr. Partner *256K 10MB* $1998
Executive Partner *1 Drive* $1798
Executive Partner *2 Drives* $1870
Executive Partner *10MB* $2695

QUADRAM

Quadview *640K 1 Drive* $1396

AMIGA

AMIGA Computer System $1039

SHARP

PC-7000 *384K 2 Drive Portable* .. $1139

TELEVIDEO

Telecat *512K 20MB Harddisk* ... $1979
Tele286 Model 1 *512K 1.2MB Drive* $1949
Tele286 Model 2 *512K 44MB Fixed* ... $2829

TOSHIBA

1100 *512K 3.5" Drive* $1548
1100 *Plus 640K Dual 3.5" Drives* $1749
3100 *640K 3.5"Drive 10MB Fixed* $3369

ZENITH

ZFL-171-42 *256K 2 Drive Port.* .. $1688
ZF-148-41 *256K 1 Drive* ..... $ 935
ZF-148-42 *256K 2 Drives* $1094
ZF-158-41 *256K 1 Drive* $1289
ZF-158-42 *256K 2 Drives* $1399
ZF-158-43 *256K 20MB Harddisk.* $1849
ZF-241-81 *AT 512K 1.2MB Drive* $2396
ZF-241-82 *AT 512K 20MB Fixed* $3079

MODEMS

AST

Reach 1200 *Card w/Crosstalk* .... $ 359

AT&T

4112 1200 *Card w/Softcall* ..... $ 329
4000 1200 *External* ..... $ 314

EVEREX

300/1200 *Internal* ..... $ 139

Hayes

1200B *Internal w/Smartcom II* .. $ 339
2400B *Internal w/Smartcom II* .. $ 539
Smartmodem 300 *External* ..... $ 136
Smartmodem 1200 *External* .... $ 355
Smartmodem 2400 *External* .... $ 589

PROMETHEUS

Promodem 1200B *Internal* ..... $ 228
Promodem 1200B *w/Mite* ..... $ 254

QUADRAM

1200 *Internal w/Crosstalk* ..... $ 289
2400 *Internal w/Crosstalk* ..... $ 448

VENTEL

1200 *Halfcard w/Crosstalk* ..... $ 326
2400 *Halfcard w/Crosstalk* ..... $ 428
PC 1200 *External* ..... $ 319
PC 2400 *External* ..... $ 428

WATSON

Watson 1200 *Data/Voice* ..... $ 344

INTERNAL BOARDS

AST

SIXPACK *64K w/ Sidekick* ..... $ 167
SIXPACK *384K w/Sidekick* ..... $ 199
SIXPACK PREMIUM *512K* .... $ 358
Advantage *1.5MB* ..... $ 678
Advantage *3MB* ..... $ 997
5251-11 *Package* ..... $ 588
5251-12 *Package* ..... $ 525

DCA

IRMA ..... $ 759

DIGIGRAPHICS

Extend Series *384K* ..... $ 149

EPSON

Monochrome Board ..... $ 95
Color Video Board ..... $ 109

EVEREX

Edge ..... $ 269
Graphics Edge ..... $ 298
Mini-Magic Card *384K* ..... $ 118

HERCULES

MonoGraphics Card ..... $ 189
Color Card ..... $ 149

INTEL

PC Above Board *2MB* ..... $ 638
AT Above Board *2MB* ..... $ 649

MOUNTAIN

RACECARD 286 *Halfcard* ..... $ 469

NITRO MICRO

Monographic Card *w/Parallel* ... $ 99
Color Graphics Card *w/Parallel* $ 98
Parallel *Printer Adapter* ..... $ 39
Parallel/Serial *Adapter* ..... $ 59
7-PAK *OK Par/Ser/Clock/Game* $ 99

ORCHID

Tiny Turbo 286 ..... $ 439

QUADRAM

EGA+ *Video Card* ..... $ 384
Quadcolor I ..... $ 208
Quadboard 384K ..... $ 229
QuadSprint ..... $ 436
QuadLink ..... $ 349

SIGMA

Color 400 *Video Card* ..... $ 462

STB

Chauffeur ..... $ 259

TSENG LABS

EVA *EGA Adapter* ..... $ 319

UNIVATION

TurboCharger *9.57 MHz 8086 Card* .... $ 379
Dream Board *512K EMS/Turbo* ..... $ 539

MONITORS

AMDEK

300G *Green* ..... $ 119
300A *Amber* ..... $ 128
310A *Monochrome Amber* ..... $ 155

EPSON

Monochrome Monitor ..... $ 109
RGB Color Display ..... $ 388

NEC

MultiSync *HiRes Monitor* ..... $ 538

PGS Princeton Graphic Systems

Max 12E *Monochrome* ..... $ 159
HX-12 *Color Display* ..... $ 419
HX-12E *HiRes Color* ..... $ 525
SR-12 *HiRes Color* ..... $ 539

TAXAN

121 *Green monochrome* ..... $ 139
122 *Amber monochrome* ..... $ 148
630 *RGB Color* ..... $ 428
640 *RGB Color* ..... $ 488

ZENITH

1230 *Green composite* ..... $ 99
1220 *Amber composite* ..... $ 99

DRIVES

MEGA

Half Height *10MB* $1319
Half Height *10-10* $1966
Half Height *20MB* $1752
Half Height *20-20* $2498

IRWIN MAGNETICS

10MB Tape Backup *Internal* ... $ 462
20MB Backup *Internal AT* ..... $ 566
10MB Tape Backup *External* ... $ 655

MAYNARD

10MB ONBOARD *Hardcard* ..... $ 588
20MB ONBOARD *Hardcard* ..... $ 689

MOUNTAIN

20MB Drivecard ..... $ 769

PLUS DEVELOPMENT

10MB Hardcard ..... $ 499
20MB Hardcard ..... $ 639

SEAGATE

10MB *Internal w/cont* ..... $ 409
20MB *Internal w/cont* ..... $ 424
30MB *Internal AT* ..... $ 668
20MB *External w/cont* ..... $ 538

PRINTERS

CITIZEN

MSP-10 *160 cps* ..... $ 289
MSP-15 *160 cps 132 col* ..... $ 389
MSP-20 *200 cps* ..... $ 329
MSP-25 *200 cps 132 col* ..... $ 488
Premiere 35 *Daisywheel 35 cps.* $ 469

DATA PRODUCTS

8012 *180 cps* ..... $ 288
8022 *180 cps wide* ..... $ 454
8052 *200 cps color* $1079
8072 *200 cps color* $1432

EPSON

LX-86 *120 cps* ..... $ 218
FX-85 *160 cps* ..... $ 349
FX-286 *200 cps 132 col* ..... $ 529
LQ-800 *NLQ 200 cps* ..... $ 528
LQ-1000 *NLQ 200 cps 132 col* ..... $ 688
LQ-2500 *324 cps* $1089
DX-10 *LQ 10 cps* ..... $ 228
DX-20 *LQ 20 cps* ..... $ 312
DX-35 *LQ 35 cps* ..... $ 559
EX-800 *30 cps* ..... $ 529

HEWLETT PACKARD

LaserJet $2298
LaserJet Plus $2919
ThinkJet ..... $ 398
7475A Plotter *6 Pen* $1348

OKIDATA

182 *IBM Parallel* ..... $ 219
183 *Wide IBM Parallel* ..... $ 369
192 *IBM Parallel* ..... $ 349
193 *Wide IBM Parallel* ..... $ 489

OTC

700 *700 cps* $1419

Panasonic

1091 *120 cps* ..... $ 248
1092 *180 cps* ..... $ 329
1592 *180 cps* ..... $ 439
1595 *240 cps* ..... $ 588

QMS

Kiss Laser *Printer* $1698
BIG KISS *Laser printer* $2389
Post Script 800 *Laser Printer* ... $4688

QUADRAM

Buffer 8K *Par-Par* ..... $ 138
Buffer 64K *Par-Par* ..... $ 165
Buffer 128K *Par-Par* ..... $ 198

TOSHIBA

P321 *Parallel* ..... $ 479
P341 *Parallel* ..... $ 759
P351 *Parallel & Serial* ..... $ 998

YOU'VE FOUND US

NITRO MICRO SM

THE LOGICAL ALTERNATIVE To Your Mail Order NEEDS....

ORDER TOLL FREE 800-382-3888

Add 2% shipping and handling on all orders.

NO SALES TAX

No surcharge on Visa or MasterCard. All items subject to availability and price change. All hardware and software will be repaired or replaced at our discretion within warranty period of manufacturer.

VISA MasterCard

Hours: Eastern
Mon.-Fri. 10 a.m.-7 p.m.
Saturday 11 a.m.-5 p.m.

QUICK SHIP *FAST DELIVERY SERVICE*

ORDER TOLL FREE **800-382-3888**

P.O. Box 90200
Indianapolis, IN
46290-0200

NITRO MICRO SM

Circle 434 on reader service card

Arlington Computer Products gives you the best prices on IBM PCs...

IBM PC

2 Drives, 256K Monochrome Monitor	$1275
2 Drives, 256K, Color Monitor	$1495
2 Drives, 256K, w/10MB Monochrome Monitor	$1625

IBM XT

1 Drive, 640K, 20 MB Hard Disk, Monochrome Monitor	$2275
1 Drive, 640K, 20 MB Hard Disk, Color Monitor	$2495

IBM AT

1.2 Floppy, 512K, 20 MB Hard Disk, Monochrome Monitor	$2995
1.2 Floppy, 512K, 20 MB Hard Disk, Color Monitor	$3225

...and COMPAQ too!

COMPAQ PORTABLE

2 Drives, 256K	$1595
1 Drive, 256K w/20 MB	$1999

COMPAQ DESK PRO

1 Drive, 640K w/20 MB Green or Amber Monitor	$2275

COMPAQ 286

DESKTOP — 1 Drive, 256K w/30 MB, Monitor	$3295
PORTABLE — 1 Drive, 256K, 20 MB Hard Disk	$3795

DRIVES AND TAPES

10 MB Tape Back Up	$409
20 MB Tape Back Up for AT	$549
60 MB Tape Back Up for AT	$749
360K Floppy for AT	$115
360K Floppy for PC/XT	$ 99

SEAGATE

10 MB Hard Disk Kit	$379
20 MB Hard Disk Kit	$395
30 MB for AT	$609
40 MB for AT	$749

BOARDS

HERCULES GRAPHICS CARD	$195
HERCULES COLOR CARD	$145
SIGMA COLOR 400	$419
STB EGA	$289
PARADISE AUTOSWITCH	$359
QUADRAM EGA	$369
AST ADVANTAGE W/128 K	$349
AST RAMPAGE	$269
AST RAMPAGE AT	$409
INTEL ABOVE BOARD	CALL
ORCHID PC TURBO W/DAUGHTERBOARD	$499
AST 5251-11	$569

MODEMS

HAYES 1200	$365
HAYES 1200B ALONE	$299
HAYES 1200B W/SOFTWARE	$335
HAYES 2400	$565

MONITORS

AMDEK		PRINCETON	
310A	$145	MAX 12	$159
600	$399	HX12E	$505
722	$505	SR12	$565

THOMPSON COLOR	$349
NEC MULTISYNC	$579

★ISSUE HIGHLIGHTS★

AST 6 PACK PLUS 384K $199	EVEREX THE EDGE $219	NEC MULTISYNC MONITOR $579
HERCULES COMPATIBLE COLOR CARD $69	HERCULES COMPATIBLE GRAPHICS CARD $95	PRINCETON HX12 MONITOR (incl. cable) $415
EVEREX 300/1200 INTERNAL MODEM W/SOFTWARE $149	SEAGATE 20MB KIT FOR PC/XT $395	PC MOUSE W/DR. HALO II $104

SOFTWARE

WORDPERFECT 4.1	$205	D BASE III PLUS	$405
WORDSTAR 2000	$229	FRAMEWORK	$389
WORDSTAR 2000+	$289	ENABLE	$329
WORDSTAR PRO	$239	LOTUS 123	$325
MULTIMATE	$239	SYMPHONY	$429
MULTIMATE ADV.	$269	HARVARD TOTAL PROJECT MGR.	$265
VOLKSWRITER III	$145	SMARTCOM II	$ 79
TURBO LIGHTENING	$ 59	CROSSTALK	$ 95
R BASE 5000	$319	NORTON UTIL.	$ 59
REVELATION	$499		

PRINTERS

EPSON

LX 86	$229	LQ 800	$505
LX 90	$259	LQ1000	$699
FX 85	$339	DX 20	$319
FX 286	$469	DX 35	$619

OKIDATA

ML192 IBM	$339
ML193 IBM	$475
84 IBM	$635

TOSHIBA

321	$439
341	$795
351P	$975
351P/S	CALL

NEC

P5	$1149
P6	$475
P7	$639

PANASONIC

1091	$269
1092	$339

SILVER-REED

EXP 800	$669

IBM

PROPRINTER	$409
PROPRINTER XL	$599

Arlington Computer Products, inc.
450 E. HIGGINS ROAD
ELK GROVE VILLAGE, IL 60007

FOR ORDERS & SYSTEMS QUOTES:

800-548-5105

CUSTOMER SERVICE AND IN ILLINOIS CALL 312-228-6333

Circle 825 on reader service card

Prices and Availability Subject To Change Without Notice

EVERY BUSINESS NEEDS AN IBM-PC

WHO WANTS TO PAY IBM PRICES?

WE HAVE A SOLUTION!!!

FACTORY DIRECT
$799.
STANDARD MODEL

100% Compatible PC-XT

BASE P[illegible] $950.00 LEASE $39[illegible]

With 20 M[illegible] Hard Disk $1399.00 LEASE $56/MO

CALL

Upon Approved Credit

Our **PC-XT SUPER TURBO COMPUTER** runs all the popular Business Programs, like Lotus 1, 2, 3, Word Perfect, Wordstar, dBase III, Homebase, Sidekick, and Flight Simulator. In addition to running the programs at the standard IBM clock speed of 4.77 Mhz, it also runs at 8 Mhz — **almost twice as fast as IBM**.

ACS has developed the fastest, most powerful XT and AT computers available today. We have also researched the numerous software programs available to automate your office. If you are considering buying a computer, call ACS. We can recommend the software and hardware system that will best solve your business needs.

HERE'S WHAT YOU GET

ACS-Turbo Mother Board 4.77/8.0 Mhz
640K of RAM
Two 360K Floppy Drives
Heavy Duty 135 Watt Power Supply
Keyboard New "AT" Type with Large Enter Key
Parallel Printer Port
Monochrome Graphics Display Card
High Resolution Mono Monitor
with Swivel Base and Anti-Glare Screen

OPTIONS

20 MEG Hard Disk	$449.00
20 MEG Tape Back-Up	$595.00
Clock/Calendar	$ 59.00
Internal Modem 300/1200 BAUD	$199.00
Okidata 192 Printer	$399.00

PROGRAMS INCLUDED

Included in the purchase price is MS-DOS, the standard IBM operating system. With our Hard Disk Computer, you also get HOMEBASE, a general purpose multi-function program to perform word processing, electronic filing, and data base management. HOMEBASE has a built-in calendar, with monthly, weekly, and daily scheduling. The Homebase Calculator lets you perform calculations on the monitor and the ability to print a paper tape if desired. HOMEBASE also includes a communication program with autodialer for communication with other computers (requires a modem).

5 YEAR WARRANTY AVAILABLE

GUARANTEE & WARRANTY

We guarantee you will be delighted with our **ACS-Turbo Computer** or return it within 30 days for a refund (less shipping charges). We warranty our Turbo Computer 100% Parts & Labor for 1 year. We believe our computer is even more reliable than IBM — that's why we're offering a five-year extended warranty for only $30.00 a year. Order early for the holidays — delivery may take over 30 days.

HOW TO ORDER

Call us at (818) 889-1092. We have experienced salespeople to advise you with your computer requirements. Ask for our experts — ask for Department FD.

You can charge our **ACS-Turbo Computer** with a VISA or MasterCard. We also have a lease plan available for qualified businesses, with payments from 36 months to 60 months.

*IBM is a registered trademark of International Business Machines.

DEALERS WANTED

ACS

5311 Derry Avenue, Suite A, Agoura Hills, CA 91301
Phone: 818/889-1092 Fax: 818/889-5605 Telex: 299 353 POST UR
EASY LINK Mailbox: 62941735 Telex: 5106018224 ACS AGRA HILLS UQ

Circle 752 on reader service card

$2000?
That's Too Darned High!

Why should a CAD package cost more than a Word Processor? It shouldn't! Lots of people ask how we can offer a CAD system as good as ProDesign II at a price as low as $299. It's easy. A PC Software Package does not cost $2000 to manufacture. It doesn't even cost $200. It makes us ask the questions "Why do comparable CAD packages cost $2000 and more? What makes a CAD package cost more than a Word Processor?"

ProDesign II doesn't. ProDesign II is the complete CAD package you get for $299. With ProDesign II, you get such advanced features as Auto Dimensioning, Area Fill (Hatching), Fillets, Mirroring, Isometrics, Curve Fitting, Object Snap, Attributes, Drawing Merge, Area Calculation, Parallel Lines, Parallel Curves, Tangents, Perpendiculars, and many many more. Features once available only for $2000 or more. Features you get at no extra charge with ProDesign II.

But there is another, very important reason you should get ProDesign II. ProDesign II is very unique among CAD packages. It is easy to learn and use. When we call ProDesign II "The Easy to Use CAD System", we're not joking. You will be productive with ProDesign II in an hour or two instead of a week or two. In fact, we are confident that ProDesign II is without a doubt the easiest CAD system in the world to learn and use!

What else does ProDesign II offer? Compatibility. Compatibility with over 150 printers. Compatibility with over 80 plotters. Compatibility with most graphics adapters, digitizing tablets, and mice. Compatibility with most display adapters. Compatibility with any software that can produce HP plotter commands. Compatibility with mainframe CAD systems (IGES). All at no extra charge! (You can also get an AutoCAD Interchange Utility for $99 that converts drawings to or from the AutoCAD format.)

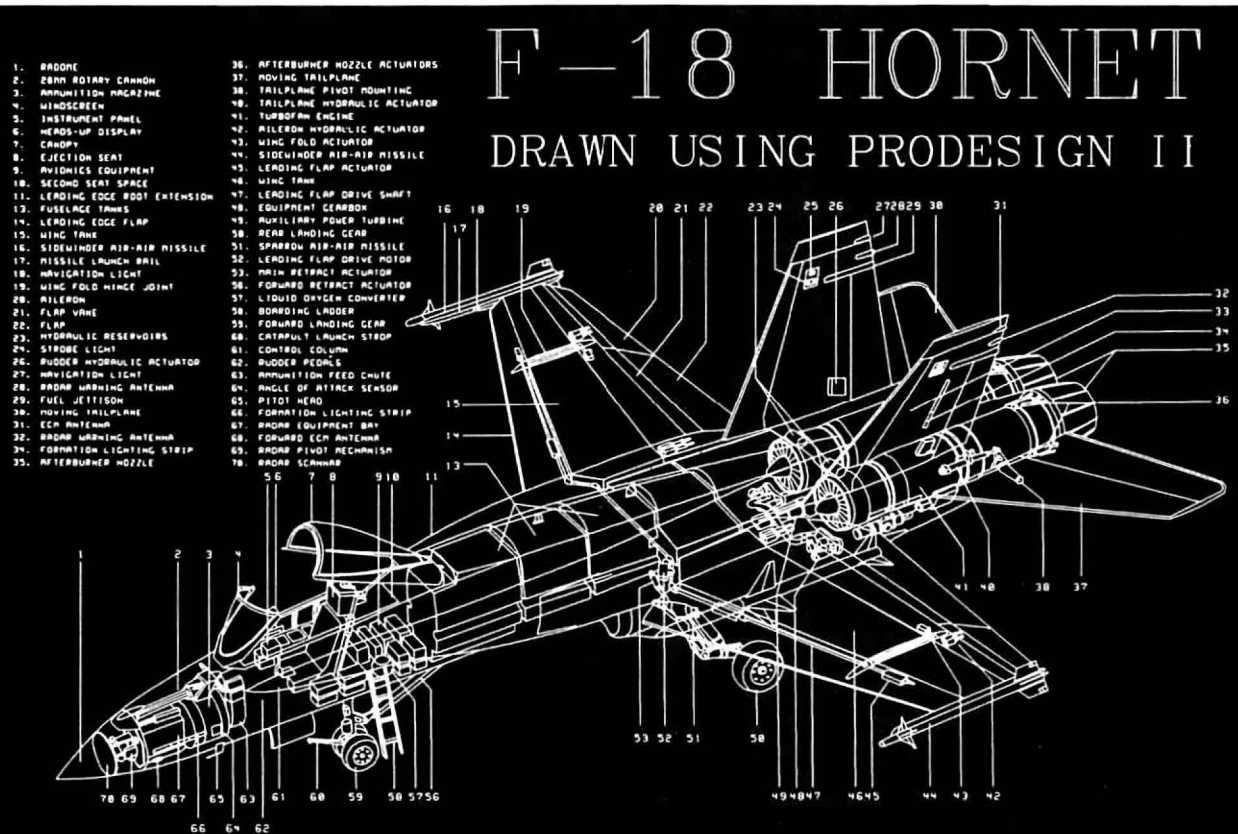
What additional hardware do you need? None! An IBM PC compatible and 512K RAM is all you need. ProDesign II produces high resolution drawings on your dot matrix printer - better than .005" resolution on a IBM/Epson compatible printer. And you don't have to get a mouse or digitizing tablet. ProDesign II is designed for easy and efficient keyboard use. You won't even need a math coprocessor, although it is supported. From a small drawing on a dot matrix printer to an E-Size drawing on a large plotter, ProDesign II is the one to use!

ProDesign II — Affordable, Compatible, and Usable!

Where do you get it? See your local dealer or contact:

American Small Business Computers
118 South Mill Street
Pryor, OK 74361
918/825-4844 **TELEX 9102400302**

PRODESIGN II — ONLY $299!



Circle 543 on reader service card

.
Star-Dot-Star

A global exchange of personal computer discoveries

This month: 1-2-3 time and space savers, switching subdirectories within dBASE III Plus, DOS 2.10 ECHO overhaul, putting nothing on the screen, and buttonless font changing for the upgraded Epson FX-80

Edited by Steven Cook

Shortcut Copies

When I am using *1-2-3*, I frequently need to copy something from a distant area of the worksheet to the cell pointer's current position.

The usual approach is to move the cell pointer to the cell or range to be copied, select /Copy and press <Enter>, move back to the destination cell, press <Enter>, then move the cell pointer back to the destination cell again to resume work.

A simpler and faster method is to leave the pointer at the destination cell, select /Copy, press <Backspace> instead of <Enter>, then move the cell pointer to the cell or range to be copied and press <Enter> twice. The cell or range is copied, and the pointer shoots back to its starting point.

This simple shortcut also works with the /Move command. It's saved me countless keystrokes and time I would otherwise have spent returning the cell pointer to its original location.

Max Braun
Orlando, Florida

Translations to Go

The Translate Utility functions of *1-2-3* release 2 and *Symphony* provide an easy way to interchange data between various programs, but they also occupy a significant amount of disk space. Fortunately, the translation utility automatically determines which translation modules are available (by checking the module file names) and adjusts its menu options accordingly. If you don't need to translate data between all the formats offered, you can save disk space by deleting those modules you are unlikely to use.

The purpose of each translation module should be obvious from its file name, but the modules are listed in TRANSLATIONS for easy reference. Don't delete the main translation program, TRANS.COM, unless you do not need the translation utility at all.

Dan Domzalski
Buffalo Grove, Illinois

(continues)

TRANS.COM–The main translation program
DIF.XLT–DIF files to Lotus products
DBF2.XLT–dBASE II to Lotus products
DBF3.XLT–dBASE III to Lotus products
JZZLOTUS.XLT–Jazz to other Lotus products
VCWRK.XLT–VisiCalc to Lotus products
WRKWR1.XLT–Messages for formats that do not need translation
WR1WRK.XLT–Symphony 1.1 and 1-2-3 release 2 to Symphony 1.0
WR1WKS.XLT–Symphony 1.1 and 1-2-3 release 2 to 1-2-3 version 1A

TRANSLATIONS: Lotus Translate Utility file names and purposes

Don't Let "English
Programs Put You

"Like" Database On Their Menu.

Once upon a time, databases like dBASE, PFS, and Paradox were advertised as "easy-to-use." With "English commands," or an "English-like" query language. Unfortunately, some of you believed. And were bitten.

Well, the fairy tale's over. Here's the reality. What they call English is not really English at all. Oh, there's a smattering of English words here and there all right. . . on menus or screen labels. And these menus do help you move around in the program. But when you want to get information out of their database, a computer language takes over. And if you can't speak it, you're in a lot of trouble.

Now unless we're mistaken, the reason you buy a database is not to move around in menus or to learn a second language. It's to get information in and out. That's why the official language of Q&A™ is genuine English. Not English-like commands, real honest to anglo saxon. To get answers from a Q&A database, simply type a question into your computer just the way you talk. If you want to know which salespeople sold more than average in the last six months, you actually type in:

Q&A even handles complicated questions like "Give me the names and phone numbers of the eastern region salespeople who work for Craig Elliott and whose sales are below average. Sort them by state, and show me their commissions and commission to salary ratios."

But English alone is not enough. So Q&A includes a powerful database manager, a flexible database reporter, and a fast, full-featured word processor. You can use it for record keeping. Word processing. Custom mailings. Database management. Inventory tracking, letters, reports and much more. Since Q&A is both your database and word processor, merging a mailing list with a form letter just doesn't get any easier.

Release 2.0: The Second Generation.

In its first year, Q&A received some of the highest ratings ever given by professional software evaluators.* Here's what PC Week's Jim Seymour had to say: "Q&A is the quintessential manager's product. . .a near perfect tool for people who want to poke around in customer lists, personnel lists, product lists, and who also need to write reports and letters. . ." And now with Release 2.0, it's even better and faster (two to four times as fast as Release 1.1). Here's just a sample:

Q&A Database	Q&A Word Processing
✓ Local area network support	✓ Use 1-2-3 graphs and files in documents
✓ 8-up/across mailing labels	✓ Column math & multicolumn printing
✓ 64000 character look-up tables	✓ Microjustification
✓ 16 million records	✓ Built-in spelling checker
✓ 2400 fields per record	✓ Imports Wordstar, ASCII, PFS Write, IBM Writing Assistant
✓ 115 simultaneous indices	✓ Automatic mail-merge with database files
✓ Searches files as fast as dBASE III	✓ Automatically prints envelopes
✓ Imports dBASE, 1-2-3, Fixed ASCII, DIF, PFS File/Report	

Red checks denote new features

For all its power, Q&A hasn't sacrificed ease of use. You can set up databases in seconds by typing the label followed by a colon (like name:, address:, etc.) anywhere on the screen. Then, with only two more keystrokes you're ready to enter information.

Menus? Yes, we use them too. For moving between modules in our program, or jumping temporarily to others (like Lotus 1-2-3) without leaving Q&A. But to get information in or out, we use plain English.

An Offer You Can't Refuse.

We've made Q&A easy to learn and use. And with our 30-day money-back guarantee and a contest, we're making it easy to try (*Q&A and PFS owners, please see note below*).† Until December 1st, every 40th caller to the toll free number below will receive the complete Q&A package ABSOLUTELY FREE. Even if you're not a 40th caller, you still win, because along with the information we send, you'll get a free demonstration disk that normally sells for $10. Call now. If you can speak English, you're a winner. It's the easiest way to keep the database wolves at bay.

(800) 556-1234 Ex. 576
(800) 441-2345 Ex. 576 in CA

Q&A
New! Release 2.0

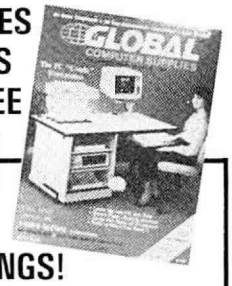
The Database that Understands English

SYMANTEC
10201 Torre Avenue • Cupertino, CA 95014

*PC Magazine's Editor's Choice; InfoWorld's Highest Rating, 5 Disks, "Highest Ever" rating for software from Software Digest † Offer good through December 1st, void where prohibited. Limit one call per person and/or mailing address. Q&A owners please call (408) 973-9597 for our very low cost upgrade offer; PFS owners call (408) 253-9600. Q&A is for IBM PC/XT/AT's and compatibles, suggested retail $349.00. Symantec and Q&A are trademarks of Symantec Corp. Other brand and product names are trademarks and/or registered trademarks of their respective holders. © 1986 Symantec Corp.

Circle 790 on reader service card

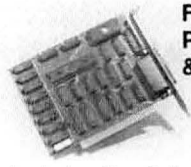
FIND THE WIDEST RANGE OF DP WORKSTATIONS, ACCESSORIES & SUPPLIES IN THIS FREE GLOBAL GUIDE ...all at HUGE SAVINGS!



The GLOBAL GUIDE offers more variety than any office equipment, computer or software dealer; plus, toll-free order convenience. Use the Reader Service Number or dial 1-800-8-GLOBAL (That's 1-800-845-6225).

GLOBAL
COMPUTER SUPPLIES
45 South Service Road, Plainview, NY 11803

Circle 819 on reader service card



FITS IBM PC, XT & AT

256K PRINTER BUFFER

- Includes Parallel Printer Port
- One Year Limited Warranty
- Software for multiple copies, pause . . . AND MORE

$180

TO ORDER CALL
800-826-1465
(602) 938-3165

Ditron
CORPORATION
4026 W. ST. JOHN
GLENDALE, AZ 85308
MC/VISA, COD ACCEPTED
IBM, PC, XT, AT a trademark of IBM CORP.

Circle 288 on reader service card

PC SOFTWARE
Public Domain & (User Supported)

PC-Write (easy to learn work processor)
PC-DBMS (relational database-req. 192K)
PC-Dial (fast-friendly-modem comm.-PCjr)
QMODEM (fast-versatile-modem comm. 192K)
Team-Mates (9 pop-up window desk aids & utils.)
Gen. Ledger (double entry bookkeeping)
Arcade Games 1 (frog, packman, pitfall & more)
Arcade Games 2 (kong, pyramid, fortune, golf & more)
Games Disk (flight, startrek, spacevad, slots & more)
Ultra Utilities (recover lost files, examine sectors)
Wordflex (easy to use word processor)
Time & Money (home finance mgr. & computation aids)

$6.00 Ea.

Try a Six-Pac

any six of the above only $29.95
(all orders add $3.00 shipping & handling)
(credit card orders welcome. $10.00 min. please)

The above programs were written for the IBM-PC & PC-jr, will run on some compatibles. Be certain of compatability before ordering.

Soft/Plus Research
759 S. State St., Ste. 109
Ukiah, CA 95482
(707) 462-3118
24 Hour Order Line

MasterCard VISA

Circle 850 on reader service card

DB3+CD: Directory-changing utility for dBASE III Plus

```
A>debug <Enter>
-a 100 <Enter>
xxxx:0100 move dx,bx <Enter>
xxxx:0102 move ax,3b00 <Enter>
xxxx:0105 int 21 <Enter>
xxxx:0107 retf <Enter>
xxxx:0108 <Enter>
-n cd.bin <Enter>
CX 0000
:8 <Enter>
-w <Enter>
Writing 0008 bytes
-q <Enter>
```

```
*Program CD.PRG
parameter dir
close databases
load cd
call cd with dir
? 'Directory now changed to ',dir
release cd
return
```

DB3+CD.PRG: dBASE III Plus program to execute CD.BIN

dBASE Subdirectories

Subdirectories make organizing your hard disk a breeze because you can put related data and progams into logical "cubbyholes." I was disappointed when I discovered that *dBASE III Plus* lacks a simple command to change the current directory.

It's possible to use the command RUN CD *path* to accomplish this end, but that requires additional memory, plus extra time to load the DOS command interpreter. Fortunately, *dBASE III Plus* can easily load and execute assembly language programs. I've created the programs CD.PRG and CD.BIN that use this feature to change the current directory.

CD.PRG, shown in DB3+CD-.PRG, is written in *dBASE III Plus*'s command language. It closes any open data files, loads the assembly language program CD.BIN into memory, transfers control to CD.BIN, then eliminates CD.BIN from memory and returns control to the calling program.

Follow the steps shown in DB3+CD.BIN to create CD.BIN using the DEBUG.COM program from the DOS Supplementary Programs disk. You should store both CD.PRG and CD.BIN on your hard disk in the same subdirectory that contains *dBASE III Plus*.

To use the programs, simply issue the command DO CD WITH *path*, replacing *path* with the appropriate subdirectory specification.

Calvin Hsia
Honolulu, Hawaii

(continues)

Professional Print Spooling Software

COMPUTE WHILE YOU PRINT!

PrintQ®

See us at COMDEX/Fall November 10-14, 1986 Bally's Las Vegas Las Vegas, Nevada

FINALLY, A REAL MAINFRAME PRINT SPOOLER FOR YOUR IBM PC OR COMPATIBLE

If you spend part of your PC time running applications. Part of it printing. And a lot of time waiting . . .

Imagine a program that prints up to 10,000 pages while you run applications.

PrintQ does that. And more.

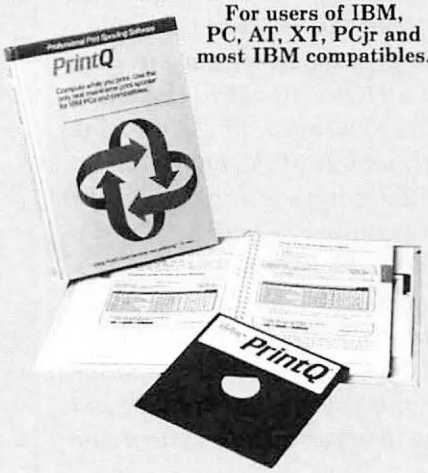
It's the first really complete print spooling subsystem for your PC. And your biggest time saver ever!

HOW *PrintQ* WORKS

Run your application programs as usual, but instead of stopping after the print command, keep right on computing! ***PrintQ*** intercepts the documents bound for the printer, spools them to disk, then prints them according to your commands.

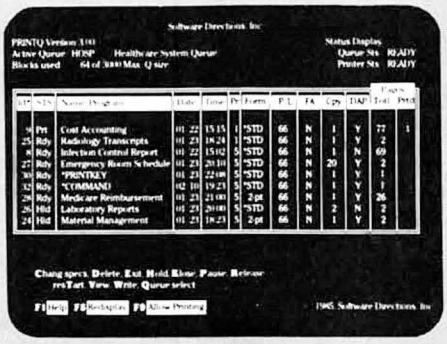
NOT COPY PROTECTED

For users of IBM, PC, AT, XT, PCjr and most IBM compatibles.



Dealer Inquiries Invited
Corporate Licensing Available

© 1985, 1986 Software Directions, Inc.



"Pop up" status display lets you monitor and control document printing at any time.

WITH *PrintQ* YOU CAN . . .

- Re-start printing from any page.
- View documents on screen with or without printing.
- Print up to 255 copies automatically.
- Save reports for reprinting.
- Minimize form changes. ***PrintQ*** groups similar documents.
- Print in order of priority.
- Simplify forms alignment.
- Work while printer is down.
- Copy reports to ASCII files.
- Control from within a batch file.
- Use any printer (including laser).
- No program modifications required.

. . . AND MUCH MORE.

*"Using **PrintQ** could become very addicting, and users may never want to go back to ordinary printing again."*

—PC Week

FULLY GUARANTEED

Use ***PrintQ***. If you're not convinced ***PrintQ*** saves time, increases productivity and enhances printer function, return it within 30 days for a full refund.

Order now and you'll receive the ***PrintQ*** disk, complete easy to understand documentation, and the Quick Start Card which will have you reaping the benefits of ***PrintQ*** in seconds.

Call toll-free or mail the coupon to order now.

1-800-346-7638

In New Jersey Call
201-584-8466
Same day shipping on phone orders

PCW 11-86

SDI Software Directions, Inc. 1572 Sussex Turnpike, Randolph, NJ 07869

YES. Rush me PrintQ for just $89, which includes postage and handling (Canada — add $10; Foreign — add $20). If I'm not convinced PrintQ saves time, increases productivity and enhances printer function, I'll return it within 30 days for a full refund.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

☐ Check enclosed. ☐ Visa ☐ MasterCard ☐ AmEx.

Acct. No. _____ Exp. date _____

Signature _____ Phone # _____

NJ residents add 6% sales tax.

IBM is a registered trade mark of International Business Machines Corporation.

Circle 874 on reader service card

STATS-2™
A COMPLETE STATISTICAL PACKAGE
$149

- **EASY ACCESS TO DATA FROM SPREADSHEET FILES (1-2-3, SYMPHONY, ETC.)**
- **A POWERFUL TOOL FOR DATA ANALYSIS AND FORECASTING**
- Easy to use, no commands to memorize (menu driven)
- Super-fast (8087 support)
- Can be used as a stand-alone, full-featured statistical package (comes with its own Data Editor for entering/editing of data); can process data from many spreadsheet programs and data bases
- Descriptive statistics, t-tests, Correlations (including "economically" formatted matrices), Crosstabulations, Comparisons of Distributions, Significance Tests, Powerful General Multiple Regression module (up to 50 predictors, Durbin-Watson statistic, autocorrelation of residuals, forecasting subprogram, and more), Flexible General Analysis of Variance/Covariance module (up to five factors, repeated measures, unequal n, contrasts, and more), 10 Nonparametric Statistics, Bargraphs, Scatterplots, and much more
- Requires IBM-PC (or compatible), two disk drives, 256k

To order send check or money order for $149 (plus $5.00 shipping and handling) to:

MasterCard **StatSoft™** VISA

(the developers of STATFAST)
2832 East 10th Street, Suite 4, Tulsa, OK 74104. (918) 583-4149

Lotus 1-2-3 is a registered trademark of Lotus Development Corp.

Circle 175 on reader service card

Flow Charting II™
FAST. SIMPLE. SPECIFIC.

Now build, update and print process flow and organizational charts easily, confidently.

- **Readjust chart immediately after addition or deletion**
- **Travel quickly across a 120 or 200-column screen**
- **Move a single character or half a chart - instantly.**

Present the true, current picture. Use Flow Charting II on your IBM®-PC compatible system. General Motors, Bechtel, Touche Ross, Fairchild and 500 other major US corporations use it.

1-800/672-3470, ext. 897 Calif.
1-800/538-8157 ext. 897 National
408/629-5044 International

PATTON & PATTON
340 Lassenpark Circle
San Jose, CA 95136

IBM is a registered trademark of International Business Machine Corp.

Get a PC of the Action with a PC WORLD Action Ad!

Toll Free:
800-435-7766
(CA: 800-435-7760)

•

DOS ECHO Default

Photios Ioannou's item on how to make ECHO OFF the default setting for DOS version 3.10 is certainly useful [*.*, *PCW*, July 1986]—if you have DOS 3.10. If you have DOS 2.10, you can follow the steps shown in DOS ECHO to achieve the same result.

You will need a copy of the DEBUG.COM program from the DOS Supplementary Programs disk. Copy it onto your DOS disk or to a hard disk, then type in the commands as shown. When you restart the computer, ECHO OFF will be the default setting.

I found these steps posted on a local computer bulletin board system run by John Ratti. They are modifications to similar patches he found on a bulletin board run by Gene Plantz.

Curtis Schultz
Elmhurst, Illinois

Editor's note: Mr. Ioannou originally submitted patches for PC-DOS versions 2.10, 3.00, and 3.10, but I hesitated to publish the others since they involve significant changes to COMMAND.COM and a correspondingly high chance of error. DOS ECHO Default is presented in response to the numerous requests we have received for a DOS 2.10 patch. Use it with care: Remember, this patch works only with IBM PC-DOS version 2.10. Do not use it with any other DOS version or with MS-DOS provided by other manufacturers. If you make a mistake, simply omit the w *step (or press <Ctrl>-<Alt>-<Del>) and start over. If you have a hard disk and you discover that the system can*

(continues)

Your free ticket to The Source.℠

Save $49.95! Join The Source Information Network before November 30th!

Send the coupon below or call The Source right now. And we'll waive our standard $49.95 registration fee.

And once you're online, you'll have all the time in the world to learn the ins and outs of The Source since our step-by-step tutorial doesn't cost you a penny in online charges.

Soon you'll be zipping through a whole new world of online data base attractions like an Investor Services package with automated portfolio management.

Grolier's full-text, online encyclopedia. Stimulating Special Interest Groups, where you can download free software. Plus, electronic mail, comprehensive news, travel services and much more.

All at very competitive online charges.*

But you have to act now. To take advantage of our free membership offer, call 1-800-336-3366** and give our representative this claim number, 78ACH29. Or mail the coupon below. And do it before November 30th!

*Online rates as low as 10¢/minute. $10 monthly minimum applies.
**In Virginia, call 703-821-6666.

Send no money. To sign up, just mail this coupon. Or call The Source toll-free at **1-800-336-3366** and give our representative this claim number, 78ACH29.

INFORMATION NETWORK
The Source
The most powerful resource any personal computer can have.

Bill my SourcePak Manual (if ordered) and all charges on my account (including monthly minimums) to:
☐ Visa ☐ MasterCard
☐ American Express

☐ Yes, I want to join The Source and take advantage of your free membership offer.

☐ Also send me the SourcePak Manual (shown) at a special reduced rate of $9.95 (plus $3.00 postage and handling†.) Regularly $19.95—Save 50%!

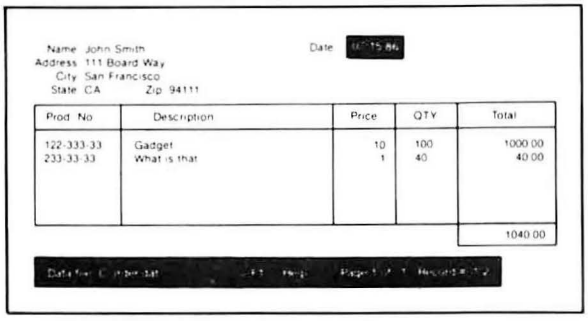
MAIL TO: The Source, PO Box 1305, McLean, VA 22102

Offer expires November 30th, 1986
†International customers add $15.00 postage and handling.

Credit card # _____ (must be provided)
Expiration date _____
Name _____
Address _____
City _____ State ____ Zip _____
Signature _____
Mother's maiden name _____ (for online password verification)
PC type _____
Phone (day) _____ (evening) _____

The Source is a service mark of Source Telecomputing Corp., a subsidiary of The Reader's Digest Association, Inc. © 1986 Source Telecomputing Corp.

IF YOU STILL USE PAPER FORMS TRY FORMMANAGER II!



MEET FORMMANAGER II. It can help automate your paper office. More than a data manager, FormManager II lets you generate forms and organize them easily. You simply lay out your forms on the screen and fill in the data. FormManager II can calculate the tax due, total amount or even set up conditional calculations. More than 26 mathematical functions are included.

FormManager II can print on pre-printed forms or just print on any plain paper. With a laser printer, you can even use different fonts on the same page.

HERE ARE SOME HIGHLIGHTS:

- Generate or use dBase III™ data files.
- Lay out forms on the screen with Forms Editor.
- Use the cursor keys to move from field to field.
- Fill in data easily with error checking.
- Print on pre-printed forms.
- Print on any plain paper with lines and boxes.
- Sort, search and modify any data records easily.
- Do complex calculation or even conditional statements.
- Report writer summarizes all your records.

SPECIAL LIMITED TIME OFFER
ONLY $99

Attention, MS FORTRAN, PASCAL, C Programmers, Forms Designer programming tool can save you time and effort producing professional screen forms. Don't struggle with the formatted I/O for screen data entry. Just use our Forms Editor to lay out the forms and call our library routines to do the job.

Comes with Forms Editor, runtime library, sample programs and library source code for PASCAL and C.

Only **$275.**

To Order Call 408-262-1054

BIT Software, Inc.
P.O. Box 360619
Milpitas, CA 95035

dBase III is a trademark of Ashton-Tate, Inc.
FormManager and Forms Designer are trademarks of BIT Software, Inc.

Circle 783 on reader service card


```
A>debug command.com
-e 096e 00
-e 1734 3c 1f
-e 366e 0d 0a 24
-e 3672 26 c6 06 6e
-e 3676 09 00 e9 05 e8
-w
Writing 4580 bytes
-q
```

DOS ECHO: Patch to make PC-DOS 2.10 default to ECHO OFF

no longer boot from this drive, insert the original DOS disk into drive A:, restart the computer, then copy the COMMAND.COM file from the floppy disk onto the hard disk. Perhaps Microsoft will soon see the logic of making ECHO OFF the default setting.

Blank Lines With ECHO

When I started using DOS 3.10, I was dismayed to find that the ECHO command behaves differently than it does under DOS 2.10. Under DOS 2.10, an ECHO command followed by several space characters would put a blank line on the screen. DOS 3.10, however, ignores spaces and responds by displaying the current ECHO status.

A simple way to get the better of DOS and echo a blank line is to use the ECHO command followed by a space and ASCII character 255. To create this character, hold down the <Alt> key and press

(continues)

SILICON EXPRESS DISKS DS/DD 7.95

VERBATIM OR MAXELL DS/DD 16.95

ELEPHANT DS/DD 8.95

Datacase 7.95

INSIDE OHIO 1-800-225-0755

YOUR TOLL FREE ACCESS OUTSIDE OHIO

1-800-228-0755

CALL...FOR THE BEST PRICES...
BEST DELIVERY...
We have hundreds of other programs in stock at Fantastic savings.

SILICON EXPRESS

ALL NEW STORE WITH EXPANDED WAREHOUSE

Ability	299.95
Ancient Art of War	26.00
Addition Magician	24.95
Algeblaster	26.95
Algebra I thru IV	ea. 26.95
Alphabet Zoo	18.95
Amazon	27.49
American Dream	87.95
Archon I or II	22.45
ASC II Express	69.95
Balance of Power	34.95
Ballyhoo	27.95
Bank Street Writer	46.50
Bank St. Writer -	64.95
Baron	29.50
Basic Compiler	279.95
Basic Interpreter	244.95
Boston Com. Diet	55.95
BPI Acc. Payable	414.95
Acc. Receivable	414.95
General Ledger	414.95
Inventory Control	554.95
Job Cost	554.95
Payroll	414.95
Time Accounting	554.95
Breakers	30.95
Certificate Maker	41.95
Champ. Load Run.	19.45
Chart Master	245.00
CIP	204.95
Classmates	34.95
Clip Art Vol 1	15.95
Clip Art Vo. 2	21.95
Clout	118.00
Cobol Compiler	489.95
Copy II PC	18.50
Cornerstone	69.95
Crosstalk	92.00
Crossword Magic	34.95
Crusade in Europe	23.75
Cut & Paste	23.00
Cutthroats	23.69
dBase III -	419.95
Deadline	28.00
Deadline Manager	104.95
dGraph III	138.00
Diagrammaster	225.00
Disk Drive Analyzer	21.95
Dollars & Sense	104.95
Dow Jones Con.	34.95
Dr. Halo II	74.95
Dutill III	48.50
Early Games	15.95
Easy	97.50
Easy as ABC	20.95
Einstein Writer	99.95
Electric Disk	214.95
Enable	489.95
Enchanter	23.69
Esp Statistics	554.95
Executive Suite	27.95
Executive Writer	48.95
F-15 Strike Eagle	19.45
Family Roots	149.95
Financial Ckbk.	31.95
Flashcalc	89.95
Flight Simulator	29.00
Fontrix 2.5	84.95
Fontrix Utility Pak	20.95
Fontpaks 1 thru 13	ea. 13.00
Fortran Compiler	244.95
Fraction Factory	15.95
Framework II	419.95
Fully Powered PC	24.95
Gato	20.45
Gem Draw	99.95
Gem Desktop	29.95
Get Organized	74.95
Ghostbusters	22.00
Goren Bridge	51.95
Graphics Expander	27.95
Graphics Magician	19.95
GRE (Harcourt Brace)	59.95
Great Paper Airplane	27.95
Harvard Proj. Man.	199.95
Total Proj. Man.	259.95
Hacker	20.95
Hacker II	26.95
Hellcat Ace	24.95
Hitchhiker's Guide	22.00
Homeword	46.95
Infidel	26.00
In House Accountant	99.95
Jet	32.75
KeyWorks	49.95
Kids of Keys	17.95
Kid Writer	18.89
Kindercomp	17.95
King's Quest II	28.00
Knowledgeman 2.0	319.95
Load Runner	19.45
Lotus	CALL
Magic Spells	20.50
Managing Your Money	104.95
Mask Parade	27.95
Mastering the SAT	104.95
Mastertype	22.50
Math Blaster	26.50
Micro Cookbook	21.45
Micro Lg. Baseball	22.50
Micro Lg. Mngrs.	22.50
Micro Lg. Team Disk	13.95
Microsoft Access	164.95
C Compiler	349.95
Chart 2.0	299.95
Project	249.95
Word	239.95
Millionaire	29.50
Mind Forever Voyag.	30.95
Mind Over Minors	41.95
Mind Prober	34.95
Most Amazing Thing	22.95
Multimate 3.3	229.95
Advantage	279.95
Multiplan MS/DOS	119.95
Murder by the Doz.	21.99
Music Construction	24.99
Newsroom	30.50
Newsroom Pro	89.95
Night Mission Pinball	27.95
Norton Utilities	69.95
Nutshell	99.95
Nutshell Info Filer	134.95
One-On-One	24.00
Paperback Writer	27.95
Perry Mason	27.95
Personal Accountant	62.95
PFS: Access	59.95
PFS: File	82.50
PFS: Graph	82.50
PFS: Plan	82.50
PFS: Proof	59.95
PFS: Report	82.50
PFS: Write	82.50
Piece of Cake Math	18.95
Pinball Construction	21.25
Pitfall II	27.95
Pitstop II	23.50
Planetfall	22.00
Print Master	41.95
Print Master Clip Art	27.95
Print Shop	35.95
Print Shop Cmpn.	32.95
Print Shop Gr. 1 or 2	22.95
Print Shop Refill	12.25
Probase	244.95
Prokey 4.0	69.95
Quick Basic	69.95
QuickCode 1-2-3	99.95
QuickCode III	138.00
Quicken	64.95
Qwiknet 2.5 500	549.95
R:Base 5000	339.95
Reader Rabbit	22.75
Ready!	49.95
Reflex	89.95
Remote	92.00
Rendez. w/Rama	22.75
Report Card	32.95
Ret. System 4-1-1	104.95
Samma -	369.95
Sargon III	27.25
Sat (Harcourt Brace)	45.00
Sat (Barron's)	53.00
Seastalker	22.00
Select Write WP 101	69.95
Seven Cities of Gold	25.45
Sidekick protected	29.00
Sidekick n/protected	44.00
Sideways Ver #3	41.95
Signmaster	160.00
Silent Service	24.95
Snooper Trps 1 or 2	22.95
Solo Flight	19.95
Songwriter	23.89
Sorcerer	26.00
Speed Reader II	37.50
Speedkey	104.95
Spellagraph	27.95
Spellbreaker	34.95
Spellicopter	23.50
Spell It	26.50
Spitfire Ace	24.95
Spy Hunter	26.00
Squire	28.00
Starcross	28.00
Star Trek	25.75
State of the Art	
Acc. Payable	369.95
Acc. Receivable	369.95
Bookkeeper	334.95
Budget & Financial	334.95
General Ledger	369.95
Inventory Control	369.95
Payroll	369.95
Pro Time Billing	534.95
Sales Invoicing	334.95
Story Machine	17.95
Story Maker	24.95
SuperCalc 3	239.95
SuperCalc 4	CALL
Superkey	35.50
Suspect	26.00
Suspended	28.00
Symphony	CALL
Temple of Apshia	23.00
Think Tank	99.95
Tigers in the Snow	27.95
Time Is Money	69.95
Transylvania	12.95
Travelling Sidekick	36.95
True Basic	84.00
Turbo Database Tlbx.	38.95
Turbo Gameworks	37.50
Turbo Lighting	54.50
Turbo Pascal 3.0	36.50
Turbo Pascal 8087	55.00
Turbo Pascal BCD	55.00
Turbo Pas. 8087,BCD	65.00
Turbo Tutor	19.00
Tycoon	29.50
Typefaces	87.95
Typing Tutor III	28.50
Ultima III	34.95
Visible 8088 protected	35.95
Volkswriter Deluxe 3	141.00
V.P. Planner	69.95
Websters Spell Checker	39.95
Websters Thesaurus	48.95
Windows	69.95
Will Writer	27.95
Winter Games	21.45
Wishbringer	27.95
Witness	22.00
Wizardry	35.95
Word Attack	26.50
Word Perfect	219.95
Wordstar	214.95
Wordstar 2000	299.95
Wordstar 2000 +	359.95
Wordstar Prof.	299.95
Writing Business Plan	34.95
Zork I	21.75
Zork II or III	24.75
HARDWARE	
Accelerator Board	679.95
Captain Board (384K)	229.00
Compuserve Starter	21.95
Copy II Option Bd.	74.00
Datacase	7.95
Disk Notcher	4.95
Flip-n-File	10.95
Gmcd. III PC, XT or AT	39.25
Gmcd. w/Y-Cable	49.95
Hercules Color Card	189.95
Graphics Pak	534.95
Graphics Card	389.95
Kraft Joystick	29.95
Lemon	31.95
Lime	48.95
Mach III IIE Joystick	32.25
Maestro-Bd. 0 Meg.	379.95
Maestro Bd.-2.5 Meg.	449.95
Paradise Color Card	164.95
PC Saver	34.95
Peach	41.95
Prometheus 1200B	289.95
Smartmodem 300	232.95
Smartmodem 1200	424.95
Smartmodem 1200B	429.95
Smartmodem 2400	699.95
System Card (16K)	299.95
System Card (256K)	474.95
Zoom 1200B	279.00
PRINTERS	
Star NX-10	274.95
Star SG-15	394.99
Star SD-10	344.99
Star SD-15	474.99
Star SR-10	494.99
Star SR-15	594.99
Star Powertype	344.95
Printer Stand	16.95
Okidata 192P	399.95
Okidata 193P	559.95
Daisywriter 2000	884.95
Juki 6100	424.95
Colored printer rbns	CALL
Color Paper Pack	12.95
MONITORS	
Magnavox Monitors	CALL
Amdek Color 600	414.95
Amdek Color 710	579.95
Amdek Color 722	635.95
Amdek Video 310A	143.00

SILICON EXPRESS

5955 E. Main St. Columbus, Ohio 43213

1-614-868-6868

YOUR ORDER FORM

SILICON EXPRESS

5955 E. Main Street Columbus, Ohio 43213

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

CHARGE CARD # _____ Exp. Date _____

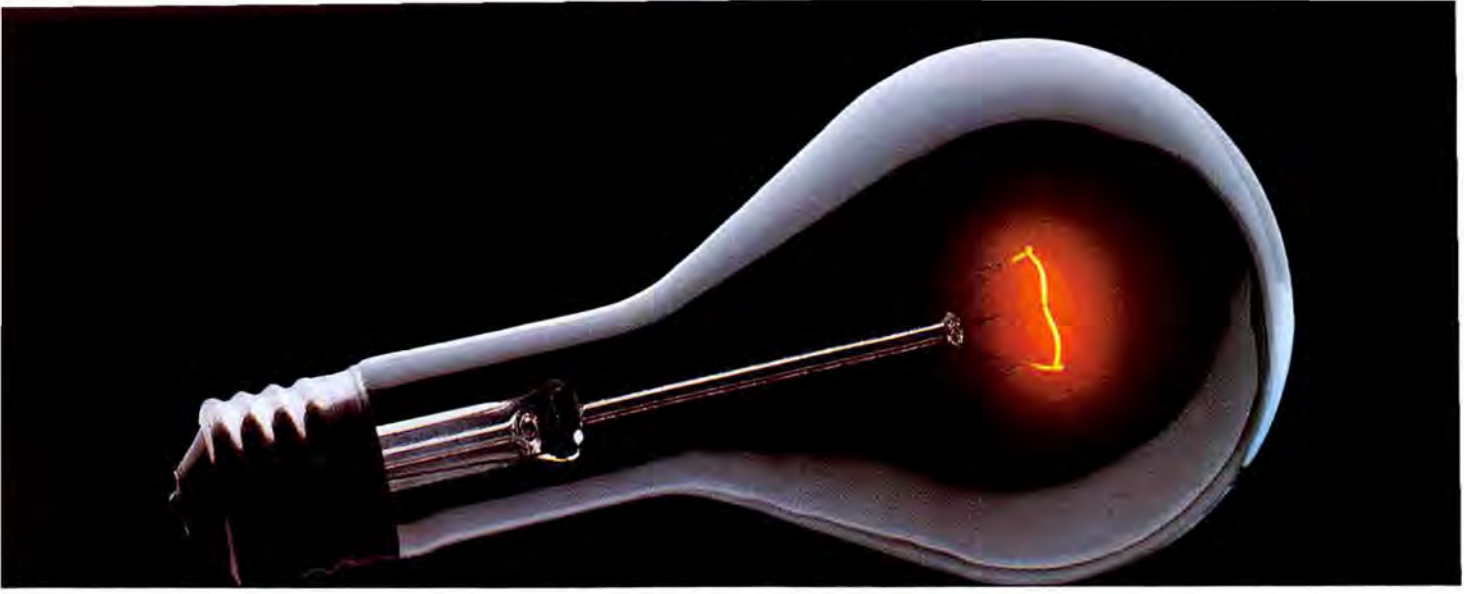
QTY	DESCRIPTION	PRICE
	SHIPPING	
	TOTAL	

Computer Type _____

Phone No. _____

No additional surcharge on Mastercard, Visa, or School purchase orders. Personal checks allow 2 weeks. Shipping charges are $3.00 minimum. Ohio residents add 5½% state sales tax. Prices subject to change without notice.

Circle 380 on reader service card



COMPUSERVE.
YOU DON'T HAVE TO KNOW HOW IT WORKS TO APPRECIATE ALL IT CAN DO.

You don't have to know about hardware. You don't have to know about software. All you have to know is that CompuServe is a computer information service. You subscribe to it. And in return, you have access to an incredible amount of information, entertainment, communications and services right at your fingertips.

Here are a few of the hundreds of things you can do with CompuServe.

COMMUNICATE

Even beginners can compose, edit, send and file messages the first time they go online with CompuServe's **EasyPlex™ Electronic Mail.** Friends, relatives and business associates—anywhere in the country—can stay in constant, convenient touch.

CB Simulator features 72 channels for "talking" with thousands of other subscribers throughout the country and Canada. The chatter is frequently hilarious, the "handles" unforgettable and the friendships hard and fast.

More than 100 CompuServe Forums welcome your participation in discussions on all sorts of topics. There are Forums for gourmet cooks, golfers, musicians, pilots, sailors and more, all designed to show you how easy and fun it can be to get the most out of your computer.

If you want to learn more about your computer system, CompuServe's at your service. Our **Users Forums** cater to specific computer makes and models, and offer information and expertise on many different types of machines. You'll find electronic editions of popular computer periodicals. You can even find free software.

And if you need answers to software questions, seek out a **Software Forum.** You can often find solutions quickly and easily online.

Bulletin Boards let you post messages where thousands will see them. Use our National Bulletin Board or the specialized bulletin boards found in almost every Forum.

HAVE FUN

You'll find all sorts of sports and entertainment trivia games, plus brain-teasing educational games. You can go it alone or compete against players from all over the country. Test your wits in the only online TV-style game show with real prizes. Then, when you're ready, go for the ultimate in excitement and get into one of our interactive space adventures.

CompuServe's **movie reviews** keep that big night at the movies from being a five-star mistake. **Soap opera updates** keep you up on all the latest turmoils and tragedies on your favorite daytime dramas.

For leisure-time reading and relaxing, look into the electronic editions of some of your favorite magazines, including OMNI On-Line.

SHOP

CompuServe's **ELECTRONIC MALL™** lets you take a coast-to-coast shopping spree without ever leaving home. It's an exciting and easy way to shop online, buying name-brand goods and services from nationally known merchants.

SAVE ON TRIPS

CompuServe's travel services let you control your own travel arrangements through the convenience of your personal computer. Scan flight availabilities on almost any airline worldwide. Find airfare bargains, then book your own flight online.

With CompuServe you've got direct and connecting schedules for national and international flights. Plus complete listings of over 28,000 hotels around the world.

MAKE PHI BETA KAPPA

When you run out of the answers at homework time, it's time to turn to CompuServe for the complete set of continuously updated encyclopedias that doesn't take up an extra inch of shelf space.

The College Board, operated by the College Entrance Examination Board, gives tips on preparing for the SAT, choosing a college and getting financial aid.

KEEP HEALTHY

HealthNet will never replace a real, live doctor—but it is an excellent and readily available source of health and medical information.

On a more personal note, **Human Sexuality** offers information on a variety of topics concerning this very important aspect of human behavior. Hundreds turn to it for honest, intelligent and candid answers.

BE INFORMED

CompuServe puts all of the latest news at your fingertips. Our sources include the AP news wire (covering all 50 states, plus national news), the *Washington Post*, the *St. Louis Post-Dispatch*, specialized business and trade publications and more.

Find out instantly what Congress did today, who finally won the game and what's happening back in Oskaloosa, with the touch of a button. And, our executive news service lets you tell us what to watch for. We'll electronically find, "clip" and file news for you...to read whenever you'd like.

INVEST WISELY

Our comprehensive investment help just might tell you more about the stock you're looking at than the Chairman of the Board already knows. (Don't know who the chairman is? Chances are, we can fill you in on that, too.)

CompuServe gives you complete statistics on over 10,000 NYSE, AMEX and OTC securities. Historic trading statistics on over 90,000 stocks, bonds, funds, issues and options. Five years of daily commodity quotes. Standard & Poor's. Value Line. And more than a dozen other investment tools.

SUPERSITE facilitates business decisions by providing you with demographic and sales potential information by state, county and zip code for the entire country.

The national business wire provides continuously updated news and press releases on hundreds of companies worldwide.

GET SPECIALIZED INFORMATION

Pilots can get personalized flight plans, weather briefings, weather and radar maps, etc. Entrepreneurs use CompuServe too for complete step-by-step guidelines on how to incorporate the IBM s of tomorrow. Lawyers, doctors, engineers, military veterans and businessmen of all types use similar specialized CompuServe resources pertinent to their unique needs.

So much for so little.

CompuServe makes the most out of any computer, and all you pay is a low, one-time cost for a Subscription Kit (suggested retail price $39.95). Usage rates for standard online time (when CompuServe is most active) are just 10¢ a minute.

In most major metropolitan areas you can go online with a local phone call. Plus, you'll receive a **$25.00 Introductory Usage Credit** with the purchase of your CompuServe Subscription Kit.

So easy the whole family can go online.

CompuServe is "menu-driven," so beginners can simply read the menus (lists of options) that appear on their screens and then type in their selections. Experts can skip the menus and just type in GO followed by the abbreviation for whatever topic they're after.

If you ever get lost or confused, just type in H for help, and we'll immediately cut in with instructions that should save the day. Plus, you can always ask questions online through our feedback service or phone our Customer Service Department.

Here's how to subscribe.

To access CompuServe, you need a computer, a modem (to connect your computer to your phone) and, in some cases, some simple communications software.

Now you're ready to order your CompuServe Subscription Kit.

For your low, one-time subscription fee, you'll receive:

- a complete, easy-to-understand, 170-page spiral-bound Users Guide
- your exclusive preliminary password
- a subscription to CompuServe's monthly magazine, *Online Today*

All this, plus:

- a $25.00 usage credit!

To order your Subscription Kit or to receive more information, call **800-848-8199** (in Ohio, 614-457-0802).

CompuServe Subscription Kits are also available in computer stores, electronic equipment outlets and household catalogs. You can also subscribe with materials you'll find packed with many computers and modems sold today.

CompuServe. You don't have to know how it works to appreciate all it can do—for you.

CompuServe®

Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, Ohio 43220

An H&R Block Company

EasyPlex and ELECTRONIC MALL are trademarks of CompuServe, Incorporated

Circle 856 on reader service card

Attention all FX80, FX100, JX, RX, & MX owners:
You already own half of a great printer

Now Only $79.95

Dealer inquiries welcome.

Now for $79.95 you can own the rest. You see, today's new dot matrix printers offer a lot more.

Like an NLQ mode that makes their letters print almost as sharp as a daisy wheel. And font switching at the touch of a button in over 160 styles. But now, a Dots-Perfect upgrade kit will make your printer work like the new models in minutes— at a fraction of their cost.

And FX, JX and MX models will print the IBM character set, too.

So, call now and use your Visa, MasterCard, or AmerEx. Don't replace your printer, upgrade it!

1-800-368-7737
In California: 1-800-831-9772

Sample of letter with Dots-Perfect

Dots-Perfect
Dresselhaus

Sample of letter without Dots-Perfect

837 E. Alosta Ave., Glendora, CA 91740 Tel: (818) 914-5831
An upgrade kit for EPSON FX, JX, RX, & MX printers

EPSON is a trademark of EPSON America, Inc.

COPY II PC™

BACKS UP PROTECTED SOFTWARE.
The backup insurance you need to protect your software investment, COPY II PC makes a floppy backup of most protected software quickly and easily. (We update COPY II PC regularly to handle new protections; you as a registered owner may update at any time for $15 plus $3 s/h.)

RUNS PROTECTED SOFTWARE FROM YOUR HARD DISK.
COPY II PC makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software. Call for current list.

MINIMUM REQUIREMENTS:
IBM PC, XT, AT, 256K jr and most compatibles. One or two disk drives. 128K memory (all available memory fully supported).

Call 503/244-5782, M–F, 8–5 (West Coast time) with your MC VISA in hand. Or send a check for $39.95 U.S. plus $3 s/h, $8 overseas.

$39.95

Central Point Software, Inc.
9700 S.W. Capitol Hwy. #100
Portland, OR 97219

Central Point Software INCORPORATED

Backup utilities also available for the Macintosh, Apple II, Commodore 64/128 and Atari ST.

PC TOOLS NOW AVAILABLE!
Put all the most popular disk utilities (even undelete) together with a powerful DOS interface. Then make them resident and you have PC Tools. PC Tools lets you run nearly any DOS command within any other running program. Just $39.95 plus $3 s/h.

Circle 662 on reader service card

the digits 255 on the numeric keypad, then release the <Alt> key. Although you cannot see the difference between ASCII 255 and a space, DOS will not consider the line blank and will display a blank line as intended.

Bill Braun
Cleveland Heights, Ohio

Editor's note: Some word processing programs cannot accept the <Alt>-255 character. Thus, you may have to use the DOS EDLIN program to put the character into your batch files. See the DOS manual for details on using EDLIN.

Printer Pointer

Shortly after Epson discontinued the FX-80 and introduced the FX-85 printer, the company released an upgrade board for the FX-80 that gave it the ability to print in the same near letter quality (NLQ) mode offered by the FX-85. The hitch? Although the FX-85 could be switched between draft and NLQ modes with the press of a button, the upgraded FX-80 required a laborious three-step process: Turn the printer off, reach inside and flip a switch, then turn the printer back on.

Pleased as I was with the NLQ typeface, I resented the nuisance, and I feared for the long-term survival of the tiny switch as my husband and I flipped it back and forth several times a day.

I learned recently that the FX-85 printer can also be switched

(continues)

PC-DESK
TAKES YOU BEYOND SIDEKICK

PC-DESK. The Ultimate in Desk-Top Management

Now, finally at your command. A completely integrated word processor, calendar/reminder, name/address/phone database and directory. Letter/label/report printer, mailmerge, invoice system and printing calculator.

PC-Desk does just about everything you need. It's a powerful and easy-to-use tool that reduces your work and makes your business life easier. And, it does more than hundreds of higher-priced programs.

The Most Powerful Feature

PC-Desk automatically prepares your letters, invoices and memos.

It's fast and easy to send individually typed, personalized letters, either singly or by the hundreds. Just select the names you want. Tell PC-Desk which letter to send, and it does the rest.

It puts in the special greeting you use for each person. It adds the variable information you want. . .the shipment date, company or product name, or whatever you choose. All at the touch of a button.

PC-Desk is simply spectacular. Users say, "This is the way software ought to be!" Try it for 60 days. If you're not completely satisfied, return it for a full refund.

Free Updates, Free Support.

That's right. Free updates. (Remember, if you already own PC-Desk, send for your free update to version 6.5.)

And, if you ever need help, just call us. We'll talk you through it.

Look At Everything You Get!

Easy Instructions
Step by step directions on the screen. You'll always know what codes to use. Even if you're new to computers, you'll be efficient right away.

Calendar/Reminder
24 reminders per day. Reminder days are highlighted. Put the cursor on any day. . . all your reminders pop up. See a full month at a time. Flick back and forth between months. Print reminders with a single keystroke. You're organized and you'll stay organized.

To Do List
Tracks up to 20 projects. You'll never forget what you need to do.

Word Processor
Full-featured. . .why use any other word processor? PC-Desk gives you professional-looking documents. . .with bold, underlining, centering, and justification. Word wrap, block move, search, margin settings. And no waiting for screens to come up with Turboscreen.

Personal Address Book
Automatically printed in a pocket-sized format. Cross-indexed by company name. Breast-pocket holder free when you order PC-Desk.

Database
Outstanding organization and flexibility. Easy to access and maintain. Name, address, phone number (work and home), salutation, title, date, variables for automatic printing, comments, and more. Sort on zip, or alphabetically by name or company. Search, scroll through, change or delete. Select names for group mailings. Make notes on client contact. Print your rolodex, envelopes, (with return address too), letterheads, invoices, labels, entire name and address file.

Mail Merge
Fully integrated with database. Letters with up to four variables.

Calculator
Print your calculations. Pops up into word processor. Hex, binary, and octal for programmers.

Memory Partitioning
Lets you flip back and forth between PC-Desk and other programs. Cut and paste.

Logs
Client billing, computer use, telephone, and expense logs. Great for tax records! Print monthly statements with total time and expenses. Edit your logs. With auto-dialer calls are logged automatically.

Auto-Dial
Save time. Auto-dial any phone number in your database. Choose work or home number.

Encrypt
Protect your files from prying eyes.

DOS Functions
Copy, delete, print, view, renamefiles easily.

On-Screen Clock

Manual
Full instructions.

Not Copy Protected

SideKick is a registered trademark of Borland International, Inc. IBM is a registered trademark of International Business Machines Corp.

Software STUDIOS
8516 Sugarbush, Suite 104
Annandale, VA 22003
703/978-2339

PC-DESK
SIMPLY THE BEST.

To order, or for more information:
Call Toll Free 1-800-A-PC-DESK

YES! Rush me the best—PC-Desk.
60-Day Money-Back Guarantee.

★ SPECIAL OFFER ★

Only **$79**
(plus $5.00 Shipping & Handling).
You save **$46** on the regular $125 price.
Offer Expires in 30 Days

☐ Check ☐ Money order
☐ MasterCard ☐ Visa

Card # _____
Expiration date ____/____
Name _____
Firm _____
Address _____
City _____
State/Zip _____

Requirements: IBM-PC, AT, XT, or compatible. 128K for program, 272K for memory partitioning, MS-DOS 2.0. Modem required for Auto-Dial only.

64K ■ 128K ■ 256K
DRAMS
EPROMS
80287-10 ■ 80287-8 ■ 80287-3
8087-3 ■ 8087-2 ■ 8087-1
4416 ■ 4464
V-20 ■ V-30
BITTNER
ELECTRONICS
MasterCard VISA
(714) 497-6200
CALL NOW FOR FREE CATALOG
Circle 622 on reader service card

ICs PROMPT DELIVERY!!!
SAME DAY SHIPPING (USUALLY)
QUANTITY ONE PRICES SHOWN for SEPT. 21, 1986
OUTSIDE OKLAHOMA NO SALES TAX
640 Kbyte MOTHERBOARD KITS: Zenith 150, IBM PC XT, Compaq Portable & Plus, hp Vectra
DYNAMIC RAM
1Mbit 1000Kx1 100 ns $40.00
4464 64Kx4 150 ns 4.20
41256 256Kx1 100 ns 4.85
41256 256Kx1 120 ns 3.40
41256 256Kx1 150 ns 2.89
41128 128Kx1 150 ns 4.99
4164 64Kx1 150 ns 1.35
EPROM
27512 64Kx8 250 ns $22.00
27C256 32Kx8 250 ns 6.50
27256 32Kx8 250 ns 5.25
27128 16Kx8 250 ns 3.95
27C64 8Kx8 200 ns 4.75
2764 8Kx8 250 ns 3.95
STATIC RAM
43256L-12 32Kx8 120 ns $27.00
6264LP-15 8Kx8 150 ns 3.10
$10.00 $12.00 8MHz V20 V30
$132.00 $345.00 5 Mhz 8MHz 8087 80287-8
OPEN 6½ DAYS, 7 AM-9 PM SHIP VIA FED-EX ON SAT.
SUNDAYS & HOLIDAYS: SHIPMENT OR DELIVERY, VIA U.S. EXPRESS MAIL
SAT DELIVERY INCLUDED ON FED-EX ORDERS RECEIVED BY: Th 9M Air $6 / Rs Fr 9-One $13 / Rs
MasterCard/VISA or UPS CASH COD
Factory New, Prime Parts
MICROPROCESSORS UNLIMITED, INC.
24,000 S. Peoria Ave., BEGGS, OK. 74421 (918) 267-4961
Please call for current prices because prices are subject to change. Shipping & insurance extra. Cash discount prices shown. Orders received by 9 PM CST can usually be delivered to you the next morning, via Federal Express Standard Air @ $6.00, or Priority One @ $13.00!
Circle 103 on reader service card

♥ COMPUTER BRIDGE ♥
♠ 15 DAY FREE TRIAL ♦
- Deals, Bids, Declares, Defends and Scores
- Enjoy over a MILLION Different Deals - or your own
- Scoring: Rubber-MPS-IMPS-Chicago-Partials
- Either partnership can optionally Signal
- Runs on either a Color-Graphics or Text Display
- Cancel, Claim, Concede, Hints, Take-Back
- For 1 to 3 players - partners or opponents
- Novice to Advanced Features- for all players
- Print a BID and PLAY record of any Game
- Newsletter subcription and Owner Tournaments
- Disk: Not Copy-Protected - can be Backed-up
- Here is what the Critics are saying...
"RECOMMENDED" Jerry Pournelle - BYTE JAN 86
"A Challenging Opponent" PC World - NOV 85
FOR ANY 256K IBM-PC OR COMPATIBLE
THE $75 BRIDGE PARLOR™ PROGRAM
Send NO MONEY - pay when satisfied
☎ Call 1-716-865-8412 Today
or Send order ☞ Parlor Software Co.
P.O. Box 17850, Rochester, NY 14617
(No $4 S&H Charge on Phone orders)
- Same Day Shipping - Dealer Inquires Welcome
Guaranteed to be Strongest Available
Circle 126 on reader service card

CompuCover®

COVER YOUR INVESTMENT
IBM PC, XT or AT 22.95
IBM PC Jr. 18.95
IBM Pro Printer 16.95
Custom combinations available for all IBM models
Epson - C.Itoh - Okidata
Over 3000 covers to choose from.
You name it - We got it!
Anti-Static • Different Colors
Call for Free Catalog
VISA MasterCard ORDER LINE 1-800-874-6391 FLORIDA ORDER LINE 1-800-342-9008 Dealer Inquiries Invited American Express Card
CompuCover
P.O. Box 310 Dept. PC
Mary Esther, FL 32569
Customer Service
(904) 243-5793
Telex 469783
Circle 416 on reader service card

Twelve Metre Challenge

Multi-faceted sailing simulation for one or two computers develops creative, political, financial, investigative and technical skills
Not copy protected for IBM PC XT AT and compatibles. DOS 2.1+/384K/CGA/2FL or 1FL+HD. $50 each, $90 for two. (Two copies necessary for communications mode.) Add $5 S/H. MA residents add 5% sales tax. VISA/MC
ENTERTAINMENT FROM
GREYLOCK SOFTWARE, Inc.
Box 730 • Great Barrington, MA 01230
413-528-5555

"CPYAT2PC"
IS LIKE HAVING A
FREE
360K FLOPPY DRIVE
Allows copying of IBM AT file for use on IBM PC's & compatibles with no modification of existing hardware or software. A 360K floppy drive is not required. CPYAT2PC may reside on your IBM PC/AT hard disk and copies 1 file or entire subdirectories in 1 step. Also runs on other AT compatibles such as COMPAQ 286, ZENITH Z-200, and KAYPRO 286I. Dealer inquiries welcome. ONLY $79 + shipping.
MICROBRIDGE COMPUTERS
Sky Way Building, Suite 125
655 Sky Way, San Carlos, CA 94070
(415) 593-8777 • (415) 595-2150
VISA CHECK, COD WELCOME (Prepayment Required) MasterCard
Circle 171 on reader service card

between modes by sending it the Escape character followed by X and the numeral 0 (to select draft mode) or X and 1 (to activate NLQ). A little research proved that sending the same sequence to the upgraded FX-80 has the same effect.

Because I tend to print drafts more often than NLQ documents, I leave the switch set for draft mode. When I need to print in NLQ mode, I simply place the NLQ command at the top of the document before printing.

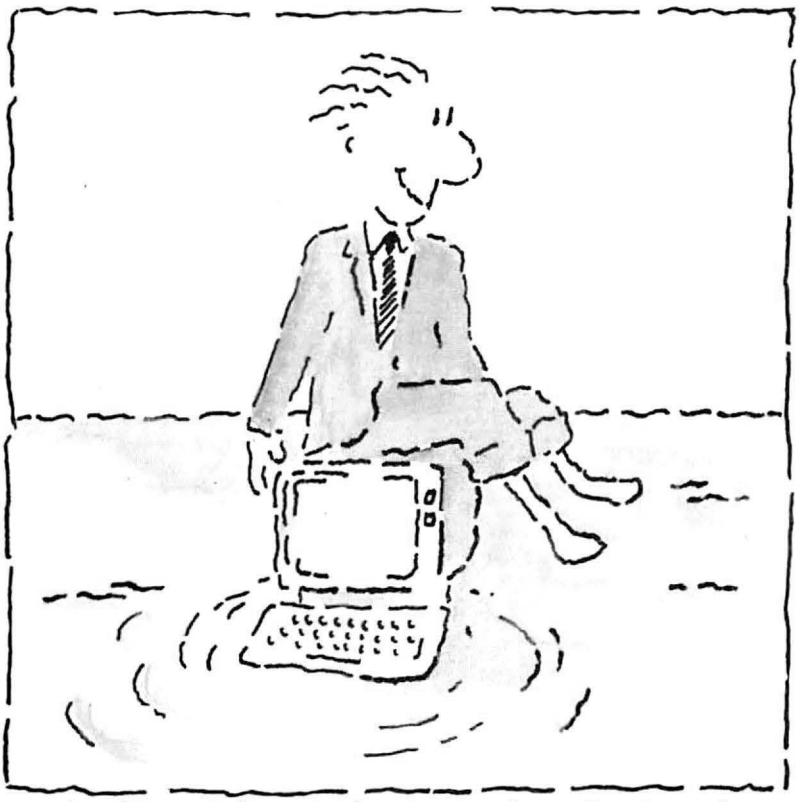
Ruth Blau
Arlington, Virginia

Prime Correction

Thanks to Ralph Davison who noticed that PRIMES2.BAS, presented in August's *.*, has a bug. Add the statement **:DEFSNG T** to the end of line 100. This will prevent the time counter from overflowing when the program is run after 9:06 in the morning.

*Join the *.* global exchange. We'll pay $25 to $200 for each item published. Send your personal computer discoveries to* Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107, or electronically to MCI Mail PCWORLD, CompuServe 74055,412, or The Source STE908. 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 receipt of any submitted materials. Accepted contributions will be acknowledged by payment.*

GET YOUR FEET WET.



Sample Dow Jones News/ Retrieval® — the nation's premier online business and financial resource—without getting in over your head.

For only $49.95, the News/Retrieval Membership Kit lets you and your colleagues plumb the depth of this valuable news and information service.

Eight free hours* of online time will get you started. There's a User's Guide to show you the way, step by step. And a year's subscription to *Dowline* (the magazine of News/Retrieval) gives you background on and suggested applications for our offerings.

Stay on top of the competitive situation in your industry. Check on the positions of your company and clients. Keep up with breaking news or call up past news from *The Wall Street Journal* (online exclusively with News/Retrieval) back to January 1, 1984. You can analyze a wealth of financial data, tap a pool of general knowledge, even plan a trip using almost any computer and modem, terminal or communicating word processor.

The Dow Jones News/Retrieval Membership Kit. It can help you embark on a wave of success. . .and not feel soaked.

To order or for more information, call **1-800-345-8500, Ext. 338.** (Alaska, Hawaii and foreign, call 1-215-789-7008, Ext. 338.)

Or use the coupon.

YES! I WANT TO GET MY FEET WET!

☐ **Corporate offer-$49.95 Each** includes:
- 8 Free Hours* • Multiple Passwords
- User's Guide • 1 Year of *Dowline*
- $12 Annual service fee waived for 1 year

☐ **Send more information**

☐ **Personal offer-$29.95 Each** for individual use, includes: • 5 Free Hours*
- Single Password • User's Guide
- 1 Year of *Dowline* • $12 Annual service fee waived for 1 year

$____ENCLOSED (Check/Money Order) ☐Bill me later Charge to: ☐AmExp ☐ MC ☐ VISA

(If you pay by credit card, all subsequent usage charges will be billed to your credit card.)

Card No. _____ Exp. Date_____

Signature_____

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Daytime Phone Number _____

Mail to: DJN/R Membership Kit, P.O. Box 300, Princeton, NJ 08543-0300
ATTN: John McGovern HOPW1106E

*Per account. Limited to new subscribers only. Free time (8 hours per Corporate offer; 5 hours per Personal offer) must be used within 30 days after receipt of password(s). Certain databases have fees over and above usage charges which are excluded from free time offer.

Dow Jones News/Retrieval®

Fuel for your ideas.

Copyright © 1986 Dow Jones & Company, Inc. All rights reserved. Dow Jones News/Retrieval is a registered service mark of Dow Jones & Company, Inc.

We have 100's of Software and hardware items in stock. Shipments on almost all items within 24 hours!

Call for programs not listed

WAREHOUSE DATA PRODUCTS

SPECIAL
WORD PERFECT
$195

Technical & Other Info. (602) 246-2222

TOLL-FREE ORDER LINE 1-800-421-3135

FREE! UP TO $100 SOFTWARE FREE!

With every purchase over $100.00 you can select one of the following MS/DOS diskettes at no charge. Please indicate choice(s). 1. Blueberry I - 54 basic utility programs includes printer select, graphic generation, etc. **Retail value $10.** 2. Blueberry II - includes a banner generator, a label maker and a checker game (requires graphics card). **Retail value $10.** 3. Print Select program - Assembly language program to select different type fonts, etc., or make your printer function as a correctable typewriter - perfect for envelopes, notes, etc. Adaptation modules for popular printers included and capability to adapt to any printer. **Retail value $40.** 4. Deposit Program Compiled DBase to list and total cash, check, bank card for bank deposit and keeps history - Developed for our corporate use - Super Program! (source code available). **Retail value $40.** Select an additional diskette for every additional purchase of $150 or purchase over $500 and receive all four at no charge.

DATA BASE MANAGERS

Clipper	$329
Clout 2	117
Condor III	310
Knowledgeman II	290
Powerbase 2.2	212
PFS: File	76
Q&A	Call
Quickcode	138
Quickreport	138
Revelation	445
R: Base System V	332

WORD-PROCESSING

Easy	88
Leading Edge w/Merge/Spell	75
Microsoft Word	252
Multimate Advantage	Call
Peachtext 5000	145
PFS: Write	76
Volkswriter 3	139
Webster Spellcheck	37
Wordstar	162
Wordstar Propac	233
Wordstar 2000	233
Wordstar 2000+	278

SPREADSHEET

Microsoft Multiplan	108
PFS: Plan	76
Spreadsheet Auditor 3.0	82
Supercalc 4	Call
VP Planner	49

ACCOUNTING

BPI AP, AR, PR, GA	299 ea.
Cyma	Call
Dac Easy Accounting	39
Dollars & $ense	94
Managing Your Money	94

INTEGRATIVE

Ability	59
Enable	312
Smart Software	Call

COMMUNICATION PROGRAMS

Crosstalk	89
Remote	89
Smartcom II	83

GRAPHICS

Chartmaster	199
Energraphics 2.0	269
In-A-Vision	249
Microsoft Bus Mouse	106
Microsoft Chart	164
Microsoft Serial Mouse	119
Newsroom	31
PC Mouse W/DR Halo II	106
Printshop	33
Signmaster	132

PROJECT MANAGER

Harvard Total Project	262
Microsoft Project	219
Super Project Plus	239
Timeline 2.0	209

EDUCATIONAL

Flight Simulator	$28
Turbo Tutor II	25
Typing Tutor III	Call

LANGUAGES

Lattice C Compiler	242
Microsoft C Compiler	249
Microsoft Fortran	195
Microsoft Macro Assembler	84
Microsoft Pascal Compiler	166
Microsoft Quick Basic	55
Ryan McFarlan Fortran	305
Ryan McFarlan Cobol	479
Turbo Pascal w/8087 + BCD	55

UTILITIES

Carbon Copy	115
Copy II PC	19
Copywrite	39
Desqview	55
Double Dos	27
Fastback	85
Microsoft Windows	55
Norton Commander	37
Norton Utilities 3.1	49
PC Tools	19
Prokey 4.0	70
Sidekick	31
Sidekick (unprotected)	47
Sideway 3.1	36
Superkey	39
Traveling Sidekick	39
XTree	27

ACCESSORIES

Copy II PC Board	75
IBM 135 watt power supply	59
Mini Micro Parallel Print Buffer	69
Masterpiece	88
Masterpiece Plus	113

INCREDIBLE VALUE

Nationally advertised boards for IBM PC and most compatibles at give away prices.

Keyboards (similar to 5151)	$79
Monochrome Board w/printer port (similar to Hercules Graphics)	$79
Expansion Board 0 to 576K	$42
Multifunction Board w/game port (similar to AST six pack)	$79
Four Drive Floppy Controller	$39
Color Card w/o printer port	$69
Color card w/printer port	$79

HARD DRIVES

Bernoulli 20 MB w/cont.	2077
Filecard 20 MB	555
Maynard 20 MB Hard Card	Call
Seagate 20 MB Int. w/cont.	$385
Seagate 30 MB Int. w/cont.	479
Seagate 30 AT Int.	Call

PRINTERS

CANON LASER	1939
CITIZEN	
MSP-10	285
MSP-15	385
MSP-20	325
Premiere 35 Daisywheel	469

EPSON SPECTACULAR

Hurry — Call us now for special low, low pricing on the following Epson printers:

FX86	FX286
LQ800	LQ1000
EX800	EX1000
LX86	LQ2500

Pricing good through December 31, 1986.

NEC	
NEC P5XLP	1126
NEC P7 Parallel	635
NEC 8850	1098
NEC P6 Parallel	455
OKIDATA - Call on all models	
PANASONIC	
1091	235
1092	299
1592	425
KXP3151	399
STAR MICRONICS	
LV1210	179
NB15	975
NX10	232
SG15	365
SR15	585
TOSHIBA	
P351	969
P341	768
P321	Call

MONITORS

AMDEK 310A	142
AMDEK 600	395
Magnovox Color RGB	Call
Multitech Color RGB	259
Princeton Max 12	159
Samsung TTL Amber	72
Samsung TTL Green	70

EGA MONITORS

AMDEK 722	505
NEC Multisync	Call

EGA BOARDS

Everex Enhancer EGA	235
Paradise Auto Switch EGA Card	359
Quad EGA Plus	349
STB EGA Plus	Call
Vega Video	Call

RAM

64K 150NS (set of 9)	$11.50
256K 150NS (set of 9)	30
256K 200NS (set of 9)	39

MODEMS

Everex 300/1200	120
Hayes 1200	Call
Hayes 1200B	Call
U.S. Robotics Courier 2400	359
U.S. Robotics Passwd. 1200	180

BOARDS

AST Advantage	329
AST Premium	359
AST Sixpac (384K)	Call
Hercules Color Card	145
Hercules Graphics +	182
Intel Above Boards	Call
J Lazer (Tall Tree)	Call
J Ram III (Tall Tree)	179
J Ram III AT (Tall Tree)	Call
STB Chauffeur	185
STB Mono	155

COMPUTERS

ABBOTT TURBO PC
IBM Compatible Computer, 4.77 or 7.47 key selectable, AT style keyboard, 640K, dual drive, 135 watt power supply $599
or with 20 MB Seagate Harddrive $970
6 month limited warranty

Corona PC ..... Call

Multitech 900 Accel
IBM AT Compatible, 512K, expandable to 1 MB on the mother board, one 1.2 MB drive, 195 watt power supply, MS/DOS 3.1, clock, 6 or 10 MHZ key selectable, soft white monitor, AT style keyboard, 1 year TRW warranty ..... Call

Multitech Turbo
IBM Compatible Computer, 256K, dual drives, 8 MHZ, ports-parallel-serial-clock, 5151 type keyboard, graphics board (similar to Hercules), mono monitor DOS 3.1, 6 month national warranty ..... Call

Sharp Portable ..... Call

TERMS: Add 3% for C.O.D. orders. Shipping on most software is $5.00. AZ orders +6.7% sales tax. Personal check - allow fourteen (14) days to clear. We accept purchase orders from authorized institutions for 1.5%. All returns are subject to our approval. There will be a 20% restock fee. Minimum phone order $50.

No Charge for Master Card or Visa

MasterCard VISA

TOLL-FREE ORDER LINE 1-800-421-3135

WAREHOUSE DATA PRODUCTS

2701 West Glendale Ave. • Phoenix, AZ 85051

Hours 7 A.M. to 5:30 P.M. M.S.T. - Mon. thru Fri.
Saturday 10:00 A.M. to 3:00 P.M.

Circle 220 on reader service card

Softstrip®
COMPUTER READABLE PRINT™

The PC User's Edge

NOW! TRANSFER DATA – PROGRAM TO PROGRAM WITH SOFTSTRIP®.

Now you can move data between programs quickly and easily using SOFTSTRIP data strips.

Using the Softstrip System, you can move data between computers and such programs as WordStar and MacWrite, dBASE and AppleWorks, Lotus 1-2-3 and Excel and ReadySetGo and many others.

We've created a series of several dozen Application Notes on Softstrip data strips. These lead you through simple steps to make the file transfer as easy as possible, adding even more versatility to your personal computer when you purchase the SOFTSTRIP SYSTEM. The advanced system you've been hearing so much about.

All you need to move data between programs is STRIPPER™ software at **$19.95** and the Softstrip System Reader at **$199.95**.

For a complete list of Application Notes, contact your dealer or call Cauzin.

NOVEMBER CASE HISTORY

LIBRARY HI TECH JOURNAL and LIBRARY HI TECH NEWS, the world's leading source of information on library automation and information technology, are printing Softstrip data strips to make it easier for their readers to stay abreast of the vast amount of material published monthly.

According to C. Edward Wall, Editor and Publisher, LIBRARY HI TECH NEWS monitors more than 200 publications dealing with information with application to library operations. The newsletter includes bibliographies of books, conference reports and articles published in hundreds of other periodicals.

The newsletter prints bibliographies in Softstrip data strip form. As Mr. Wall notes, this permits any library or information center to build a valuable on-line data base of useful information.

The data strips are ASCII based, and will operate with most of the information retrieval software developed for micro computers.

LIBRARY HI TECH JOURNAL and LIBRARY HI TECH NEWS are published by Pierian Press, Box 1808, Ann Arbor, MI 48106 (313) 434-5530

This data strip contains IBM2MAC, a utility that runs on the IBM and converts an IBM file to Macintosh format.

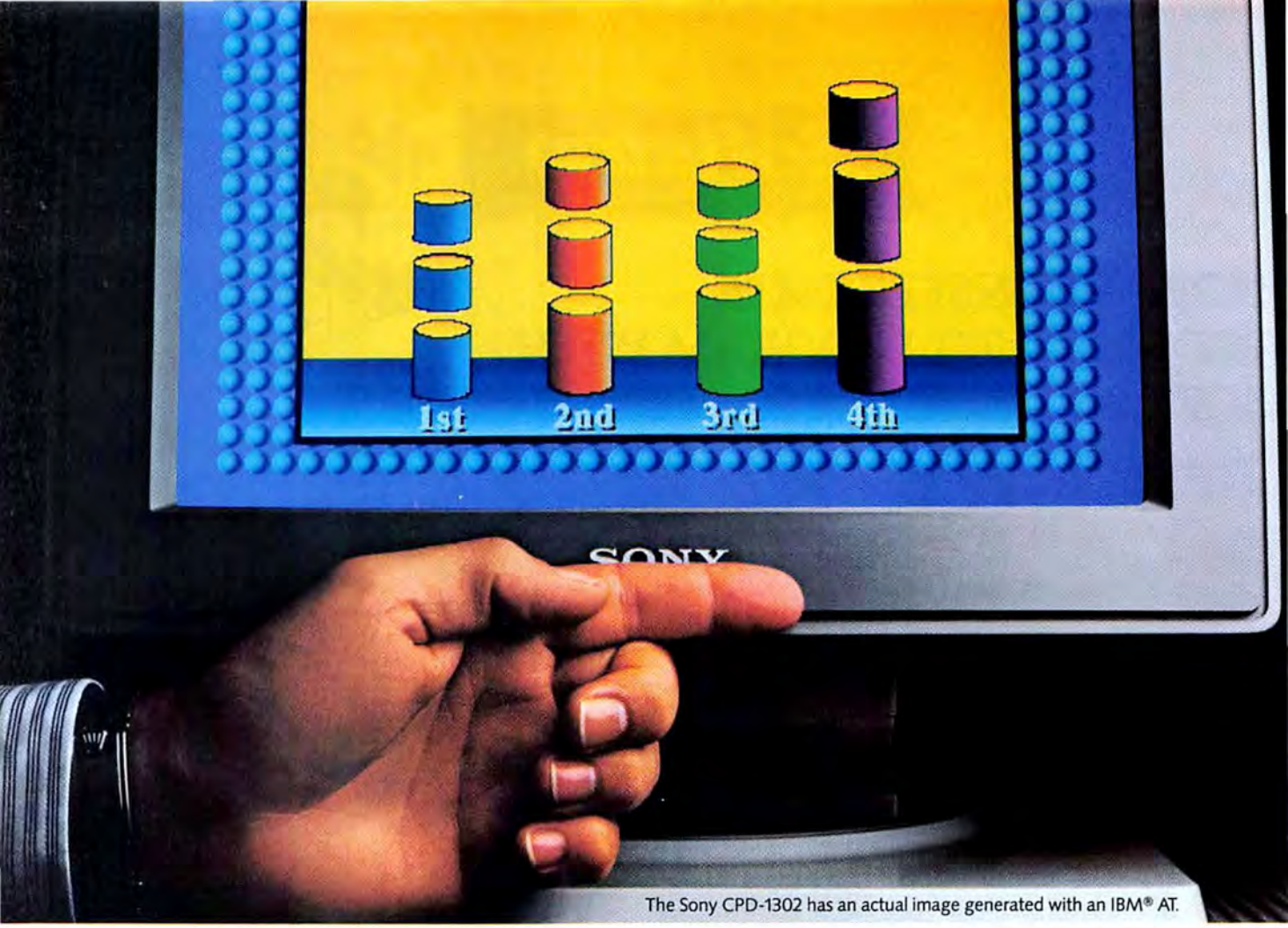
Users' Groups: Call for Special User Group Discounts.

ACT NOW! Don't delay. See your local Softstrip dealer or call us at 1-800-533-7323. In Connecticut: 203-573-0150.

CAUZIN
835 South Main Street
Waterbury, CT 06706
(203) 573-0150

For Europe and Asia Contact:
Softstrip International, Ltd.
53 Bedford Square
London, WC1 B3DP England
01-631-3775 Telex: 263874SOFTST G

Circle 154 on reader service card



The Sony CPD-1302 has an actual image generated with an IBM® AT.

Look at the picture. It's got to be a Sony.

Why the leading name in living rooms is about to become the leading name in offices.

Since 1968, Sony has been delivering the brightest, sharpest color picture with its patented Trinitron® one-gun, one-lens picture tube.

Not only did that picture become the one by which all others are judged, it even received an Emmy.

Now that picture is setting new standards in the demanding world of personal computers.

25 years have gone into the making of this picture.

Every Sony advance in the quality of your TV picture has been applied to the improvement of your computer picture.

That's why a Sony monitor is so clearly superior to other monitors. And that's why you can get a brighter, sharper picture for your computer the same way you'd get one for your home.

Only Sony could give you 9 clear choices for better computer monitors.

Only Sony makes color computer monitors from 9" to 25", plus video projectors with Multiscan™ technology that display computer images on 100" and 200" screens with astonishing resolution.

Sony CPD-9000
9" High-Resolution Monitor

Sony CPD-1201
12" High-Resolution Monitor

Sony CPD-1310
13" Medium-Resolution Monitor

Sony KV-1311CR
13" Combination Computer Monitor/Receiver

Sony KV-2011CR
20" Combination Computer Monitor/Receiver

Sony KV-2511CR
25" Combination Computer Monitor/Receiver

Sony VPH-1030Q1 & VPH-2030Q1
100" & 200" Multiscan Video Projector

So you can have Trinitrons from the smallest desk to the largest boardroom.

Sony's newest 13" Multiscan Monitor, the CPD-1302 shown above, works with CGA, EGA and even PGA graphics cards. It's a monitor that will not only give you dazzling high-resolution graphics, it's also compatible with the computer you're using now.

And several of these Sonys have the same, impressive .25mm Super-Fine Pitch™ Aperture Grille, giving them the highest resolution of any monitors in their class.

Sony even has monitors that are also remote-control Sony TVs.

In short, the standard for the brightest, sharpest picture in home, industry and broadcast is soon to be the standard for PC monitors.

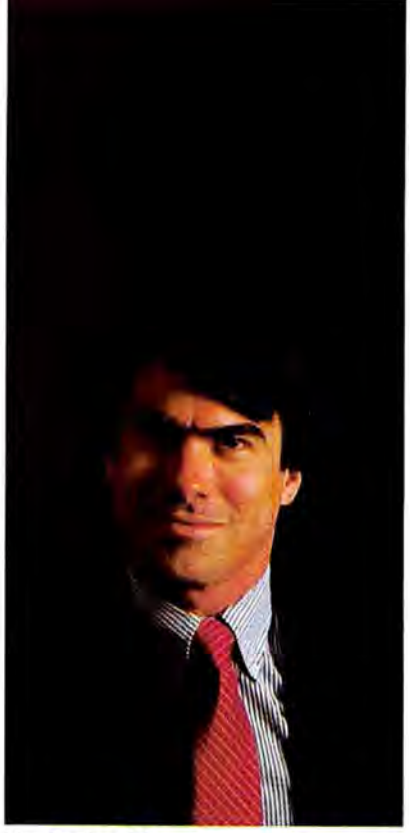
Find out more: call Sony at 1-800-222-0878 (in N.J., 1-800-222-0879).

Trinitron Computer Monitors

SONY
THE ONE AND ONLY.

© 1986 Sony Corporation of America. Sony, Trinitron, Multiscan, Super-Fine Pitch and The One and Only are trademarks of Sony. IBM is a registered trademark of International Business Machines Corp. Because the computer industry lacks standards, Sony does not and cannot make any warranty or representation with respect to performance of its monitors with each and every software or hardware option.

Circle 579 on reader service card



Kevin Strehlo

Computers and the Compleat Angler

Like computing, fly-fishing is a pure, intense pursuit that can harbor some unforeseen snags.

A few months ago I would have said that computing and fly-fishing go together about as well as business and pleasure. But that was when I planned to get way ahead of my work schedule before the start of the week-long Henry's Fork Anglers school. Instead I found myself behind, with no choice but to pack my portable computer along with my untested number 6 graphite fly rod. I grudgingly conceded that my column would have to carry a Last Chance, Idaho, dateline.

As I found out, though, there is nothing wrong with writing a stone's throw away from feeding trout and the occasional grazing moose. Just as the mountainous territory on either side of the Continental Divide is fly-fishing country, it is also writing country, complete with its own rarely spoken but closely observed rules.

Fishing requires a pure link between a fisherman and his finned prey. With the exception of Bing Lempke, a well-known fly tier with a contrary opinion on every subject, no real fisherman uses an automatic reel, for example. When you feel the tug, you strip in line as fast as you can by hand.

The same can be said for writing in the wilderness: There are no PCs in the fishing writer's tackle box.

To do it right, you have to write with knife-sharpened pencils on the backs of old guide-trip reports. At least that's how Greg, a fishing school guide and an aspiring writer, does it. With enough longhand editing and rewriting, he hopes to turn a story on the symbolic role of the great blue heron into believable fiction.

Greg could have used a manual typewriter, of course. Hemingway was photographed standing at one as he punched out *For Whom the Bell Tolls* in Sun Valley, Idaho.

But not even Charles Brooks, a prolific local writer who whipped out the polished prose of *Fishing Yellowstone Waters* in less than a month, worked on a PC. Charlie's wife, Grace, typed it and checked the spelling. A PC would have been a needless extravagance, a hindrance to pure writing.

(continues)

TEACH YOUR PC TO READ.

© 1986, DEST Corporation. PC Scan is a trademark of DEST Corporation (not to be confused with PC Scanner, a product of Caere Corp.).

Why? Because if your PC could read, you wouldn't have to spend so much time typing information into it.

INTRODUCING PC SCAN.™

It's the new personal page reader from DEST.

And it just might be the fastest way ever to get existing information into your PC. Not to mention the easiest.

Now, for instance, you can enter entire documents (or parts of them) directly into your PC's word processing program. Complete with tabs, indents, underlines, the works.

Without the tedium of retyping. Or reformatting.

Because, with PC Scan, all it takes is two keystrokes. It's really that simple.

IT READS 600 WORDS PER MINUTE.

That's ten times faster than a good typist. Which means you can enter an entire 40-page proposal into your PC in under 30 minutes.

And yet, for all its speed, PC Scan is incredibly accurate. More accurate than the most proficient typist.

What's more, PC Scan even admits its mis#akes. By doing just that. Inserting a pound sign whenever a character isn't clear enough to read.

So if there's ever an error, you can find it and fix it in seconds.

READ INTO IT WHAT YOU WILL.

Think of all the useful information that crosses your desk that you'd like to have in your PC, where you can use it.

Like graphs and charts. Legal briefs. Letters. Logos. Manuals. Memos. Sales reports. Resumes. Proposals. Photocopies. You name it.

PC Scan reads all this and more into many of the popular word processing and graphics programs you already have.

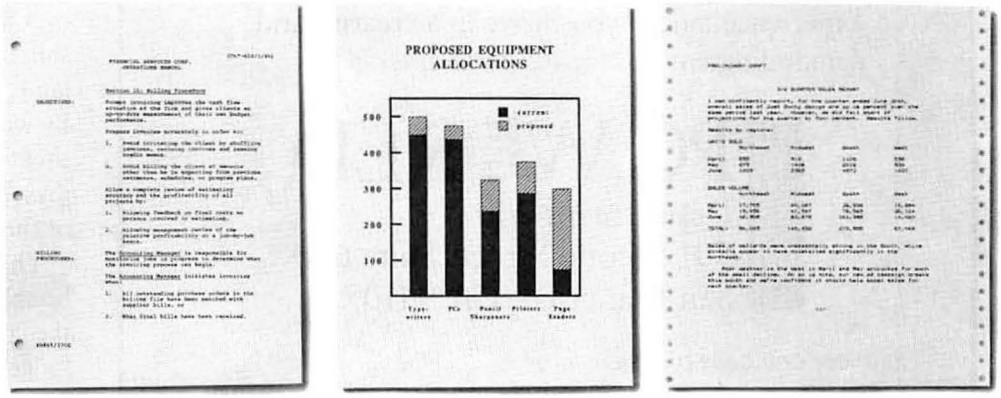
And while this technology may be new to you, it's not new to DEST.

You see, we've been making the leading line of scanners for larger computers for years. And now PC Scan brings that same technology to personal computers at a much smaller price.

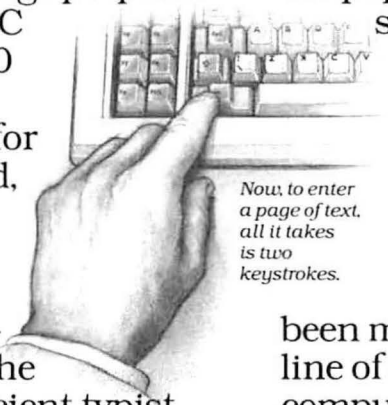
IT PAYS FOR ITSELF IN MONTHS.

Read in only a few pages a day, and PC Scan will pay for itself in less than a year.

And yet the bigger payoff is the time PC Scan saves you. Time you can use for more productive things. Like acting on information. Instead of simply typing it.



Whether it's manuals, bar charts, less-than-perfect dot matrix printing or just about anything else you have on paper, PC Scan can read it all into your personal computer ten times faster than you can type it.



Now, to enter a page of text, all it takes is two keystrokes.

CALL FOR A DEMO.

If you'd like to read more about PC Scan or if you'd like to see it read, call the toll-free number below.

Ask for a free brochure and the name of the dealer nearest you.

And you'll have your PC reading in no time.

DEST

800-538-7582

In California, 408-946-7100.

Circle 602 on reader service card

What's *Your* World View?

PC World is looking for writers and editors who understand that readers need more than just product specs. They need to know how to make PCs a more productive part of their business lives.

If you have significant industry and media experience, and if you thrive in a creative and demanding environment, *contact us.*

PC WORLD
Department 200
501 Second Street, Suite 600
San Francisco, CA 94107

No telephone calls please.

Moving?

Be sure your subscription to *PC World* goes with you!

Use the coupon here for your convenience to change the mailing address on your *PC World* subscription.

Be sure to include the mailing label from a recent issue if possible or, if a label is not available, please send us your complete former address including the zip code. Allow 6–8 weeks for this change to be effective.

SAVE TIME. Call our toll-free service number for immediate service: 800-525-0643 (In Colorado, Alaska, Hawaii and foreign countries 303-447-9330).

New address:

Name_____
Company_____
Address_____
City, State, Zip_____

Former address:

Attach mailing label here ▶

Send coupon and mailing label to *PC World* Subscription Dept., P.O. Box 55029, Boulder, CO 80322-5029

[redacted]

Nor was my fishing cabin suited to writing by computer. Reading the LCD display was impossible in the dim light. And though I prefer to plug my machine in to conserve batteries, the cord wouldn't reach the solitary outlet that dangled overhead from the log beam ceiling.

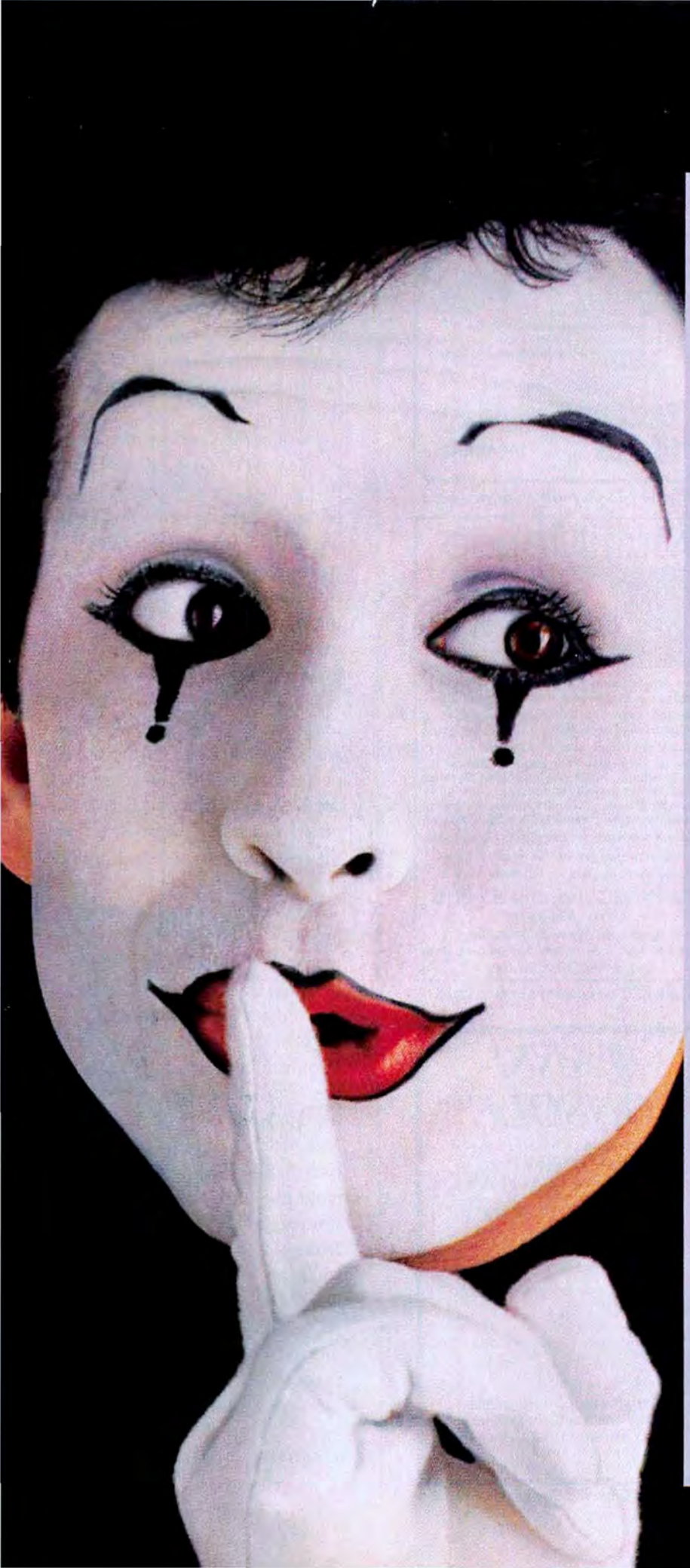
But my computer and I did fine over at the main lodge after I shifted a mounted cutthroat-trout lamp to one of the dining tables. By working almost until dawn that first night in Idaho, I freed myself for a week's intense pursuit of the fine art of fly-fishing.

That was what my computer bought me—time for pleasure. As the copy streamed out over the lodge's phone at 300 bps, I stepped outside and watched a sandhill crane spread its 6-foot wingspan and take flight across the lake into the reddening sky, trumpeting its eerie welcome to the new day.

Only after I was inextricably involved in the school did I realize that fly-fishing can be a dangerous sport. Being hooked by an errant cast was a minor mishap; learning to deal with the treacherous and easily underestimated power of the river was a more serious matter. Several fishermen every year wade too close to the falls on the Yellowstone River and are swept away to their deaths—or so say the Henry's Fork guides.

The guides seemed concerned about keeping me out of trouble. I developed a reputation during my

(continues)



What if...

YOUR PRINTER WAS A SILENT PARTNER?

Hewlett-Packard presents the QuietJet and QuietJet Plus printers. One of them will make a perfect desktop partner for your personal computer. Because both printers are designed to give you ultra-quiet performance and high-quality printing. At prices you can afford.

Now you can carry on a normal office conversation—even a telephone conversation at your desk—without it sounding like you're calling from inside an auto repair shop. Because both printers are built around our low-decibel non-impact technology.

And they're as quick as they are quiet. You can print a standard letter in less than a minute (160 cps). With printing quality that's crisp, clean and easy to read.

Both QuietJet printers let you print everything from quick memos to exhaustive reports. And the wide-carriage QuietJet Plus also allows for larger spreadsheet printing. They work with just about all PC's, including our HP Vectra PC and other IBM-compatibles.

So if a silent partner sounds better than a noisy printer (and it does), check out our new QuietJet printers.

Call **1 800 367-4772**, Dept. 710K for the name of the authorized HP dealer nearest you.

HEWLETT PACKARD

Business Computing Systems

QuietJet printer and HP Vectra PC are trademarks of Hewlett-Packard. IBM PC is a registered trademark of International Business Machines Corporation. PG606PWX © 1986 Hewlett-Packard Co.

Circle 810 on reader service card

2 Mb EMS RAM / CLOCK
FOR IBM PC/XT & COMPATIBLES
WITH LIFETIME WARRANTY

FEATURES —
- Supports Lotus/Intel/Microsoft Expanded Memory Specifications (EMS)
- Uses either 64K or 256K DRAM chips
- User upgradable
- Can fill system memory to 640K, allowing remaining memory to be used for EMS
- Includes Clock/Calendar function
- EMS memory manager software included
- EMS compatible RAM Disk software included
- EMS compatible Print Spooler software included

$199.00 W/64K OF RAM

The Apparat 2 MB Expanded Memory/Clock Board allows you the option of filling your system memory to the maximum 640K and/or using up to 2 MB RAM for expanded memory. The expanded memory manager Software, which is provided, is compatible with the Lotus/Intel/Microsoft Expanded Memory Specification. The clock/calendar function allows you to automatically initialize the date and time on each system power-up.

ADDITIONAL PRODUCTS —
- CLOCK/CALENDAR CARD
- PROM BLASTER (24 or 28 pin)
- COMBO II CARD
- 256K RAM CARD
- 512K RAM CARD
- EXTERNAL HARD DISK
- INTERNAL HARD DISK
- XT HARD DISK UPGRADE
- SHORT SLOT PAR/SER CARD FOR PPC, AT
- 384K RAM CARD FOR PPC
- ADD-ON DISK DRIVES
- AT RAM CARD
- AT COMBO CARD
- CABLES

Apparat, Inc.
4401 South Tamarac Parkway — Denver, Colorado 80237
(303) 741-1778 — TOLL FREE 800/525-7674

Circle 10 on reader service card

MAKE YOUR *ENTIRE* SYSTEM PORTABLE

Take your entire system with you *anywhere* you go... in a custom-designed case from Cabbage. Carry... or ship, safely & easily, around town or around the world with complete protection.
- **Designed for your *specific* problems & needs.**
- **A full line of options available.**
- **Serial numbered for your convenience & protection.**
- **Prompt delivery.**

"Nothing Tougher... Than a Cabbage"

CABBAGE CASES, INC.
1166-C Steelwood Ave.
Columbus, OH 43212
(614) 486-2495

Circle 703 on reader service card

NEW!

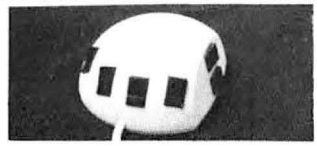
SafeSkin™
KEYBOARD PROTECTOR

Remains in place during keyboard use. Prevents damage from liquid spills, dust, ashes, etc. Fits like a second skin, excellent feel. Available for: IBM-PC, AT, Apple (all), Compaq, Model 100, NEC 8201, C64, Zenith 150, DEC, Kaypro, KB5151, AT&T 6300, WYSE 50 and many others, Send $29.95, check, M.O., Visa & MC include exp. date. Specify computer type. Dealer inquiries invited. Free brochure avail.

Merritt Computer Products, Inc.
2925 LBJ Fwy. #180 / Dallas, Texas 75234
(214) 339-0753

Circle 639 on reader service card

MultiMouse



A new single-handed data entry device that combines a mouse with a chord keyboard.
Six-button keyboard completely emulates all functions of an IBM PC, XT, AT keyboard.
Keyboard functions with all software.
Mouse is compatible with Logitech Mouse, Visi-On Mouse, PC Mouse of Mouse Systems Corp., Torrington Mouse Manager, and Microsoft Mouse. Drivers included for both mouse-based and keyboard-based software.
Standard Keyboard is completely functional.
Key codes can be learned in about 2 hours.
Available in right-hand or left-hand version.

$289.00 MC/Visa, Check, COD
(801) 484-1973
American West Engineering
2144 S 1100 East, Suite 150/Salt Lake City, UT 84106
Dealer inquiries invited

Circle 820 on reader service card

PC EXPANSIONS

AST SixpackPlus (384K)	$209
SixPakPremium (1M)	$429
Advantage (1.5M)	$519
Advantage (3M)	$799
Rampage (2M)	$459
RampageAT (2M)	$659
INTEL AbovePC/AT (2M)	call
Quadboard (384K)	$199
QuadportAT 139 EGA+	$379
HERCULES graphics board	$209
Color Card	$159
HAYES Smartmodem1200B	$359
Smartmodem1200	$389
Maynard OnBoard20	$669
Sandstar Series	call
MaynStream Tape from	$689
WD File Card (20M)	$639
Seagate 20M Hard Disk	$459
PlusDevelopment 20M HD Card	$699
Tandon TM102 119. **Teac** FD55BV	$109
Toshiba for AT 109 1.2M	$139
Set of 9 (64K) $12 (256K)	$29
8087-3	$119

CALL
Monitors...NEC, Amdek, Princeton Gr
Printers...Citizen, Panasonic, Toshiba
LaserPrinters...Cannon, Qume, HP
All Popular **Software**

VLM Computer Electronics
10 Park Place • Morristown, NJ 07960
(201) 267-3268 • Visa, MC, Check or COD

FANSI-CONSOLE™

The Integrated Console Utility™
FAST, POWERFUL
ANSI.SYS REPLACEMENT
For the IBM-PC, AT, and clones
New Version 2.00 is MUCH FASTER

- Speed up your screen writing
- Extend your ANSI.SYS to full VT100
- Scroll lines back onto screen
- Save scrolled lines into a file
- Add zip to your cursor keys
- Free your eyes from scroll blinking
- Easy installation
- 43 line EGA support
- Over 40 other useful options

"So many handy functions rolled into one unobtrusive package"
-PC-World Feb 86 pg 282.

400 p Manual (w/slip case) & disks $75

Satisfaction Guaranteed!
Order Yours Today!

HERSEY MICRO CONSULTING, INC.
Box 8276, Ann Arbor, MI 48107
(313) 994-3259 VISA/MC/Amex

Circle 240 on reader service card

[redacted]

fly casting lessons of being "a line tangle waiting to happen," according to one instructor. My reputation assumed legendary proportions, Greg told me, when I became the first client ever to leave his car 60 miles downstream on a day trip.

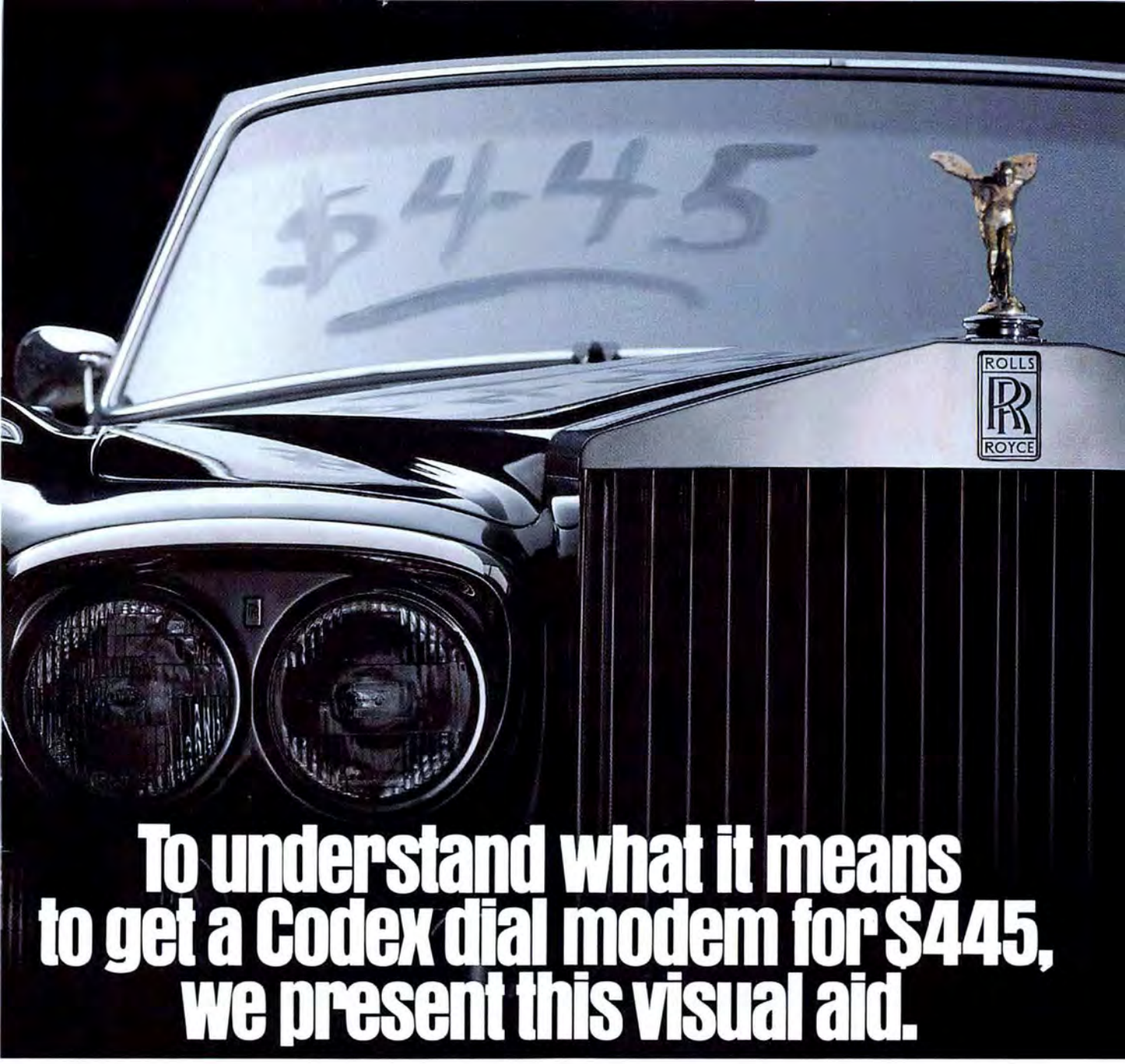
Despite the concern for my physical well-being, the real risk of fly-fishing seemed to be damage to my ego. Being out-cast by 6-year-old Chris Lawson, for example, was pretty humbling. Maybe I shouldn't have felt too bad, though; Chris's dad, Mike, is a famous fly-fisherman and owner of Henry's Fork Anglers School.

"Kids in general take to fly casting so easy," Mike said. We watched little Chris throw tight, perfect loops of fly line, cast after cast. "They're like that with computers too. They're not afraid of making mistakes and looking stupid."

I tucked his remark away and brought it up again the next day, over milkshakes at City Drug's fountain in Ashton. I asked Mike how he got into computers.

He said it happened when a client, the chairman of a large corporation, encouraged him to look into personal computers. After Mike had taught him a trick or two about catching 18-inch-plus trout in Henry's Fork, the client returned the favor by quizzing Mike about his business. The seasoned industrialist and angler wanted to make sure his favorite tackle shop and guide service didn't go belly-up. He made Mike realize the need for automated business tools.

(continues)



To understand what it means to get a Codex dial modem for $445, we present this visual aid.

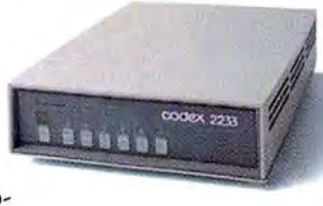
All too often something with an incredibly high reputation for quality also comes with an incredibly high price tag. And that's what makes the price of a Codex 2400 bps dial modem hard to believe.

Because our 2230 Series of 2400 bps modems is made to the same exacting standards as other Codex modems. Modems that have earned such a reputation for quality, they are preferred by more experienced data communications managers than any other brand.

Yet the prices of the 2230 Series start at just $445.

The 2230 Series provides outstanding performance, reliability, and flexibility. They are all full duplex 2400 bps modems that operate synchronously or asynchronously with a unique auto dial feature that supports virtually any computer. Plus they're Hayes compatible and are available as standalone units or as dual modem cards that pack two modems on a single card for maximum space savings.

Obviously, if you want to get a Rolls Royce for $445 you'll have to use your imagination. But to get a Codex dial modem for $445, all you have to use is your telephone. For more information call us at **1-800-426-1212 Ext. 234.** Or write Codex Corporation, Department 707-34, 20 Cabot Boulevard, Mansfield, Massachusetts 02048.



codex
MOTOROLA

See us at the Motorola/ISG booth at COMDEX, November 10-14.

© 1986 Codex Corporation. Motorola and Ⓜ are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation.

AT Power, Toshiba-Style.

The Toshiba T3100.

Try tucking this into a drawer when you're done! Until now, you had to be tied to your desk in a tangle of cables and hardware to get AT power. Toshiba's T3100, on the other hand, puts AT performance anywhere you want.

Toshiba technology improves on AT functionality: The T3100 gives you the power of an IBM® PC-AT™ in a lean, 15-pound computer that looks superb on your desk, and slips into a drawer when you don't need it. Take it home, take it to a meeting, take it around the world—wherever your work takes *you*.

Don't let its size fool you.

The T3100 is less than a third the size of the Compaq™ Portable II, yet every bit as powerful. It uses the same 80286 microprocessor as the AT, and is fully IBM-compatible, so you can share data with the other desktop computers in your office. The T3100's 10MB internal hard disk gives you ample storage for sophisticated applications. A dual-voltage power supply lets you plug in and go to work just about anywhere in the world. And Toshiba built in an advanced gas plasma screen, to give you the clarity and brightness of a CRT display—without the bulk.

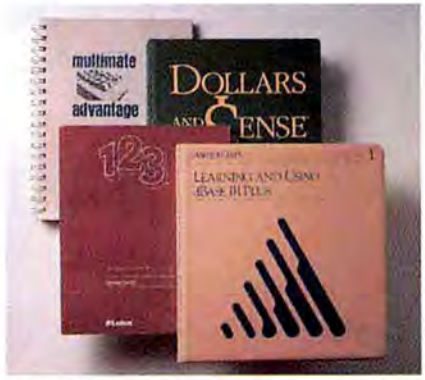
Compact is as compact does: The T3100 is less than a third the size of the Compaq Portable II.

More memory for more applications.

The T3100's full 640KB RAM lets you work with the most popular IBM PC/XT™ and AT software: Integrated financial and analysis programs, large spreadsheets, lengthy documents, electronic filing and more. A built-in 720KB diskette drive handles the new industry standard 3½″ diskettes. Each IBM-compatible pocket-sized disk holds *twice* as much information as a conventional 5¼″ diskette! And you can easily transfer data to and from other desktop computers using Toshiba's optional external 5¼″ diskette drive.

"Big" system expansion options.

Like any full-function desktop system, the T3100 grows with your computing needs. Toshiba offers a full line of internal



Software, everywhere: The T3100 runs the most popular applications written for the IBM PC/XT and AT.

and external options, including an expansion chassis with 5 IBM-compatible slots, and an internal 300/1200 bps Hayes®-compatible modem.

The next generation of computing is here. And it sure would look great on your desk. Or away from it.

Desktop computing will never be quite the same again, thanks to Toshiba's advanced CMOS and proprietary gate array LSI technology. The T3100 is backed by our reputation for high quality electronics, and by our 110-year commitment to technological excellence.

See where desktop AT power is headed.

The T3100 is *here now!* Call:

1-800-457-7777

for your nearest Toshiba dealer.

Now! **Includes SideKick® and SuperKey.®**

Specifications:

- IBM PC-AT compatible
- 80286 processor, running at 8MHz or 4 MHz
- 640KB RAM, extendable to 2.6MB
- Built-in 10MB hard disk
- Built-in 720KB 3½″ diskette drive
- MS-DOS 2.11 operating system
- High-resolution gas plasma display
- IBM Color Graphics Adapter (CGA) compatible
- 80 × 25 character display
- 640 × 400 bit-mapped graphics display
- RGB, parallel, serial and external diskette drive ports
- Carrying case, MS-DOS,™ BASIC included
- Full-sized 81-key keyboard
- 110/220 VAC switch-selectable power supply
- 12.2″ W × 3.1″ H × 14.2″ D
- All this—and only 15 pounds

Trademarks: PC-AT, PC/XT—International Business Machines Corporation; Compaq—Compaq Computer Corporation; MS-DOS—Microsoft Corporation. Registered Trademarks: IBM—International Business Machines Corporation; Hayes—Hayes Microcomputer Products, Inc.; SuperKey and SideKick—Borland International, Inc.

In Touch with Tomorrow

TOSHIBA

TOSHIBA AMERICA, INC., Information Systems Division

PC World Magazine

Congratulates

The 1986 World Class Award Winners

Hardware

3Com Corp., *EtherSeries*
AST Research, Inc., *SixPakPlus*
Compaq Computer Corp., *Compaq Portable 286*
Data General Corp., *Data General/One*
Epson America, Inc., *LQ-1500*
Hayes Microcomputer Products, Inc., *Smartmodem 1200*
Hewlett-Packard, *LaserJet Plus*
Hewlett-Packard, *HP 7475A Plotter*
IBM, *IBM PC AT*
IBM, *IBM Enhanced Graphics Adapter*
IBM, *IBM Enhanced Color Display (co-winner)*
Iomega Corp., *Bernoulli Box*
Microsoft Corp., *Microsoft Mouse*
Plus Development Corp., *Hardcard*
Princeton Graphic Systems, *HX-12 (co-winner)*
Seagate, *ST-225*

Software

American Training International, *Training Power Series*
Ashton-Tate, *dBASE III Plus*
Ashton-Tate, *Framework II*
Autodesk, Inc., *AutoCAD*
Barron's Educational Series, *Study Program for the SAT*
Borland International, Inc., *SideKick*
Borland International, Inc., *Turbo Pascal*
Borland International, Inc., *Turbo Lightning*
ChipSoft, Inc., *TurboTax*
Dac Software, Inc., *Dac-Easy Accounting*
Decision Resources, Inc., *Chart-Master (co-winner)*
Digital Communications Associates, Inc., *IRMA*
Living Videotext, Inc., *ThinkTank*
Lotus Development Corp., *1-2-3*
MECA, *Andrew Tobias' Managing Your Money*
Microsoft Corp., *Microsoft Flight Simulator*
Microsoft Corp., *Microsoft Chart (co-winner)*
Microsoft Corp., *Microsoft Windows*
Microstuf, Inc., *Crosstalk XVI*
Peter Norton Computing, Inc., *Norton Utilities*
Software Publishing Corp., *pfs:file*
Software Publishing Corp., *Harvard Total Project Manager*
WordPerfect Corp., *WordPerfect*

PCW COMMUNICATIONS, INC.
501 Second Street, Suite 600
San Francisco, CA 94107

SIMPLY ADD Pizazz™

EGA, CGA, HERCULES, all other popular display adapters fully supported. It's easy with Pizazz.

200 + COLORS! Print hundreds of colors (30 monochrome shades). Color chart program included FREE.

Pizazz Main Menu, a keystroke away.

EXCLUSIVE PRINT SMOOTHING. Make rough, jagged-edges disappear for better looking graphics and text!

PRINT VERSATILITY! You can print anywhere on the page. Change sizes, rotate, print windows..go wild!

LIKE IT? Save images (like logos, etc.) for later use, even print them on an entirely different printer.

See What Your Printer's Been Missing

Pizazz Won't Let You Go Hungry EGA, CGA or whatever popular graphics adapter you have, Pizazz satisfies your great graphics hunger. Order graphics any way you like. The menu is incredible—rotate, window, enlarge, reduce, smooth jagged edges! Most of all, Pizazz gives you what most printers don't— a truly easy way (only three simple keys, honest!) to print color or monochrome graphics and/or text.

A Pizazz In Hand Is Worth 200 In the Brush
Pizazz lets you paint graphics pictures with more than 200 color tones, or up to 30 gray scales for monochrome printing. It's perfect for business or personal use...and with EGA, you'll go wild!

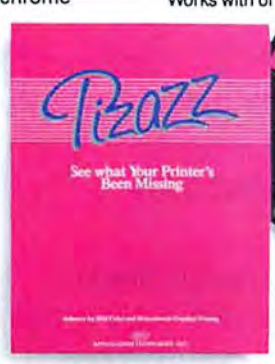
Hurry, I Desparately Need Pizazz In My Life!
If Pizazz is not the best printing accessory you've ever had, return it. We guarantee* you'll love it. Call us right now on our Toll-Free Order Line...OR...Fill out the order form below...OR...just see your favorite dealer and explain why you need Pizazz in your life.

INTRODUCTORY OFFER, ONLY $49.95
Pizazz is not copy protected
**30-Day Money-Back Guarantee*

Order Toll-Free 1-800-433-5201 To order in MA, or for additional information call 617-433-5201.

What the experts say about Pizazz: Pizazz has all the features and more than its "Best of 85" predecessor. "...it's a snap to print all or part of the on-screen image, expand or contract it, and change colors (shading patterns in monochrome)." – PC Magazine, Best of '85

For IBM® PC/XT/AT or true 100% compatibles. Supports over 100 printers. Works with or without Microsoft Windows™. Memory resident program takes as little as 32K.



YES! Satisfy My Graphics Hunger

Send me ___ copies of Pizazz @ $49.95 _____
Outside US add $10.00 per copy _____
MA res add $2.50 per copy sales tax _____
Payment Enc. ___ VISA ___ MC ___ AmEx ___ Total _____

Name _____
Address _____
City _____ State _____ Zip _____
Card# _____ Exp Date ___/___
Tel# _____ Signature _____
Computer _____ Display Card _____
Printer(s) _____

Orders outside US make payment by bank draft payable in US dollars drawn on a US bank.

Order Toll Free Now! 1-800-433-5201

aptec **Application Techniques, Inc.**
10 Lomar Park Drive, Pepperell, MA 01463

Circle 754 on reader service card

☑COMPATIBILITY ☑AFFORDABILITY
☑RELIABILITY ☑EXPANDABILITY

IBM XT/AT COMPATIBLE COMPUTERS BY
☑AFTON COMPUTER INC.

QUANTUM 286 TURBO

Made In The USA

- IBM AT COMPATIBLE
- PHOENIX BIOS
- 8-10 MHZ SUITABLE CLOCK SPEED
- 512K UP TO 1 MB RAM ON BOARD
- 2 SERIAL PORTS 1 PARALLEL PORT ON BOARD
- 1.2 MB FLOPPY
- 8 EXPANSION SLOTS
- AT KEYBOARD
- 200 WATT POWER SUPPLY
- ONE YEAR WARRANTY

All For Only $1395.00

QUANTUM XT TURBO

- 4.77-8MHZ SWITCHABLE CLOCK SPEED
- 640K ON BOARD
- SERIAL, PARALLEL AND CLOCK
- AT STYLE KEYBOARD
- 360K FLOPPY
- 135 WATT POWER SUPPLY
- ONE YEAR WARRANTY

All For Only $745.00

MAIL ORDERS ONLY

AFTON COMPUTER INC.
(714) 863-6951
24825 Calle El Toro Grande
El Toro, California 92630
Customer Service (714) 553-1701
Telex 756731

Prices, Configurations and Deliveries Subject To Change.
Circle 665 on reader service card

I was impressed. I'd figured Mike would think no more of personal computers than he did of automatic reels, but I was wrong. He bought a 48K Apple II+ seven years ago, which meant he'd owned a personal computer longer than I had.

Mike figured the Apple would be obsolete in no time when he bought it, but it is still doing the job. In just about the memory space taken up by PC-DOS, Mike handled payroll for a dozen employees, the shop's accounting, and a mailing list big enough to fill two disks. He also kept records on 18-inch-plus fish so he could tell you, for example, that 1985 was a better year than 1982. And he printed out the reports the Forest Service requires from guiding outfits.

Mike had a mind to try some other things if he ever got himself a new computer. He was putting together a newsletter and a mail-order catalog as well as writing the copy on *Word Handler* and laying it out by hand. He wasn't interested in desktop publishing applications, though. What he wanted was an IBM compatible so he could try out some of the "new" software. "I understand that the Lotus spreadsheet is a lot nicer than *VisiCalc*," he said.

Ken Miyata, one of Mike's best friends and another avid fisherman, also influenced his decision to buy a personal computer. As Mike told me this story over dinner, at the same table where I'd worked on my column, the idea of a computer in a

(continues)

Discover the true potential of laser printing.

Unleash The Power. It has harnessed the awesome energy of light. With that power, it will move mountains of work in minutes.

Introducing the Genicom 5010 Laser Page Printer; twenty-five percent faster than yesterday's laser printers. Printing everything from letters and legal size paper to transparencies—at 10 pages a minute. So fasten your seatbelt. And prepare for laser speed.

Superior Handling. When it comes to paper handling, the Genicom 5010 Laser is the printer to beat. It delivers double the standard input and 10 times the output capacity of other leading brands.

Handle big jobs easily with the 5010's automatic 200 sheet feeder. Shift into overdrive with a Genicom exclusive: an optional 50 sheet feeder cassette. There's even a manual feed slot, so you can print single sheets and transparencies without interrupting your work flow. And keep your work moving without a hitch, thanks to Genicom's efficient paper path.

But no matter what you feed the 5010, the result is laser perfect. Whether it's word processing that approaches typeset quality or high resolution graphics, the Genicom 5010 leaves nothing to the imagination.

It's Convertible. With Genicom's unique personality cartridges, the 5010 converts into multiple identities. Like a Diablo® 630, an IBM® Graphics Printer, or a Hewlett-Packard® LaserJet Plus for starters. Changing personalities is easy. Simply plug in a new cartridge. In seconds, the 5010 is up and running with any computer worth mentioning, plus the very latest laser software.

ENLIGHTENED

When it comes to print styles, the 5010 converts to your personality. Choose from a variety of fonts. Insert up to four font cartridges at once, and vary type styles within the same document.

Take Command. The 5010's prominent control panel is sophisticated simplicity. Just push a button to select fonts, input cassette, forms overlay, paper size, characters per inch, lines per inch and form feed. Even the 5010's diagnostic readout speaks your language, with a 32 character LCD that informs you of printer status in plain English.

Pass The Limit. Genicom designed the 5010 to surpass the standard limits for printer reliability. That's why the 5010's OPC drum and developer last 28,000 pages. And the toner cartridge has a 5000 page life, instead of just 3000 pages like other lasers.

Finally, Genicom backs its laser with a full year warranty on parts and labor. So stop by your nearby Genicom dealer today and discover what a true laser printer can do. Put a 5010 through its paces. You'll see the light.

For the Genicom dealer nearest you, call 1-800-437-7468. In Virginia, call 1-703-949-1170.

Diablo® is a registered trademark of Xerox Corporation. IBM® is a registered trademark of International Business Machines Corporation. Hewlett-Packard® is a registered trademark of Hewlett-Packard Company.

GENICOM

The Printers That Mean Business.

One Genicom Drive, Waynesboro, VA 22980

Circle 972 on reader service card

How to put Ferrari speed and Mack Truck capacity into a PC without available slots.

Install the Dream Board in place of your multifunction card.

Chugging along in an overloaded, underpowered PC without room to expand? Need the increased power and memory of an AT™ without sacrificing your current software library or DP budget?

Problem solved:
The Univation Dream Board!

- A PC accelerator board that triples the speed of your PC,
- *Plus* an EMS RAM board with up to 2 megabytes of high-speed RAM for your most complex Lotus™ spreadsheets and CAD operations,
- *Plus* a full-featured multifunction card with serial and parallel ports, clock/calendar, RAM Disk, Print Spooler, Disk Cache, and a speed selection switch that maintains 100% PC software compatibility.

All in ONE SLOT

That's the dream come true. If your PC, XT, Compaq™ Portable, or 100% compatible is full, simply replace your single application multifunction card with the Dream Board. You'll retain all your multifunction features while adding incredible speed and power. **With slots to spare!**

Planning to buy a new PC? The Dream Board is the ideal multifunction board. It provides the speed and power of an AT at a fraction of the cost.

Act While the Dream Board is fresh in your mind!

You need the power and the slots. The Dream Board is the answer! Call Univation today. Representatives are waiting to answer your questions and fill your order. Stop traveling in the slow lane. ***Move into the passing lane today!***

Outside California Call:

(800) 221-5842

UNIVATION
System Solutions for Business

1231 California Circle
Milpitas, CA 95035
(408) 263-1200

TRADEMARKS and REGISTERED TRADEMARKS: PC/AT—International Business Machines Corporation; Compaq—Compaq Computer; Lotus—Lotus Development Corporation; Dream Board—Univation.

Circle 85 on reader service card

fishing lodge began to seem quite natural.

Ken, Mike said, had used his TRS-80 heavily writing for the Smithsonian in Washington, D.C., and spreading the word about the pure joy of fly-fishing. He also used it to keep track of the size, number, species, location, and flies used for the fish he caught. "His favorite fly was an ant," Mike recalled. "He wrote an article for *Fly Fisherman* called 'Anting the Hatch.'"

Mike and Ken's last expedition would have filled Ken's fishing data base with some pretty decent entries. "We were doing just great on Henry's Fork," Mike said. "There were some good mayfly hatches going on, and I tried to talk him into staying." But Ken had wanted to fish the treacherous Big Horn River.

Mike still blames himself for not having been more persuasive. A couple of days after Ken left for the Big Horn River, his mother called Mike to see if Ken had shown up. He'd checked into his motel on the Big Horn but had never gone back. They found his body downstream a few days later.

After Ken died, his relatives were dismayed to find that he'd left behind no handwritten notes or scraps of paper, seemingly nothing personal at all.

They perhaps didn't understand personal computers, any more than do writers who avoid word processing for fear the computer will get between them and their work.

The computer is just another tool, a rod that can put a delicate point just past where the circles are rising, even though the writer is throwing all his line.

Kevin Strehlo is a freelance writer and PC World *columnist who fishes for PC tales from an office overlooking Silicon Valley, and sometimes finds them in Idaho trout streams.*

Circle 608 on reader service card

Advertiser Index

Reader Service Number		
752	ACS, 405	
—	AST Research, 8-9	
433	AT & T, 363	
846	ATI, 361	
715	Access Information Concepts, 120	
822	Accolade, 88	
944	Advanced Digital, 19	
191	Advanced Transducer Devices, 376	
665	Afton Computer, 436	
204	Amdek Corp., 180-181	
—	American Airlines, 329	
770	American Computer & Peripherals, 194	
771	American Computer & Peripherals, 194	
697	American Flyers, 118	
814	American Micro Technology, 81	
318	American Micro Technology, 83	
717	American Mitac, 40	
543	American Small Business Computers, 406	
820	American West Engineering, 430	
953	Anthro, 18	
10	Apparat, 430	
754	Application Techniques, 435	
860	Applied Reasoning, 192	
825	Arlington Computer Products, 404	
501	Ashton-Tate, 104	
841	Avalon Hill Game Co., The, 112	
372	BarComp, 26	
317	Barr Systems, 105	
504	Barrington Systems, 42	
833	Bell & Howell, 65	
340	Best Computer Supplies, 394	
783	Bit Software, 414	
622	Bittner Electronics, 420	
50	Bloc Development, 188	
975	Boeing Computer Services, 360	
481	Borland Int'l., IFC-1	
705	Brooks Power Systems, 186	
865	Bulldog Computer Products, 330-331	
235	Business Computers of Peterborough, 153	
743	C. Itoh, 191	
703	Cabbage Cases, 430	
863	Canal Systems, 136	
873	Canon, 386-387	
154	Cauzin, 423	
662	Central Point Software, 418	
—	Chase, 202	
60	Chipsoft, 128	
871	Chipsoft, 128	
—	Citizen, 380	
—	Codex, 431	
879	Command Technology, 370	
—	Compaq, 49-56	
393	CompuAdd, 290	
856	CompuServe, 416-417	
416	Compucover, 420	
823	Computer Associates, 129	
91	Computer Discount Warehouse, 391	
847	Computer Discount Warehouse, 393	
848	Computer Discount Warehouse, 395	
158	Computer Hut, 390	
—	Computer Mail Order, 121-124	
747	Concentric Data Systems, 58	
276	Contemporary Computerwear, 382	
—	Curtis Mfg. Co., IBC	
534	DCA, 103	
602	DEST, 426-427	
33	Dac Software, 21	
365	Decisionware, 154	
—	Desktop Publishing, 17	
780	Disk World, 392	
691	Diskette Connection, 349	
288	Ditron Corp., 410	
—	Dow Jones News/ Retrieval, 421	
3	Dow Jones Software, 33	
—	Dresselhaus, 418	
706	Dynax, 147	
708	Dynax, 147	
510	Eastern Enterprises, 397	
292	Eastman Kodak, 137	
493	Ecosoft, 76	
817	Electric Software Corp., 119	
840	Electronic Arts, 61	
424	Ellis Computer, 133	
—	End User Software, 377	
852	Enlightenment, 107	
—	Epson, 354	
699	Everex, 14, 24-25	
610	FTG Data Systems, 44	
71	Fox & Geller, 362	
92	Funk Software, 358	
—	GE Information Services, 371	
78	Genest Technologies, 182	
972	Genicom Corp., 437	
819	Global Computer Supplies, 410	
637	Golden Bow Systems, 382	
—	Greylock Software, 420	
891	H & E Computronics, 31	
442	HDG Software, 190	
489	HavenTree Software, 22	
824	Headlands Press, 62	
77	Hercules, 171-176	
240	Hersey Micro Consulting, 430	
242	Hewlett Packard, 20	
810	Hewlett Packard, 429	
394	Houston Instrument, 30	
—	HowardSoft, 11	
—	IBM, 12-13	
200	IDEAssociates, 84-85	
797	ITT/Qume, 152	
—	Indian Ridge Enterprises, 149	
949	Infocom, 338-339	
499	Information Builders, 332	
512	Inmac, 38-39	
624	Inner Loop Software, 382	
756	Int'l. Battery Corp., 57	
683	Kamerman Labs, 7	
828	Kronos, 16	
809	Kurta Corp., 185	
593	Leading Edge Products, Inc., 357	
400	Logicsoft, 163-168	
598	Logitech, 159	
—	Lotus Development Corp., 70-71, 73, 156-157, 347	
843	Magitronic Technology, 398	
—	Maxell, 36	
98	Maynard Electronics, 5	
—	McGraw-Hill, 189	
639	Merritt Computer Products, 430	
112	Micro Mart, 396	
739	MicroCom, 198	
632	MicroComputer Business Services, 399	
171	Microbridge Computers, 420	
103	Microprocessors Unlimited, 420	
827	Microprose Software, 365	
—	Microrim, 126-127	
—	Microsoft, 46-47, 340-341, 343	
560	Microstar, 401	
275	Microstuf, 148	
818	Microtek, 106	
122	Microway, 102	
864	Monogram, 336	
749	Mt. Whitney Group, The, 59	
870	MultiTech Systems, 6	
505	Multitech Electronics, 344	
194	NEC Home Electronics, 372	
124	NEC Information Systems, 10	
737	NEC Information Systems, 160-161	
434	Nitro Micro, 402-403	
734	North Edge Software, 378	
381	Northeastern Software, 294-295	
621	Norton Utilities, The, 193	
628	Norton Utilities, The, 195	
533	Office Solutions, 178-179	
861	On-Line Access, 381	
133	Orchid, 23	
272	Overland Data, 82	
742	PC American, 400	
136	PC Connection, 245-251	
525	PC Mart, 196-197	
—	PC Network, 141-146	
710	PC Quik-Art, 352	
293	PC SIG, 116	
588	Panasonic, 77	
694	Panasonic, 78-79	
229	Paperback Software, 80	
—	Paradise, 150-151, 367	
126	Parlor Software, 420	
388	Patton & Patton, 412	
614	Paul Mace Software, 140	
674	Peachtree Technology, 184	
851	Performs, 186	
238	Perry Computers, 346	
142	Persoft, 68	
236	Personal Computer Support, 131	
604	Personal Computer Support, 373	
615	Personal Tex, 48	
777	Pick Systems, 138	
455	Plus Development, 206-207	
241	Polaroid, 117	
804	Polytron, 132	
148	Primavera Systems, 162	
931	Princeton Graphic Systems, 26	
306	Princeton Graphic Systems, 293	
511	Public Domain Exchange, 158	
983	QIC Research, 72	
—	Quaid Software Ltd., 125	
937	Racore Computer Products, 374	
371	Radio Shack, 63	
838	Red River Technology,. 139	
801	Rix Softworks, 350	
802	Rix Softworks, 350	
608	Rose Associates, 439	
453	Royal American Technology, 187	
431	SBT, 385	
844	SPSS, 355	
—	Safeware, 60	
281	Samna, 34-35	
—	Scitor, 27	
425	Seagate, 155	
457	Server Technology, 291	
169	Sigma Design, 337	
380	Silicon Express, 415	
520	Simonton Industries, 101	
850	Soft/Plus Research, 410	
648	SoftCraft, Inc., 292	
173	SoftCraft, 368	
711	SoftKlone, 60	
866	Softlogic Solutions, 199	
447	Softlogic Solutions, 201	
744	Softlogic Solutions, 203	
559	Softlogic Solutions, 205	
862	Software Bottling, 64	
874	Software Directions, 411	
821	Software Link, The, 43	
526	Software Link, The, 99	
—	Software Publishing, 45, 183, 289, 334	
—	Software Studios, 419	
579	Sony, 424	
—	Source, The, 413	
449	SourceMate, 169	
748	Springboard Software, 113	
319	Star Micronics, 134-135	
175	StatSoft, 412	
763	Stella Systems Corporation, 86-87	
308	SubLogic, 375,379	
467	SubLogic, 383	
857	Sunol Systems, 158	
790	Symantec, 408-409	
—	Sysgen, 364	
713	TDA, 333	
188	Tallgrass Technologies, 28-29	
329	Tech PC, 66-67	
331	Tech PC, 66-67	
859	Technoland, 389	
997	Teknika Electronics Corp., 345	
921	Telemart, 130	
—	Texas Instruments, 110-111	
759	Time/Design, 369	
658	Toshiba, 114-115	
732	Toshiba, 384	
—	Toshiba, 432-433	
—	TranSec Systems, 132	
85	Univation, 438	
—	VLM Computer Electronics, 430	
832	Value Line Software, 351	
193	Ven-Tel, BC	
681	Video-7, 74-75	
855	Visual Communications Network, 100	
700	Votrax, 204	
220	Warehouse Data Products, 422	
486	Wells American, 41	
869	Western Telematic, 356	
165	WordPerfect, 353	
312	Worthington Data Solutions, 349	

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles

Free Reader Information Service

Get more information on products you're interested in—simply return one of these cards today. There's no cost. And no obligation.

It's easy to get more information on products advertised in PC WORLD. Here's how:

- Print or type your name and address, and circle the appropriate answer to each question.
- Circle the number(s) of the product(s) you're interested in. Product numbers appear in both the ad and the Advertiser Index.
- Apply first-class postage before mailing.

Please print or type all information.

Name

Company

Address

City, State, Zip *(zip code needed to ensure delivery)*

Phone: Area code/Number

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200	201	202	203	204
205	206	207	208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312
313	314	315	316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344	345	346	347	348
349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372
373	374	375	376	377	378	379	380	381	382	383	384
385	386	387	388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440	441	442	443	444
445	446	447	448	449	450	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									

1. Your primary job function:

a. Corporate or general manager
b. Department manager
c. MIS manager
d. Professional
e. Other

2. Number of employees in your company:

1. 25 or fewer
2. 26-99
3. 100-499
4. 500-999
5. 1000 or more

3. Plan to buy:

a. Now
b. In 4-6 months
c. In 7-12 months
d. More than 12 months from now
e. For reference only

4. For how many IBM PCs and compatibles do you buy products? (Include both company and personal units, please.)

1. 1
2. 2-4
3. 5-9
4. 10 or more

*Circle reader service number 999 to subscribe to PC WORLD. We will bill you $17.97 for a 1-year (12-issue) subscription (U.S. and Canada only).

Valid through 2/9/87

4BRWO W Nov. 86

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles

Free Reader Information Service

Get more information on products you're interested in—simply return one of these cards today. There's no cost. And no obligation.

It's easy to get more information on products advertised in PC WORLD. Here's how:

- Print or type your name and address, and circle the appropriate answer to each question.
- Circle the number(s) of the product(s) you're interested in. Product numbers appear in both the ad and the Advertiser Index.
- Apply first-class postage before mailing.

Please print or type all information.

Name

Company

Address

City, State, Zip (zip code needed to ensure delivery)

Phone: Area code/Number

1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71 72
73 74 75 76 77 78 79 80 81 82 83 84
85 86 87 88 89 90 91 92 93 94 95 96
97 98 99 100 101 102 103 104 105 106 107 108
109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132
133 134 135 136 137 138 139 140 141 142 143 144
145 146 147 148 149 150 151 152 153 154 155 156
157 158 159 160 161 162 163 164 165 166 167 168
169 170 171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190 191 192
193 194 195 196 197 198 199 200 201 202 203 204
205 206 207 208 209 210 211 212 213 214 215 216
217 218 219 220 221 222 223 224 225 226 227 228
229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252
253 254 255 256 257 258 259 260 261 262 263 264
265 266 267 268 269 270 271 272 273 274 275 276
277 278 279 280 281 282 283 284 285 286 287 288
289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312
313 314 315 316 317 318 319 320 321 322 323 324
325 326 327 328 329 330 331 332 333 334 335 336
337 338 339 340 341 342 343 344 345 346 347 348
349 350 351 352 353 354 355 356 357 358 359 360
361 362 363 364 365 366 367 368 369 370 371 372
373 374 375 376 377 378 379 380 381 382 383 384
385 386 387 388 389 390 391 392 393 394 395 396
397 398 399 400 401 402 403 404 405 406 407 408
409 410 411 412 413 414 415 416 417 418 419 420
421 422 423 424 425 426 427 428 429 430 431 432
433 434 435 436 437 438 439 440 441 442 443 444
445 446 447 448 449 450 451 452 453 454 455 456
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

1. Your primary job function:
a. Corporate or general manager
b. Department manager
c. MIS manager
d. Professional
e. Other

2. Number of employees in your company:
1. 25 or fewer
2. 26-99
3. 100-499
4. 500-999
5. 1000 or more

3. Plan to buy:
a. Now
b. In 4-6 months
c. In 7-12 months
d. More than 12 months from now
e. For reference only

4. For how many IBM PCs and compatibles do you buy products? (Include both company and personal units, please.)
1. 1
2. 2-4
3. 5-9
4. 10 or more

*Circle reader service number 999 to subscribe to PC WORLD. We will bill you $17.97 for a 1-year (12-issue) subscription (U.S. and Canada only).

Valid through 2/9/87

4BRWO W Nov. 86

PLACE
FIRST-CLASS
POSTAGE HERE.

(POST OFFICE
WILL NOT DELIVER
WITHOUT STAMP)

PC WORLD

Product Information Service
P.O. Box 92844
Rochester, NY 14692

PLACE
FIRST-CLASS
POSTAGE HERE.

(POST OFFICE
WILL NOT DELIVER
WITHOUT STAMP)

PC WORLD

Product Information Service
P.O. Box 92844
Rochester, NY 14692

PC World Directory

PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

FORMAT: *The standard format includes a product ID, a 300-character descriptive ad, and company name, address, and telephone number.*

Advertisers may choose among categories already in use, or they may create their own. Display advertisers can cross-reference their current ad to the PC World Directory *for increased exposure at low cost.*

RATES: *Listings are accepted for three-time consecutive insertions at a rate of $975 ($325 per issue). We offer a six-time insertion, 15 percent discount contract for a total of $1626 ($271 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.*

DEADLINE: *For copy deadlines, contact a* PC World Directory *sales representative at 415/546-7722 or 800/435-7766 (nat'l), 800/435-7760 (CA). Please send copy and prepayment to* PC World Directory, *501 Second St., #600, San Francisco, CA 94107.*

Accessories

Computer Forms

Lowest Price Guaranteed!
Now you can make your BEST deal on any stock or custom printed computer paper product. THAT'S RIGHT! If you see a lower price advertised in any current catalog or publication, "WE'LL BEAT THAT LOWER PRICE BY 10%." Call or send for our FREE fully illustrated computer paper catalog. Top quality, premium papers. 100% Satisfaction Guaranteed. Visa/MC. *Datasource Computer Forms, 171 Florida St., Farmingdale, NY 11735, 800/643-9090 (Nat'l), 516/752-8088 (NYS)*

Furniture

Workstation Furniture
Our *E2 Series 1* furniture for PC owners uses materials that maximize long-term value & functionality, including high-strength laminates & high quality hardware. Design features include modular components, radiused corners, rounded edges, & a refined, professional look. Call for a free copy of our catalog! *E2 Corporation, 22931 S.E. 37th St., Issaquah, WA 98027, 800/225-8340*

Accessories

Printer Accessories

An Uki for Your Oki!
Compatability of IBM Plug-n-Play & versatility of Okidata Instruction Set at flick of switch. Easy to install. Complete–no other ROM needed. Utility software included. Specify printer model & serial #s. Add $3 ship. NY res add sales tax. Oki 83, 92, 93–$49.95. Oki 192, 193–$79.95. *Uki Switch Corp., 326 Linden Place, West Hempstead, NY 11552, 212/685-8199*

Supplies

Ribbons
Wholesale Prices. Call Collect! All new for all printers. Brother HR-15 M/S: $59/dz • Canon PW1156A: $69/dz • Diablo M/S: $34/dz • Epson MX-100: $54/dz • IBM 4201 Propt: $59/dz • NEC 3500 M/S: $69/dz • Okidata 93: $23.25/dz • 193: $69/dz • Panasonic KX-P1090: $89/dz • Star Micronics SD-15: $84/dz • TI 855: $67/dz • Toshiba 1350: $59/dz, & most others. *BDP (Bargains Delivered Promptly), P.O. Box 1330, Fair Lawn, NJ 07410, 201/791-0226*

Assembly Language

Free 8088 Tutor Monitor
Learn 8088 assembly language using the new book, *IBM PC-8088 Assembly Language Programming*, by Richard E. Haskell. Order the book for $25 plus $3 s/h & get the powerful TUTOR monitor software *free*. Load & examine any disk file, disassemble any 8088 code, debug EXE files. Satisfaction guaranteed. *REHI Books, 54 N. Adams #130-W, Rochester Hills, MI 48063, 313/853-1941*

Bar Code

Bar Code Printing
On your IBM PC and Epson/Oki/IBM printer. NEW! 8K Ram-Resident Program to Print Code 39, I 2of5, and UPC-A from any program or word processor–$179, (with large Graphics TEXT –$239). Also Menu-Driven Programs, to print bar code labels and catalogs and/or large text chs up to 1-inch tall; Bar Codes 39, I 2of5, UPC, Plessey, AIAG, GSA, DOD-LOGMARS; disk data file input, assembly lang. speed. $49-299. 30 day refund guarantee. *Worthington Data Solutions. See our ad under Bar Code Readers*

Bar Code Readers
Readers use keyboard data interface. Transparent to PC software–$485. Readers for IBM mainframe terminals: 3178, 3278, 3180, 5251, 5291. RS-232 terminal readers $625. Portable Readers with $49 upload program starting at $325. 30-day refund guarantee. Free PC Printing Program with Reader Purchase. *Worthington Data Solutions, 130 Crespi Court, Santa Cruz, CA 95060, 408/458-9938*

Data Input Devices
TPS provides Bar Code & Magnetic Stripe Readers for simple installation on IBM PC, AT, 3161, 3163, & 3180 terminals, as well as many other microcomputers & terminals. No card slot or RS-232 port is required, & the readers are transparent to all software. Bar Code Printing Program $50 w/reader purchase. *TPS Electronics, 4047 Transport St., Palo Alto, CA 94303, 415/856-6833*

Low Cost Reader
For PC/XT/ATs (with any style keyboard) & compatibles. Our BCR-1000 features: rugged stainless steel wand, non-contact scanner option, auto-discrimination among all major symbologies, network compatibility, exceptionally high first read rate. Attractive pricing, quantity/dealer discounts. *Seagull Scientific Systems, 601 University Ave. #150, Sacramento, CA 95825, 916/485-7320*

Read and Print Bar Codes
Upgrade yourself to bar codes. SCAN-TASTIC system includes bar code reader & label printing program. Reader works w/dBASE, Lotus, Open Systems, & others–right out of the box. Uses no slot–takes power from keybrd. $477 includes wand & $99 Epson/Okidata label program (code 39, I 2of5). IBM PC/XT or keybrd compatible. Easy to use. Dealers welcome. *DEVSOFT, Inc., 21010 Center Ridge Rd., Cleveland, OH 44116, 216/273-5039*

Books

DOS Shell Kit
Non-technical, 100 pg. tutorial helps you use DOS to assemble a menu-driven, automated & organized file structure on hard disks. Disk version has prewritten files. Also covers batch files, key assignments, file protection, etc. Supplements DOS manual to version 3.2. By author & *PC World* writer Tom Sheldon. Bk: $12; Disk & Bk: $25. $1.50 s/h. Visa/MC. *Sheldon Publishing, 789 Casiano Dr., Santa Barbara, CA 93105, 805/687-0865/964-2480*

WordStar in English I
Simple memory codes help you master *WordStar* & *MailMerge* in a few hours. A great reference with 184 pages full of practical examples. Saves time & money for anyone writing letters, charts, envelopes, mailing labels, or form letters. Block moves & IBM special keys fully explained. Order your copy today. Send $12.95 or MC/Visa to: *English 1 Computer Tutorials, 1617 N. Troy St., Dept. B, Chicago, IL 60647, 312/489-1588*

The Flight Simulator Book
THE tutorial for "Flight Simulator II." Begins with basics, then moves in easy steps through all the authentic, modern aviation procedures: you do everything an airline captain does, in the same professional manner—using dozens of actual government charts. MC/Visa/AmEx. $19.95 plus $3 s/h. *En Route Books, P.O. Box 48407, Phoenix, AZ 85075, 800/221-6086(USA), 800/843-3485(AZ)*

Using PC Software
The Quick-Start Training Guide for 12 Top Programs. Having trouble reading—searching—juggling manuals? Get clear, easy to follow instructions for Lotus, *WordStar, dBASE III, WordPerfect, Microsoft Word, MultiMate, SuperCalc, Multiplan, pfs Write/Plan/File,* & *Flight Simulator* plus DOS—all in one top-quality volume. Only $19.95 + $4 s/h. Visa/MC/AmEx. *En Route Books, P.O. Box 48407, Phoenix, AZ 85075, 800/221-6086 (USA), 800/843-3485 (AZ)*

LaserJet Unlimited book
"A big plus for anyone with the HP LaserJet." —John Dvorak, InfoWorld. "A fantastic resource for any laser printer owner." —PC Publishing. "Demystifies the popular printer."—LA Times. 228 pages, 45 illustrations. $24.95 plus $3.50 s/h. CA res add 6.5% tax. Chk/Visa/MC. *Peachpit Press, 2127 Woolsey St., Berkeley, CA 94705, 415/843-6614*

Catalogs

PCjr Products

PCjr Catalog Hotline
Possibly the largest selection of PCjr products anywhere! Call or write to receive a free 24-page catalog. Features our lowest cost disk drives, keyboards, memory, multifunction and speech boards, pseudo DMA cartridges, joysticks, cables, dust covers, software and much, much more. *The jrProducts Group* PC Enterprises, *P.O. Box 292, Belmar NJ 07719, 800/922-PCjr, 201/280-0025*

Consultants

California

What Do You Do
when there is no off-the-shelf solution to your problem? Call us! We specialize in tailor-made programming.

- We provide design, programming, consulting & documentation services
- We write data base software: accounting, order entry, mailing list mgmt. & more
- Experts in *dBASE II, III*
- 20+ yrs computer experience
- Free brochure

Call or write: *David Jenkins, Midway Software Inc., 1609 Bancroft Way, Berkeley, CA 94703, 415/644-2369*

CompuSult
Now you can be assured that a qualified computer technician is available to speak with you about your computing questions. CompuSult is a computer consultant's agency. We can provide you with a specialized computer consultant who will zero in on your computing requirements & describe them to you in plain English. *CompuSult, 808 N. Kenter Ave., Los Angeles, CA 90049, 213/472-2568, 415/924-7027 (No. CA)*

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. *Waters Publishing, 8235 Douglas #1000, Dallas, TX 75225, 800/628-2828, ext. 539*

Data Conversion

Don't Rekey-Convert!
We use the latest disk, tape, scanning, & telecommunications technology to reformat data. *Quickly & Accurately. Usually at one tenth your current cost.* We transfer data between word processors, typesetters, micros, minis, mainframes, & software packages. Full range of consulting services includes Data Customization & Data Base Development. *Data Conversion Laboratory, 67-27 168 St., Fresh Meadows, NY 11365, 718/939-4921*

Full Spectrum
of Data Conversion Services
- Quick Turnaround
- Highly Professional
- Disk or Tape Conversions
- DisplayWriter, Wang, IBM PC & Hundreds of Other Formats

Computer Systems Services, Inc., 5 East 16th St., New York, NY 10003, 212/242-5255

Desktop Publishing

Book-Quality Documents
Publish books, technical reports, equations, etc. w/professional quality. Complete hardware & typesetting software system for under $2500 enables you to print/verify literal draft, then to mail driver diskette out for auto-typesetting to obtain "camera-ready" copy. System requirement & full $-saving item/source list, $150. *DPV Consultants, 5305 Vincennes Ct., Arlington, TX 76017*

Disk Copy Service

Duplication Solutions
MEGASOFT has the answer to your Diskette Duplication needs no matter what the volume. We provide • DUPLICATION • COPY PROTECTION • TECHNICAL SUPPORT • PACKAGE ASSEMBLY & DISTRIBUTIVE SHIPPING. We supply • AUTOLOADERS • BULK DISKETTES. We guarantee • QUALITY • 100%

SATISFACTION • FAST TURN AROUND. *MegaSoft, P.O. Box 710, Freehold, NJ 07728, 800/222-0490, 201/462-7628*

BLANKET SERVICES

- Diskette duplication
- Packaging
- Stocking/Drop Shipping

Place a BLANKET ORDER *with releases as you need them for any quantity at a fixed price*

- 48-hour delivery
- SUPERLOK copy protection
- Lifetime guarantee
- No "mastering" charge
- No charge for standard labels

Star-Byte, Inc., A Div. of Robinson-Halpern Co., 2564 Industry Lane, Norristown, PA 19403, 800/243-1515, 215/539-4300

Equipment Wanted

"Young Ideas"

The Explorer Scouts of America need your old video & computer equipment. Teens & adult advisors produce a regular cable TV show called "YOUNG IDEAS". We repair, we learn from & we use your kind of donations. All are tax deductible. Contact: *Keith St. Clare, Explorer Scouts & Boy Scouts of America, 140 2nd St., 5th Floor, San Francisco, CA 94105*

Hardware

Add-on Boards

256K & Clock: $99.95!

U.S.-made Turner Hall Card comes with 256K RAM installed & clock/calendar with battery back-up. Even beginners can install. Free software includes print spooler & RAM disk emulator. Designed for IBM PC, XT, Portable PC & Compaq. Fits in short slot (only 5 inches long). 30-day money back guarantee. *Turner Hall Publishing, 10201 Torre Ave., Cupertino, CA 95014, 800/556-1234, ext. 526; 800/441-2345, ext. 526 (CA)*

BIOS

Fixed Disk BIOS/Boot

FiXT boots from most popular Hard Disks–DAVONG, TECMAR, IOMEGA, GT LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Security, multiple volumes, removable media support optional. No-slot plug-in installation. Specify controller & computer with order. $80-$110 + $3 shpg, CA tax. *Golden Bow Systems, P.O. Box 3039, San Diego, CA 92103, 619/298-9349*

Memory Upgrade

640K on MotherBoard

640K RAM without using an expansion slot. Our upgrades allow easy insertion of 256K chips on the system board. Highly reliable due to reduced heat & chip count. 100% compatible. 30-day $ back gtd, 2-yr wrnty. *Compaq Portable*: $29; $99 w/memory. *IBM XT, Portable & 3270*: $39/$109. *IBM-PC*: $59/$129. $4 s/h. Site discount, dealers welcome. *Aristo, 16811 El Camino, 213-J, Houston, TX 77058, 713/480-6288, 800/3ARISTO*

Security

Secure AT/XT/PC

Control system access, data access! FiXT/S controls system boot for most popular XT/PC hard disk controllers. Vfeature for AT & XT–compatible HD controllers segments hard disk by volumes, controls access with passwords, supports hard disk expansion. $80-$95 + $3 shpg, CA tax. *Golden Bow Systems, P.O. Box 3039, San Diego, CA 92103, 619/298-9349*

Storage Devices

CP/M & 1.2MB on PC

With MULTI-DISK & UniForm-PC use 3.5, 5.25 & 8-inch single & double density CP/M formats as DOS diskettes on your IBM PC or XT. Many MS-DOS formats supported including IBM AT, HP-150 & Data General 1. Over 200 formats. Both MULTI-DISK & UniForm-PC $225. Drives & adapter cables available. *P S Engineering, P.O. Box 51068, San Jose, CA 95151-5068, 800/367-2398; 800/423-7171 (CA)*

Insurance

Safeware

If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media & purchased software. As little as $39 a year covers fire, theft, power surges, earthquake, water damage, auto accident. Call 8 a.m. to 8 p.m. Mon. thru Fri. Call Sat. 9 a.m. to 5 p.m. *Safeware, The Insurance Agency Inc., 2929 North High St., P.O. Box 02211, Columbus, OH 43202, 800/848-3469 (Nat'l), 614/262-0559 (OH)*

Data Security Insurance

The "all risk" Personal Computer Policy from DSI includes essential coverages not available with other policies: protection against loss of data (even from accidental erasure), loss of custom programs, & fraud. Especially intended for business computers. Coverage can be bound by telephone, 9 to 4 Mountain Time. *Data Security Insurance, 4800 Riverbend Rd., P.O. Box 9003, Boulder, CO 80301, 303/442-0900, 800/822-0901*

Leasing/Rental

IBM • Compaq • Apple

Quick delivery throughout U.S. All configurations. Excellent selection of peripherals including laser printers. Attractive rates and flexible terms. Rent from 1 month to 3 years. Purchase options available. Credit cards accepted. Offices in L.A., Phoenix, Dallas, Minneapolis. *Use 'r Computers, Inc., 5929 Baker Rd., Minnetonka, MN 55345, 800/624-2480, 612/938-1100*

Mailing Lists

IBM Mailing Lists

Now over 1,500,000 computer owners. Select from 311K Apple, 315K IBM + PCjr, Mac & many others. 8 phone verified reseller lists including 6,026 stores + VARs, chains, etc.: 40,000 UNIX users. 16,000 computer companies. Schools, specialty lists . . . over 50 lists total. Call/write for free catalog. Indicate phone & type of business. *Irv Brechner, Targeted Marketing Inc., Box 5125, Ridgewood, NJ 07451, 201/445-7196*

Software

Accounting

Open Systems, Inc.

- Open Systems™ Accounting Software–a powerful multi-user line of 15 modules for any business need.
- Harmony™ Integrated Business Software–7 accounting/productivity applications for a total business solution.
- Open For Business™ I & II–entry-level accounting solutions for DOS & the Macintosh.

Open Systems, Inc., 6477 City West Parkway, Eden Prairie, MN 55344, 800/328-2276

Myte Myke™ Business Sys

Commercial grade, integrated business application software. Order Entry, Inventory Control, Sales Analysis, Accounts Receivable, Accounts Payable, General Ledger, Purchase Orders. Pro-Time–time & billing. Install & support avail. PC-DOS, MS-DOS, NOVELL Networks, XENIX & UNIX. *M & D Systems, Inc., 3885 N. Buffalo Rd., Orchard Park, NY 14127, 716/662-6611*

CPA Review

You Pass or We Pay! Over 2,100 computer interactive multiple-choice & essay/problems. Call for details on the progressive way to study. Also Diagnostics for CMA, CPA, CIA Exams. Personnel Evaluator. IBM PC, XT, AT, or compatibles. Individual, Office, College Packages available. *MicroMash, P.O. Box 6512, Huntsville, TX 77340, 800/241-9700, 409/295-1597*

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. *Micro Information Products, 6300 La Calma #100, Austin, TX 78752, 800/647-3863*

Report Writer

qPLEX IV reads any file format: COBOL, BASIC, Pascal, dBASE, ASCII, etc. Create your own special reports, forms, labels, queries from your files. Define sorts & selects. Exports data to Lotus or other spreadsheets or word processors. No programming required. Dealer kits available. PC/MS-DOS, Xenix, UNIX. *Snow Software Corporation, 3330 Fisher Rd., Clearwater, FL 33519, 813/784-8899*

The MBA Accountant

Easy To Use & Set Up! *Powerful!* Includes: G/L, A/R, A/P, Inventory, all in 1 pkg! Many Unique Features Include:

- *POINT OF SALES* • Order Entry • FIFO/LIFO/AVG
- Billing • Purch Order & Rcpt
- Single/Batch Proc. A/R, A/P
- Open Item/Bal Fwd
- Real-Time System
- Relational Data Base

State of the Art. Complete System–No Other Software Req. IBM/comp. $129.95 + $5 s/h. *The MBA Network, 16213 Mt. Gustin, Fountain Valley, CA 92708, 714/839-1954*

PC-FUND

The leading fund accounting system for local governments & non-profit organizations. Modules include General Ledger, Payables, Encumbrances, Obligation Tracking, Receivables, Payroll, Budgeting, Fixed Assets & Donor Receipts. PC-FUND runs on the IBM PC & compatibles under MS-DOS & Xenix. *American Fundware, Inc., Box 3028, Steamboat Springs, CO 80477, 800/551-4458, 303/879-5770*

Depreciation/ACRS 4.0

Separate Federal, State, Book Depreciation/ACRS method for each asset. Common pre-ACRS methods, all non-public utility ACRS supported. Annual updates. Easy entry. FAST sorts. Error checking. Tax & accounting schedules. Written & supported by a CPA with 13 years tax experience. Demo $35. Complete $149. *Karl E. Drake, CPA. Drake Business Software, 1606 N. Willow View Rd. #2J, Urbana, IL 61801, 217/337-0012*

Fixed Assets System

CFAAS™ is a powerful tool for fixed assets accounting which calculates separate financial & tax depreciation using all standard methods. Easy to learn & simple to use, it edit checks for tax code compliance & prepares tax worksheets. Demo disk $35, complete program $695. Visa/MC. *Comprehensive Microsystems, Inc., 609 Fifth Ave., Safford, AZ 85546, 602/428-7225*

Dash/Accounting

Accounting Software
**powerful *easy to use*
Fully integrated software for IBM PC/XT/AT or compatibles. INCLUDES:
• General Ledger • Accounts Receivable • Accounts Payables • Payroll • Inventory Control • Checkbook Management • Graphics • Fully Documented
All for just $99
Dash Accounting, 15735 Camino Del Cerro, Los Gatos, CA 95034. For orders: 800/628-2828, ext 625, Info: 408/356-3616

Expense Pro–$49.95

Simplify the time-consuming task of filling out expense reports. Maintain your records on a weekly basis & print out reports for your employer or tax purposes. Looks like standard expense form. Category names can be modified for users needs. Creates yearly expense summaries. Visa/MC + $3 s/h, CA add $3 tax. *Greentree Publishers, 5364 Ashwood, Camarillo, CA 93010, 805/483-5375*

Assembly Language

DataTerm TTY

Finally a fully featured Teletype terminal emulator is available for the PC, with full 8086 assembler source code. DataTerm TTY supports 50 to 19.2K baud, configurable XON/XOFF or CTS flow control, word size & parity generation, plus text transfer in either direction. Diskette with source & manual $179.95 Visa/MC. *LAN Comp Systems, 14524 I.H.R., Issaquah, WA 98027, 206/391-3725*

Automation

AutoScript v1.0 $29.95

Attention Teachers, Corp., Developers, etc. AutoScript is a memory resident utility that records & plays scripts. Over 8,000 keystrokes can be recorded, then played at various speeds for Demos, testing, batch files, etc. It's editor further refines the script. IBM 2.0 & up. *SCY, Seven Moss St., Burlington, MA 01803*

Backup Utilities

Copy II PC Option Board

Makes floppy backups of virtually all protected software for the IBM (except those "protected" by physical disk damage) quickly & easily. Works on IBM PC/XT/AT, Compaq Deskpro & Portable, Zenith 150, 151, 158, 256K Tandy 1000, new AT&Ts. Extra $15 cable required for Compaq Portable & Tandy 1000. All require 1 360K drive & full slot. Just $95! *Central Point Software, Inc., 9700 SW Capitol Hwy. #100, Portland, OR 97219, 503/244-5782*

BASIC

BASIC Before Your Eyes

BASIC has evolved into a powerful language, & whether you stay with it or go on to other languages, here's a great way to learn an important skill. Created by a veteran BASIC instructor, this tutorial is like having a personal teacher. #EU-105–$29.95, CA residents add sales tax. *EndUser\ Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

FINALLY!

A Subroutine Library for Compiled BASIC–Load directories into arrays, WINDOWING, Graphics pie & bar charts, special string functions; 130 more routines to add power to

Microsoft QuickBASIC or IBM BASIC Compiler 2.0. Visa/MC/chk/mo. 30-Day Money-Back Guarantee. FINALLY! is only $99 + $4 s/h. *Komputerwerk, Inc., Dept. PCW, 851 Parkview Blvd., Pittsburgh, PA 15215, 412/782-0384*

BASIC Programmers' Tools

Turbocharge Your Prgms

MACH 2 $75 • The Inside Track $65 • Peeks 'n Pokes $45 • Display data 4-10 times faster • DOS/BIOS calls/interrupts • Windows • Beyond 64K data • Read/write files at DOS speeds • Controlled input ignores ^Break & ^C. Much more. Compatible with interpreted, Quick BASIC 1/2, BASCOM 1/2. Demo available. *MicroHelp Inc., 2220 Carlyle Dr., Marietta, GA 30062, 800/922-3383, 404/973-9272*

Billing/ Time Keeping

Professional Time/Billing

Install 400 clients, 20 partners, 80 job & 40 expense descriptions, 20 area of practice codes, fixed fee or hourly bills & more. Prints bills, mo. statements, aged receiv. & more. Free phone support. $149/$3 shipping. Visa/MC/AmEx. Trust acct. & other software. Call/write for free catalog. *Micro-Art Programmers, 614 Alameda Padre Serra, Santa Barbara, CA 93103-2137, 805/962-0922 (24 hour)*

TIMESLIPS™ provides . . .

Memory-resident time & expense tracking using a software "stopwatch" or time sheet posting. Create professional bills: over 5000 formats w/auto aging, project sub-totalling, flat fee, retainer accounting & more. Generates reports, graphs, charts & mailing labels. User-definable screen & bill text allows use by all professions. Not Copy Protected. 30 DAY MONEY BACK GUARANTEE. $99.95 + $7 s/h. *(see ad below for ordering information.*

TIMESLIPS™ links . . .

with the powerful accounting system: ONE-WRITE PLUS™ "the software for anyone who can write a check" using • TIME-LINK: PLUS • ($49.95). Get the power of a general ledger/check-writing system integrated with TIMESLIPS. SPECIAL: Buy One-Write Plus from us ($295) & get Time-Link: Plus–FREE. *North Edge Software, P.O. Box 286, Hamilton, MA 01936. Orders only: 800/225-5669. For more info or rush service: 617/468-7358*

Business Applications

Linear Programming

MINI-MAX ($395) is saving a copper refiner $10,000 a month. "It's extremely easy to use," says an investment counselor in Oakland, CA. See how linear programming can boost your profits. The demo disk ($35) includes a Beginner's Guide and 70-page manual with 7 examples from business & industry. *Agricultural Software Consultants, P. O. Box 32, Dept. P, Kingsville, TX 78363, 512/595-1937. Telex 757375*

dBASE II/III/III+Software

- GENERAL LEDGER
  Integrates w/AR & AP
- dINVOICER
  Billing & A/R
- SALES ANALYSIS
  Works with dInvoicer
- ACCOUNTS PAYABLE
  Includes Check Writing
- JOB COSTING
  Contractors & Small Mfgrs.
- JOB ESTIMATING
  Works with Job Cost

ONLY $99 each including Source Code. MC/Visa/chk/COD. *dATAMAR SYSTEMS, 1152 Albion St., San Diego, CA 92106, 619/223-3344*

US-Atlas

Locates 29,000 cities with graphic display of states. Computes great-circle distances. Finds all states with towns of the same name. Finds all towns within a given radius. Shows towns 5 mi. either side of a line 40 mi. long. Color-Graphics. IBM PC/XT/AT 192K DOS 2.00. Send $49.95 check or money order to: *Illston PC-Programs, 1932 Hayselton Dr., Jefferson City, MO 65101, 314/635-3417*

Office Organizer

12 programs to increase productivity. *Memobook/Tickler-File* stores memos & reminds you of appointments. Do mailing lists & form letters with *Address Book/Form Letter Maker. Do List* keeps your agenda. Plus *Filer, Tax Fax,* & 7 more. #EU-101–$29.95, CA residents add sales tax. *EndUser\Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Business Office Packs™

Specialized files for bookkeeping, financial, legal, calendar, clock, tracking, inventory, spreadsheet, Breakeven analysis, Property or Tax Planning, preparing. Examples already filled in (ready to use). Advertising Valulator, Credit, Performance Analysers, & more. Works with Framework, Lotus, dBASE, IBM compatibility req. From $95. Ask about our low-cost demo. MC/Visa. By *Software Trust, order line 800/624-2232, operator 777, 24 hours*

Smith's Invoice

Invoices, shipping labels, customer data base. Customer & product mailing lists & labels. For U.S. postal codes. Menu-driven–easy to use. For IBM PC with 128K & 2 DS/DD drives or hard disk. All software, manual on disk $15. IN–incl. tax # or add 5%. Same-day shipment on checks. *Smith Consulting, Route 1, Box 213, Greensburg, IN 47240*

Super123™

MANAGEMENT UTILITIES for Lotus users. WRITER masters outlines, memos, documents, addresses. SCHEDULER generates weekly schedule by priorities. FILER maintains, queries, & prints user defined files. Menu-driven, usable first day. Monthly support letter. Totally Lotus(1a,2), no added RAM. $39 each. Visa/MC. *SoftStar Technologies, 11844 Research Blvd., Dept. PC101, P.O. Box 201027, Austin, TX 78720-1027, 512/388-4880, ext. 11*

SHIPMATE (for U.P.S.)

SHIPMATE is a smart investment for companies that use U.P.S.

- makes zip to zone conversions
- calculates all U.P.S. charges
- prints U.P.S. shipping labels
- prints U.P.S. COD tags
- prints shipping manifest

SHIPMATE is fast/accurate/easy. SHIPMATE is acceptable to U.P.S. SHIPMATE is the inexpensive way to automate U.P.S. shipments! $129 MC/Visa/COD. *Zog Industries, P.O. Box 1222, Carpinteria, CA 93013, 800/325-6852 (USA), 800/228-4107 (CA)*

On-Line Locator

Do away w/maps & directories. Geographic location software assists organizations that distribute products/services thru multiple locations. Input reference pt. by zip, place, name, or tel to display closest location within a given radius. Single users: IBM PC & compatibles; multiusers: UNIX/XENIX. *DCC Data Service, 1200 18th St. NW #704, Washington, DC 20036, 800/431-2577, 202/452-1419(DC, AK)*

Business/Home

PC-Checkbook
Quick & easy to use. No more hassel keeping your checkbook balanced. PC-CHECKBOOK is loaded with the best features. CHECKING: Auto Balancing, Check Editing, Analysis Report & Auto Filing. PRINT LISTING: Checkbook, Selective & Screen. HELP MENUS: POP-UP prompters, Hi-lighted & full-screen menus. For all these features & more send $39.95, chk/MC/Visa. *DEB/SOFT Applications, P.O. Box 35398, Houston, TX 77235, 713/729-2362*

Caching

Get Your Disk Moving!
VCACHE increases speed of cartridge & fixed disk operations using memory caching to eliminate repetitive disk access. Allocate up to 15 MB of extended/expanded memory, or .5 MB of standard memory for caching disk data. Includes diskette & screen accelerator modules. Transparent. $65 + $3 shpg, CA tax. *Golden Bow Systems, 2870 Fifth Ave. #201, San Diego, CA 92103, 619/298-9349*

Calendar

Time-Keeper (Calendar)
A calendar/scheduler featuring a weekly or monthly graphic display: multiple calendars, conference locating, copy or move appts. within or between calendars, search, tickler reminder, print selected appts., on-line help, user configuration files. PC/XT/AT or compatible. 192K PC-DOS 2.0. Mono/color–any printer. $195. Demo–$15. *DuraSoft, 7210 Washington Ave., New Orleans, LA 70125, 504/486-6081*

dCALENDAR™
The ultimate dedicated full-screen calendar/scheduler. Business or personal. Prints weekly, monthly, yearly calendars. Add, copy, delete, edit, reschedule events. On-line help, user configuration files. Print schedules by dates or event symbols. PC/XT/AT & compatibles. 256K DOS 2.0+. Any monitor, any dot matrix printer. A real value at $49.95 MC/Visa/chk. *Computer Affirmed Technology Corp., P.O. Box 12406, Lexington, KY 40583, 606/259-0558*

Checking

LEDGER DOMAIN™ 2.1
Rave reviews from users for feature-packed, menu-driven checking system for *1-2-3* & *Symphony*. Latest version. Prints checks, one-key entry of bills, auto reconciliation. Entry sorting & extraction by dates, check numbers, categories, more. Simple, intuitive, powerful. Req. Lotus *1-2-3* v.1a (320K), rel.2 (384K), or *Symphony* (448K). $49.95. MC/Visa. *Richard Rapfogel, Ph.D., 6219 Washington, St. Louis, MO 63130, 800/222-4747, ext. 3001; 314/727-6343*

Church Applications

Parish Data System™
Comprehensive census/contribution program. Easy to operate, menu-driven. Family, member, financial info & reports fully integrated. Selective listings, labels; contribution, tuition statements; personalized letters. User can create own reports, letters. Other church programs available. Over 1600 users. *Parish Data Systems, Inc., 3140 N. 51st Ave., Phoenix, AZ 85031, 602/247-3341*

PowerChurch Plus!™
Church office software–fast, friendly & reliable, suits any denomination. Membership, mailing, contributions, accounting, attendance plus 7 other modules integrated into one high performance system. Interfaces to *dBASE III*, Lotus & word processors. Unlimited capacity. Just $495. Demo $10. Details: *F1 Software, P.O. Box 3096, Beverly Hills, CA 90212, 213/464-0625*

Romar Church Systems™
Membership—61 fields plus alternate address; labels, letters, reports any field(s). Offering–256 funds; optional pledge; statements; post to 255x/year. Finance–G/L with budget; up to 500 sub-totals & 99 depts: month & YTD reports anytime for any month. Size 2000 people/floppy; 25000/10 meg. Ad too short! Write! *Romar Church Systems, Attn: CCP, P.O. Box 4211, Elkhart, IN 46514, 219/262-2188*

Collectors

"THE COLLECTOR"™
Organize your collectibles (stamps, coins, dolls, antiques, trains, you name it) all on one disk. Single disk holds up to 4000 items. Has unlimited capacity. Sorts alph/numeric with cost/cur val at touch of key. For PC/PCjr/XT/AT or similar (128K-DOS 2.0+). Write/Call for free brochure, or $65 + $3 s/h. Visa/MC. *The Third Rail, P.O. Box 143, O'Fallon, IL 62269, 618/632-7424*

Communications

Computer-Telex-Link
Use your computer for telex communications! Replace that old telex machine with your PC & Cawthon's Computer-Telex-Link. Save Money! Save Time! Increase Productivity! Cawthon's Telex-Link is easy to install & easy to use. Since 1978 Cawthon has been linking computers to U.S. & overseas telex services. Many satisfied customers. Excellent support. *Cawthon Scientific Group, 24224 Michigan Ave., Dearborn, MI 48124, 313/565-4000. Telex: 4970016 CAWTHON*

DataTerm MAIL
Imagine an Electronic version of the postal service–where you could send a sixteen page letter, cross country, in less than a minute–& for less than the cost of a first class stamp & envelope. Automatically transmit ANY file from your PC to another, error free, at speeds up to 9600 baud. Requires only an IBM compatible, async comm adaptor, & async modem. $179.95 Visa/MC. *LAN Comp Systems, 14524 I.H.R., Issaquah, WA 98027, 206/391-3725*

Cross-Referencing

EASYINDEX PLUS™
Write a book or program, create a print ready index by page number or cross reference by file name. Unlimited number of indexes & accessed files. Can index single words or phrases up to 59 characters. Performs typesetting, print formatting, & table of contents generation. Supports over 100 printers. $39.95 + $3 shipping. (CA residents add $2.60 tax). *Foreman Software, 977 Clayton St. D3, San Francisco, CA 94117, 415/665-6414*

Culinary Arts

$3 Gets You Cooking!
Diskette Cookbook Series–VANILLA® publishes 25 popular printed cookbooks transcribed to disk. Search, scale & print recipes from 1000s available. Hard disk search supported. Create your own cookbooks. No user manual needed. jr/PC/XT/AT/compatible. Software $20; most cookbooks $6. Demo $3. Free catalog. *Vanilla Software, 3345 Lakeshore Ave., Dept. W, Oakland, CA 94610, 415/482-4756*

MealPrep
Can't decide what to eat? This innovative program will actually plan your meals for you! Just enter your favorite recipes, meal-time requirements &

MealPrep takes over from there.
- Automatic Grocery Lists
- Calorie Counter
- Complete Recipe Filing Sys
- Menu-driven–Simple to Use
- Customer Support Line
- For IBM PC & Compatibles
- $39.95 + $3 s/h, chk/mo

Cater Software, 11922 Meadowfire Dr., Austin, TX 78758, 512/836-7356

• The Recipe Manager •
Runs on IBM PCs & compatibles. 128K up with PC/DOS or MS/DOS. Serving size adjustment to 999. Generates shopping lists. Creates hard copy cook book. 65,000 recipes per data base possible. 115 recipes included. Indexed manual with tutorial. $49.95 + $3 s/h, chk/MC/Visa. (MA residents add 5% tax.) *Gem Island Software, P.O. Box 393, Reading, MA 01867-0693, 617/944-1382*

A > Cook, Recipe Finder
Unique & flexible recipe filing system. Helps you find recipes quickly. Comes with 75 basic recipes & 500 recipe references. Easy to add more recipes, change serving sizes, print shopping lists. Perfect for menu planning. Fast recall of recipes. Favorable review: *PC World*, 2/85. $40 ppd. Extra recipes $16/Disk. *East Hampton Industries, 66 Newtown Lane, East Hampton, NY 11937, 800/645-1188, 516/324-2224*

Cursor Control

New–Cruise Control™
Increase cursor speed. Stop annoying cursor run-on. Repeat any key without having to hold it down. Time/Date stamping. Turn off screen from keyboard, or after time delay. Compatible with: *1-2-3, Symphony, dBASE III, Framework, WS-2000, MS-Word, WordPerfect, Q&A, DisplayWrite III, Reflex, Lightning, SideKick, Ready, ProKey,* & most others. $29.95 + $3.50 s/h. Check/MC/Visa/AmEx. *Revolution Software, Inc., 715 Route 10 East, Randolph, NJ 07869, 201/366-4445*

Data Base Compilers

FREE dBASE Compiler
Evaluation Kit includes: demo disk with 15 PRG, 10 FMT, 6 FRM, and results of compiling with both Clipper & WordTech. Complete reprints of 5 magazine reviews of both compilers. 22 benchmark tests. Detailed brochures with all features and limitations of both. FREE. No obligation. Call 24 hours, 7 days. Buy from us for best support. *dataBASE Specialties, P.O. Box 2975, Oakland, CA 94609, 415/652-2790*

Data Entry

Data Entry Emulator
Heads-down data entry for PCs. Fast & accurate preparation of batch data files. Formatting in minutes. Features include: auto-dup, 2 pass verification, constants, format chaining, range checks, table lookups, batch totals, 129 keyboard option, & much more. 30-day trial period. ONLY $395. *Computer Keyes, 21929 Makah Rd., Woodway, WA 98020, 206/776-6443*

Entrypoint
Most widely installed data entry system for PC/XT/AT. Heads-down speed, sophisticated multi-screen applications. Features: paint the screen form design, data validation, table & file lookups, Help keys, logic processing, reformatting, batch totals, verification, 129 KB remapping & more. Demo $30, Operator $545, Developer $845. Volume pricing. *Datalex, 650 5th St., San Francisco, CA 94107, 800/962-8888, 415/541-0780*

RODE/PC Data Entry
Top-rated PC data entry software. Fastest & easiest to use. Extensive features to meet every data entry requirement. Standalone & LAN versions. High-speed data entry keyboard available. Demo version includes all programs & documentation: $40 (+$5 shipping, CA add tax) creditable to full version for 30 days. *DPX, Inc., 20823 Stevens Creek Blvd., C1-C, Cupertino, CA 95014, 408/973-9292, TELEX 701111*

KeyEntry III™
Whether just starting, or replacing keypunches, 3741s, or dedicated systems . . . You won't see the full potential of PC-based data entry until you see KeyEntry III, *the* premier data entry system for PCs. $395 to $895 version/quantity dependent. Complete Evaluation Package just $42.50 delivered. To order, or for information, call now. *Southern Computer Systems, Inc., 2732 Seventh Ave. S, Birmingham, AL 35233, 800/533-6879, 205/251-2985*

Data Management

Wilkes Data Base
For IBM-PC and compatibles: Paint screens to create/view/update/delete/sort/search/print/reformat/arithmetically manipulate new or extant files. ASCII, 16/32 bit integer & 32/64 bit floating point storage. Powerful key sort & report formatting. $325. Demo $40. *Wilkes Software, 5231 Longwood Dr., Memphis, TN 38134, 901/386-4712*

dBASE III Catalogue & Search

Multikey Boolean Search
GENERAL-PURPOSE system for cataloguing keyword abstracts. One keyword field, 1st chr = category. FAST single-index search method. Queries driven by lists of keywords. List types: MATCH, NON-MATCH, >= and <=. Satisfy ALL lists or ANY. Encode keywords into 2,3 bytes. SOURCE CODE. $49 + $3.50 s/h. *Tom Lewinson, Thinker's Apprentice, 392 Central Park W., Apt. 12X, NYC, NY 10025, 212/222-5050*

Development

Turbo Hi-lited Printout
Up to 195 Pascal words & 20 user defined words selected from 7 tables. Variable page format with title, page #s, filename/date/time, left margin. No codes to imbed in text. Printer must accept 1-5 byte code to bold, elongate, underline, change density. MS-DOS disk, manual + examples. $29.95 US + $5 s/h. *Quotidian Software, 1111 Strathcona St., Winnipeg, Manitoba R3G 3G7 Canada*

Development Tools

PC/VAX Development
Avocet's Macro Assemblers & Software Simulator/Debuggers let you develop software on your PC for virtually any microprocessor. EPROM Programmers, In-circuit Emulators & other tools help you complete the job. For PC-DOS/MS-DOS, VAX-UNIX; most popular disk formats available. $299 & up. *Avocet Systems, Inc., P.O. Box 490, Rockport, ME 04856, 800/448-8500, 207/236-9055*

UNIX-Like Tools
Program development tools w/ UNIX-like capabilities & options. Save time w/familiar commands.
- csh: shell w/file name expansion, history, aliasing
- make: auto. recompile changed modules
- ls: list files
- grep: pattern search
- cp, mv, rm: disk file mgt.

Misc, history, aliasing: cat, pr, date, others. IBM PC/XT/AT. $75. Visa/MC. *CompuTool, Inc., 1562 Columbia Dr., Elk Grove Village, IL 60007, 312/529-4103*

WINDOW.LIB $99

An easy to use complete windowing system for programmers & writing in . . .

- BASIC IBM, M-S, CB86
- C LATTICE, M-S
- COBOL M-S, RMF
- PASCAL M-S, TURBO
- FORTRAN M-S, RMF
- dBASE NANTUCKET

Window editor included. Create callable pop-up menus, help screens. The line selector features highlighting & cursor control. No royalties. *Glenco Engineering, 3920 Ridge Ave., Arlington Hts., IL 60004, 312/392-2492*

Educational

PC-Pilot

Language for education & training. Now offered also by IBM as IBM Pilot. Support for color, graphics, fonts, windows, files, video control. We offer upgrades, advanced feature library ($300), tutorial ($125), authoring prompter. Single use license ($200) & unlimited campus/site license ($2000). 20% ed. discount. *Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, 206/734-8248*

Tutor or Test Maker

STUDENTS: Learning a foreign language? POLYGLOT tutor can be used to make word lists & take a variety of quizzes. POLYGLOT & manual $24.95 + CA tax. (DEMO disk $2.50).
TEACHERS: Use TESTMAKER to compile question files & make tests. Use for any subject. TESTMAKER & manual $24.95 + CA tax. *Alchemy Software, P.O. Box 1057, Aptos, CA 95001, 408/688-6252*

Grade Week Vacation!

Average & print out your grades in minutes with the fast, easy-to-use AEIUS GRADEBOOK program. New version this year contains many advanced features. Not copy protected. In use by teachers coast to coast. For IBM & most compatibles. $49 ppd. District rates available. Send for free literature. *Aeius Corp., Dept. G, P.O. Box 700457, San Jose, CA 95170-0457, 408/257-0658*

Try CAI

16 computer-assisted instruction programs. Improve reading with *FASTREAD. Vocabulary* teaches Spanish, French, & German. Learn U.S. trivia with *State Map.* Plus *Speed-Spell, Typing Tutor, Graphic Locator, Morse Code Tutor, World Time,* & 8 more. #EU-104–$29.95, CA residents add sales tax. *EndUser\Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Teacher's Aide

14 teachers' productivity tools. *Gradebook* stores grades, then computes totals & averages. *Quizmaker* & *Quizgiver* create true-false & multiple-choice tests, & assess scores. Plus *Typewriter Simulator, Memobook/Tickler-File,* & 9 more programs. #EU-103–$29.95, CA residents add sales tax. *EndUser\Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Teacher Turned Author!

Courseware Authoring System. Create great instructional courseware in minutes. No programming. No Royalities. Mix color graphics & text. Imbedded drawing system. Recordkeeping & fast editing. Prices $119-485. Demo Disk $15. IBM PC/XT & Compatibles. *Raster Technology, Inc., P.O. Box 3477, Longwood, FL 32779, 800/233-4465(tone) 8555; 305/889-8555*

Educational/Records

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, P.O. 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, 763 27th Ave., San Francisco, CA 94121, 415/751-1337*

Eng./Sci. Graphics

Engineering/scientific graphics. *OMNIPLOT [S]* (screen graphics) & *OMNIPLOT [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! *OMNIPLOT [S]*: $195. Add [P]: both $295. *Microcompatibles, 301 Prelude Dr., Silver Spring, MD 20901, 301/593-0683*

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, you can predict the behavior of complicated real-world systems. *Minuteman Software, P.O. Box 171/W, Stow, MA 01775-0171, 800/223-1430, 617/897-5662*

Engineering/Process

ENGINEER'S AIDE

- Pipeline/Ductwork Sizing
- Pump/Fan/Compressor Sizing
- Heat Exchanger Sizing
- Orifice/Control Valve Sizing
- Project Financial Analysis
- Conversion Calculator
- Specification Writer

Pull down menus, Pop-up help windows, Single screen entry & results–ALL above for $395 (intro price, $ back guarantee). Mac interface for IBM & Mac. *Engineering Programming Concepts, P.O. Box 925, Camarillo, CA 93011, 805/484-5381*

Estate Planning

Will-Planner™

Use your PC to write a personalized will! Easy program creates typed will/trust valid in your state. Written by lawyers. Has asset inventory, estate tax estimate, dictionary, info on probate & using lawyers. For IBM PC & comp. Copy protected: $79.95; hard disk special: $89.95 unprotected (+ $4 postage, $8 foreign). Will-Planner™ by *Noetic Technologies Corp., P.O. Box 3085, Englewood, CO 80155, orders & info 303/770-2380*

Flow Charting

Flow Charting II Is Here

The latest advance from specialists Patton & Patton. Create, edit, store, update both process-flow & organizational charts simply, accurately, professionally. Uses 120 or 200-column work area, prints on 8½" or 14" paper. IBM mouse utility available. Many user features save time & motion. *Patton & Patton, 340 Lassenpark Circle, San Jose, CA 95136, 800/538-8157, ext. 897 (nat), 800/672-3470, ext. 897 (CA)*

Forms Generator

New! LaserJet Forms!
New FormSet for LaserJet Plus printers lets you create a form, change it, print it out & save it. You can modify the form at the keyboard! FormSet ends costly typesetting & artwork, pays for itself quickly. Easy-to-learn, FormSet has *100% Money-Back Guarantee!* Special Introductory price: $129.95 + $4 s/h. Visa/MC/chk. *Orbit Enterprises, Inc., P.O. Box 2875-L, Glen Ellyn, IL 60137, 312/469-3405*

Gambling

Pro Football Analyst™
Handicap NFL/USFL games against the point spread easily & profitably with your computer! Only 5 minutes/week & your local newspaper is needed to uncover hidden overlays in the betting line. Winning season GUARANTEED or your MONEY BACK! $34.95 (+ $4.55 s/h). IBM & other versions avail. MC/Visa/AmEx. Write for free catalog. *GE Ridge Services, Inc., 170 Broadway #201-PW, New York, NY 10038, 800/341-1950, ext. 77*

Games

Supernova
Explore a mysterious planet. This challenging interactive adventure game provides many hours of entertainment as you attempt to locate buried wealth on a remote mining planet. Direct all the action using plain-English sentences. #EU-107--$29.95, CA residents add sales tax. *EndUser\Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Our Favorite Games
Includes arcade games (*Gunner, Snakes, King of the Mountain, PC Downs,* and *Fireman*), card games (*Concentration* and *Solitaire*), a fantasy game (*The Caverns of Kroz*), and *Magie,* a Bingo-like game. #EU-108--$29.95, CA residents add sales tax. *EndUser\Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

GolfMaster
A highly realistic golf game to challenge your skill. Tough, colorful 18-hole course. For 1-2 players, match/medal play.
- Lakes, traps, trees, OB
- Realistic swing dynamics
- Full club set, separate screens for fairways, chips, putts
- Selectable wind strength
- Complete practice range
- "excellent game-very enjoyable" (R. Nuckolls, golf pro)
- $35 chk/mo ppd. USA.

Hitech Management Corp., P.O. Box 2121, Boca Raton, FL 33427, 305/392-3678

24 Classic Games
For your IBM PC:
- *DISK 1.1*: Blackjack, Chess, Othello, Yahtzee, Moonbase, Jammer, Maxit, Pong-Pong, 4 more.
- *DISK 2.1*: Poker, Backgammon for 2, Baseball, Wizard, Moon Landing, Crazy-8s, Startrek-II, 5 more.
- Adventure-action-strategy-FUN! Menu-driven, color & sound. 2 disks, $49.95; $27.95 ea. Ppd. MC/Visa.

Mc$OFTWARE, Ltd., Division, M.B.A. Communications, 2480-4 Briarcliff Rd. #202, Atlanta, GA 30329, 404/373-3770

Genealogy

Family Reunion 3.1
Pedigree charts, family group sheets, descendant charts, birthday charts, address labels, histories, surname indexes, searches, worksheets, user defined fields, exciting screens, logical design, virtually unlimited capacity, & MUCH MORE! IBM PC or compatibles. 256K. DOS 2.0 or above. $155. MC/Visa/AmEx welcome. $ back guarantee. *Personal Software Company, 1580 East Dawn Dr., Salt Lake City, UT 84121, 801/943-6908*

ROOTS II™
Powerful organizer for family historical info. Lightning fast searches & sorts. Print camera-ready paginated books with pedigree, descendant & ahnentafel charts, family group sheets, text & index. Display maps w/graph adapter. Any PC or compatible. Satisfaction guaranteed. $195 (+ tax in CA). *COMMSOFT, 2257 Old Middlefield Way, Ste. B, Mountain View, CA 94043, 415/967-1900*

General

U.S. $6 . . . Including Disk
Over 2,900+ software titles for IBM-PC, Apple II, Macintosh, latest titles. Lots of hi-quality manuals. VOLUME DISCOUNTS. • IBM-PC Light Pen c/w software: $65. • 640K motherboard c/w full RAM: $200 • PC mouse compatible: $65. Lots of bargains, ram chips, etc.... Specify your computer type with $1 note for our air-mailed catalog to: *MICRO-WORLD, Dept PCW, Towner P.O. Box 310, Singapore 9132, REPUBLIC OF SINGAPORE*

Graphics

Grafmatic/Plotmatic
Grafmatic (screen graphics): 70 MS FORTRAN/Pascal (3.2, 3.3) IBM 2.0, PROFORT callable graphics routines. 100-page user manual. General utility, 2D interactive, total 2D plot support, 3D plots & solid models. $135. HP, HI plotter? Try Plotmatic for complete plotter capabilities–use with GRAFMATIC $135. Both $240. *Microcompatibles, 301 Prelude Dr., Silver Spring, MD 20901, 301/593-0683*

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*

MATC CAD for $99.95
The most powerful industrial-like 2-D CAD system available, for the IBM PC, XT, AT, or Apple II computers. MATC CAD is $99.95 (pre-paid)/system. The package, including instructional materials & technical support, is $395 (pre-paid). $99.95 for add. units. Qty. disc. available. Prices good thru 8/31/86. Visa/MC accepted. *MATC CAD, 1015 North Sixth St., Milwaukee, WI 53203, 414/278-6743*

1-2-3 Slides By Modem
The PC GRAPHICS SERVICE BUREAU converts charts created by *1-2-3* & other popular business graphic packages into 4000 line resolution 35mm color slides. The SERVICE BUREAU is on-line 24 hrs a day to accept chart files via modem directly from your PC. Slides delivered to your door within 72 hrs. $10/slide, no minimum. *Graphic Elements, Inc., 5524 Green Oak Dr., Los Angeles, CA 90068-2502, 213/465-8867–Voice Lines, 213/465-8869–Modem Lines*

Hard Disk Expansion

AT/XT/PC HD Expansion
Replace hard disk with a bigger one, or add a second drive!

Vfeature supports high-capacity drives on standard AT, XT, & compatible hard disk controllers. Includes multiple volumes, security features, selectable clusters, keyboard lock. $80 + $3 shipping, CA tax. *Golden Bow Systems, P.O. Box 3039, San Diego, CA 92103, 619/298-9349*

Home Use

Shop Cheap–Eat Smart

- COUPONOMIZER–Save more money with your discount coupons & rebates. 64K.
- DIET ANALYZER–Lose those extra pounds! Tracks calories + 23 nutrients. Ideal for menu planning. 128K.

Immediate shipment, 2 week money back trial. $49.95 ea. + $2.50 s/h. AmEx/MC/Visa. Call for free brochure. *Natural Software Ltd., 7 Lake St. #7E, White Plains, NY 10603, 800/626-2511, 914/761-9329*

Home Organizer

11 programs for the home. Develop investment strategies with *Financier. Auto* tracks car expenses. Keep a well-stocked kitchen with *Shop List. Job Jar* makes it fun & easy to assign household tasks. Plus a label maker & 6 more programs. #EU-102–$29.95, CA residents add sales tax. *EndUser\ Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Inventory Control

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, pricing, and purchase order systems. *RJL 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

A richly featured, high-performance, modular system for Mfgrs. Has Stock Status Rptg, Trend Analysis, Purchase Order Tracking, QC Rptg, Historical Transaction Detail Analysis, Multi Whses/Whse Loc & Bill of Materials. On minis since 1978, expanded/ported/priced for micros. Demo avail. *Applied Micro Business Systems, Inc., 177-F Riverside Ave., Newport Beach, CA 92663, 714/759-0582*

Job Search

Super Search Software™

For the 1st time–a program for the Job-Seeker & Career-Changer • SAVE TIME • BE ORGANIZED • Directories Easily Sorted • Reminder Follow-Up Lists for Networking & Correspondence • Mail Merge • Labels • Call & Expense Reports • Financial Analysis to Control Budgets • Model Resumes & Letters • Menu-driven • A Snap to Use • Demo disk. $3 s/h. *Jamenair Ltd., P.O. Box 241957-PC, Los Angeles, CA 90024, 213/470-6688*

Land Surveys

L-PLOT

A metes & bounds program to plot & print a plat of any scale from virtually any legal description. Calculates area & error of closure, plots multiple tracts, saves to file & more. Versions available for Apple & IBM with graphics capability. Supports most dot matrix printers. Under $200. 30-day free trial. Visa/MC/chk. Call or write to: *LAN/SCAN, Inc., P.O. Box 6863, Abilene, TX 79608, 214/824-6419*

Loans

LOAN MAKER™ $89.95

Godfather of Loan Calculation & Amortization Programs. Instantly computes results on changes in Loan Parameters. Makes amort schedules for Level, Specified Amt., & Decreasing Pymts for any time period. Balloon Pymts. Save/Recall/Delete schedules. Printer options. PC/XT/AT/compat. Demo $5; 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)*

Mail List Programs

Pony Express XL 2000

For commercial & large lists. Fast machine code multisort. Prints labels 1-5 across, single line or user-defined format. Also CHESHIRE FORMAT. Records selected by user-defined codes, zips or zip ranges. Auto repeat for ease of record entry, corrections & deletions. Phone list option. Includes full function word processor. Merges w/most other word processors. $238. *Computech, 975 Forest Ave., Lakewood, NJ 08701, 201/364-3005*

List Manager–$47

More than a full-featured label program, it also allows you to code & analyze client types, mailings & responses. Menu-driven for easy operation on IBMs & compatibles w/256K. Flexible print options. Auto-sorts. Pkg's 1 million+ record capacity grows with you. Brochure. CALL TOLL FREE. Visa/MC/chk. *List Manager, P.O. Box 11259, Alexandria, VA 22312, 800/422-2408*

FlowMail–$100

Create/Name separate files. Merge files. Eliminate Dups. Select records by user defined codes. Two address lines. Print labels 1,3,4 across. Print reports, envelopes, & cards. Full screen editing with carry over fields. Free Demo Disk. Carrier route system available for bulk mailers w/HD. Call TOLL FREE TODAY! *FLOWSOFT custom programming, 875 Franklin Rd. #1635, Marietta, GA 30067, 800/628-2828, ext. 886*

SUPER MAIL™ $25

This easy-to-use, powerful menu-driven program is used by thousands of happy customers. Find names in 1-2 secs.–no sorting. Features unlimited records & labels per name AND full screen editing. Select labels by zip or name. Password protection available. Take memos + more! Only $25. Call for details. Visa/MC. *Place Management Corp., 100 East 2nd St., Mineola, NY 11501, 800/DIAL PMC, 516/294-1400 (NY)*

Best Programs–Try Free

- Mail-Track-I ($49.95) our easiest program in use since 1982.
- Mail-Track-II ($95) most flexible & powerful, allows up to 24 fields.
- Mail Bulk Rate II ($195) for 1st & 3rd class mailings.
- Mail Second Class II ($295) for 2nd class mailings.

Call or write for free trial version & catalog. *Sapana Micro Software, Dept. WCPI, 1305 So. Rouse, Pittsburg, KS 66762, 316/231-5023*

ArcList
Professional list management for IBM PC/XT/AT. Capacity 20,000,000 names, automatic zip & state verification, print any label, custom charts & reports, merge-purge with excellent near-dupe recognition, match codes, postal presorting, Nth sampling. $595. Call for free brochure. *Arc Tangent, Inc., 232 Anacapa St., P.O. Box 2009, Santa Barbara, CA 93120, 800/843-5928, 805/965-7277(CA)*

Zip Directory on Disk
41,000 zip codes w/city, state & county on floppy disk set. Data file allows your programs to automatically lookup city, state & county info based on zip. Reduce data entry errors; find errors in current lists. Req. hard disk. DOS 2.0 & other pop. formats $195. Write or call for free brochure. *DCC Data Service, 1200 18th St. NW #704, Washington, DC 20036, 800/431-2577, 202/452-1419(DC, AK)*

DBMailer+ $29.95
Powerful, easy-to-use mailing data base. Menu-driven. Unlimited files & file size. Sort, edit & delete by name, business, city, state & zip. Full screen editing. Includes full function word processor. Prints labels & merges with most other word processors. 30-day money back guarantee. Visa/MC/chk. *LYC Electronics, 1850 S. El Dorado St., P.O. Box 6188, Stockton, CA 95206, 800/821-9906; 800/446-3337 (CA)*

Mailing Programs

PostWare Mailing System
Automates mail prep & reduces postage. Sorts by US Postal Service regulations & prints addresses in pkg. & sack/tray mailing order. Produces sack/tray labels. Calculates postage. Works w/*dBASE III*, ASCII & others. Ask about 30 day $ back offer.
- 1st & 3rd Class Prg. $195
- 2nd Class Program $395
- Carrier Route Program $295
- 3rd Class Program $49.95

PostalSoft, Inc., 515 Division St., La Crosse, WI 54601-4544, 800/831-MAIL (6245), 608/784-3500

Manufacturing

TwinOaks mrp2
Real-time, mainframe-featured software for manufacturers. Highly modular, integrated system for B/M, inventory, purchasing, cost control, master scheduling, order tracking, shop floor control, material & capacity planning. For the 256K IBM PC/XT/AT with PC-DOS. Demo disk, IBM/COBOL source available. *TwinOaks Inc., Box 136, Cottage Grove, MN 55016, 612/458-1604*

Manufacturing Inventory
Integrated Inventory Control, Bills of Material, & Purchase Orders with direct accounting interface. Designed for small & medium-sized manufacturing firms. IBM PC/XT/AT version costs only $995. Special money-back guarantee. Explore MISys yourself & print sample reports using our demo ($5 ppd). *Microcomputer Specialists, Inc., 18 Lyman St., Westboro, MA 01581, 800/833-1500, 617/366-1200*

MFG. Control System
A comprehensive system for repetitive or job shop type manufacturers consisting of: B/M, Inventory, Order Processing, Purchasing, Mat. Req. Planning MRP, MPS, Shop Floor Ctrl. & CRP, Cost devel., Job & W/O Costing, Accounting. 1 yr. warranty included. Train & consult avail. Compare our system & prices for best value. *Production Systems Inc., 526 South E St., Santa Rosa, CA 95404, 707/526-1294*

Myte Myke™ Mfg Control
Integrates with Business System. Std Cost provides Bill of Material, operations routing, where used, same as except & projection capabilities. Inv. Control, Forecast/Sched, MRP, MPP, Prod Cost, Prod Orders, Shop Floor Control. Install & support avail. PC-DOS, MS-DOS, NOVELL Networks, XENIX & UNIX. *M & D Systems, Inc., 3885 N. Buffalo Rd., Orchard Park, NY 14127, 716/662-6611*

Job Shop Control
Actual Job Costing & Shop Floor Control. Tracks Material, Labor, Burden & Outside Costs. Actual vs. Estimated Quantities, Hours, Dates & Dollars. Job, Employee, Machine, Customer & Vendor activity. P&L by Job & History by Part. Improves Estimating, Costing & On-Time Shipments. *RDS Inc., P.O. Box 997, Derry, NH 03038, 603/893-6527*

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, 1810 South Lynhurst, Ste. Q, Indianapolis, IN 46241, 317/248-0357; 800/428-3515 (Nat'l); 800/792-3525 (IN)

Medical Systems w/ECS
*THRESHOLD™ $1,995 claims, A/R, patient billing. *THRESHOLD $3,995 claims, A/R, patient billing, complete practice management, statistics, analysis. *CLAIM*NET Nationwide claims clearinghouse. Full 100% credit on product upgrade. PC*CLAIM & PC*CLAIM PLUS both house 30-day money-back guarantees. IBM PC/XT/AT/compatibles, MS-DOS, 256K. *Physicians Practice Management, 1810 South Lynhurst, Ste. Q, Indianapolis, IN 46241, 317/248-0357; 800/428-3515 (Nat'l); 800/792-3525 (IN)*

Mutual Funds

FUNDGRAF©
GRAPH & find best performing mutual funds or stocks. Graph PRICE and/or MOVING AVERAGE (any span). Superimpose graphs for comparison. Calculate relative strength RATINGS. Generate buy & sell SIGNALS when trend changes. FREE brochure. DEMO disk $10. FUNDGRAF disk with data for 32 funds for 4 years $100. MC/Visa/chk. *Parsons Software, Dept. C, 118 Woodshire Dr., Parkersburg, WV 26101, 304/424-5191*

Nutrition

Diet and Exercise
Now you can plan & calculate a healthy diet & exercise program for you & your family. DIET WISE analyzes diets, recipes, & menus for 16 nutrients. ENERGY WISE calculates & tabulates calories used in your daily activities. Designed by dietitians. PC/MS-DOS. $39.95

to $120. Educational & Professional/versions available. *Nutritional Data Resources, P.O. Box 540 A, Willoughby, OH 44094, 216/951-6593*

The DINE System

Nutrient analysis, diet improvement. 3386 foods, most on micro. 15 nutrients. Uses age, sex, height, body frame, activity. DINE Score of eating behavior; personal data disk; simplified coding. Validity w/estab. standards. Apple IIe & c, DOS 3.3, 128K, 2 drives, $145. IBM PC, DOS 2.0, $165. + $1.50 s/h. MC/Visa. 15-day $ back guar. Demo $10. *DineSystems, Inc., 724 Robin Rd. Dept. 9, W. Amherst, NY 14228, 716/834-DINE*

Outline Processors

InLine™

Outline processing for IBM PC/XT/AT & compatibles–128K DOS 2.0+. Multiple paragraphs, outline merging, search & replace, macros, standard labels, zooming & more. Read outlines into *Microsoft Word, WordPerfect, MultiMate*, or *WordStar*, keeping all formats! $89.95 + $5 s/h. MC/Visa. *Compusense, Inc., 55 Constitution Dr., Bedford, NH 03102, 617/620-4556–orders only*

Party Fun

A. P. PARTYMAKER

Outrageous, provocative, hilarious fun. That's how they'll describe your party. Crank up PARTYMAKER. Menu selections lead the hapless user through fickle, capricious routines sure to please the crowd. "Confidential" forecasts, word associations, "private" talks--more. Ever so slightly wicked. IBM PC/AT/XT/jr; 128K; color mntr. $54.95. *Analytical Profiles, Inc., P.O. Box 12635, Pittsburgh, PA 15241, 412/833-9664*

pfs:file Utilities

F2L–pfs:file to Lotus

Convert your *pfs:file*/IBM Filing Ass't files to Lotus, without rekeying. F2L strips dollar signs & commas from numeric fields, converts dates to Lotus format, checks for valid data, & produces a file ready to use with *1-2-3/Symphony*. Easy to use, complete manual. Only $49.95, free s/h. NY add tax. 15 day $ back grt. *O.R.O. Enterprises, 114 Liberty St. #204, New York, NY 10006, 718/646-7048*

Preventive Maintenance Scheduling

Mint-Condition

Mint-Condition is the Preventive Maintenance Scheduling System designed to allow anyone, especially those unfamiliar with computers, to schedule preventive maintenance operations, print work orders, & store historical information pertaining to maintenance performed. Call or write for details. *Industrial Data Systems, Inc., 101 East Simonton St., Elkhart, IN 46514, 219/264-4187*

Printing Industry

W / T ESTIMATOR

Designed by a printer to increase productivity, this program can save you hours of tedious calculations, & recalculations. Use your own rates & production standards to generate a detailed estimate in 10% of the time it takes manually. For information & a free demo diskette write to: *W / T Computer Systems, P.O. Box 205, Latham, NY 12110, or call 518/272-6650*

Public Domain

$4.50 IBM PC Software

450 disks: $4.50 ea.
Arcade games, 4 disks $18.
Utilities, 4 disks $18.
1-2-3 WKS, 8 disks $36.
"c" routines, 6 disks $27.
Turbo pascal routines, 8 disks $36.
Unprotect software, 4 disks $18.
Sample, word proc, DBMS, games & utilities, 5 disks $22.50. Catalog $1. Add $4 s/h. MC/Visa. *The Computer Room, P.O. Box 1596, Dept. 101, Gordonsville, VA 22942, 703/832-3341 (M-F 10-5)*

Public Domain

Gain access to thousands of useful IBM PC programs such as File & Word Processing, Utilities, Financial, Spreadsheets, Templates, Macros, Assemblers, Tutors, Arcade-quality games. Unerase & unprotect programs w/manuals & documentation right on the disks! Write or call for free catalog. *Public Domain Sig, Inc., 2400 Santa Rita, Las Vegas, NV 89104, 702/732-0169.*

Real Estate

Property Management +

A new easy-to-use system for single or MultiFamily properties. Print checks, rent statements & receipts reports–late rents, expired leases, vacancies, income/expenses & operating statements. Includes a bank reconciliation feature & graphics capabilities. Up to 70% reduction in management time. *Realty Software Co., 1926 S. Pacific Coast Hwy. #229 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/$295 for deciding when to buy, sell, exchange, or refinance.

Visa/MC. 30 day money back. *Real-Comp Inc., P.O. Box 1263, Cupertino, CA 95015, 408/996-1160*

EZ-RE Investor Templates

Real Estate Investor Templates. Equity Share, Houses, Apartments, Warehouses, Office Bldgs. 10-year projection of cash flow, deduction, tax at sell, after tax IRR. Expenses, int., rent & apprec. adjustable annually. Mortgage types—ARM, FHA 245, amort, deferred int., int. only. Professional report. Req. *1-2-3*. $ back guar. $50 ppd. Visa/MC. *LB Associates, 8817 Skokie Lane, Vienna, VA 22180, 703/938-9093*

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-$395. Investment analysis-$245. *Yardi Systems, 3324 State St., Ste. "O", Santa Barbara, CA 93105, 805/687-4245*

Professional Quality

From the leader in real estate software, a complete library of products for investors, brokers & developers: Investment Analysis, $195 (tax updates available); Comm./Ind. Applications, $100; Residential Real Estate, $100; Financial Analysis, $100 & MUCH more. Requires *1-2-3*, *Multiplan*, or *SuperCalc 3*. *RealData, Inc., 78 North Main St., South Norwalk, CT 06854, 203/255-2732*

Property Management

Software for owners of apartments, mini-storage, condos, duplexes, fourplexes, single family, & office complexes. Provides instant cash flow analysis, records expenditures on each unit, prints summary reports, user selected expense categories. Amortization & depreciations schedules included. *Tomar Productions, P.O. Box 740871, Dallas, TX 75374, 214/750-1212*

Scientific

STATS: 1-2-3/Symphony

ADDaSTAT: Linear Regr (±95% limits or 3 LR lines/graph), 2 t-tests, Error Bars, anova, χ^2, more: 256K $80. MULTIFIT: Fourier Plot & Mult Regr: 256K $90. SYMPHONY version (both): 512K $160. All menu-driven load & transform data, print, graph, auto-significance & p-values. $5 s/h. Dealers invited. *ABACUS Scientific Software, 4521 Campus Dr. #111, Irvine, CA 92715, 714/786-6264.*

Scientific Word Processing

WordPerfect™ Add-On

TURN *WordPerfect* INTO A SCIENTIFIC WORD PROCESSOR. Display & print complete Greek & math symbol sets. Key hardware supported. Includes display chip, printer downloading program, & free custom printer definitions & macros w/ proof of purchase of *WordPerfect*. Call for flyer & ordering info. ONLY $75. *Scientific Word Processing Enhancements, 8320 N. Lockwood Ave., Skokie, IL 60077, 312/677-4270*

Sort

Opt-Tech Sort/Merge 3.0

Extremely fast Sort/Merge program. Run as a DOS command or Call as a subroutine. Many datatypes & filetypes supported including Btrieve & *dBASE*. Sort multiple files of unlimited size on multiple keys. Now featuring record selection, record reformatting & much more! Call or write for more info. $149. *Opt-Tech Data Processing, P.O. Box 678, Zephyr Cove, NV 89448, 702/588-3737*

Sortex

A flexible, general purpose select/sort/merge facility with the ultimate in performance & reliability. All the commonly used file & data types are supported. No practical limitations on the size or number of records & fields. $100 + $5 s/h with 10-day money-back guarantee (less $10 restocking fee). *Systemat Corporation, 19715 Gravina St., Rowland Heights, CA 91748, 714/594-9567*

Sorting Made Simple

An excellent tutorial on a critical & fascinating element of programming. Start by learning & observing simple, slow sorting techniques–then move on to faster, more complex methods. When done, simply adapt any of the sorting techniques to sort your own data. #EU-106–$29.95, CA residents add sales tax. *EndUser* Software, P.O. Box 10120, Palo Alto, CA 94303-0976, 800/222-2990, 800/526-8000 in Canada*

Statistics

Statistician's MACE 2.0

Full-feature program calculates 11 probability functions, multiple regression, correlation, several analyses of variance, nonparametric, ranks, transformations, much more. Read data from keyboard & ASCII files (spreadsheet, data base, WP.) IBM PC,XT,AT & compatibles. $255. Buy direct or from dealers. *The MAtrix Calculating Engine (MACE) Inc., 2313 Center Ave., Madison, WI 53704, 608/244-3331*

BMDP Statistical Software

Professional statisticians have relied on BMDP for over 20 years. For XT/ATs, 29 programs to choose from, starting at $450 for 6. Featuring descriptive statistics, ANOVA, regression, time series, multivariate, nonparametric, cluster & survival analyses. Site licenses & free program info available. *BMDP Statistical Software, Inc., 1440 Sepulveda Blvd., Los Angeles, CA 90025, 213/479-7799.*

RATS! Version 2.0

RATS, the best selling Econometric software package, now includes daily & weekly data, a new, easier to use 500-page manual, & many advanced features. Use RATS for time-series & cross-section regression, including OLS, ARIMA, VAR, logit, & probit. IBM PC or compatible. $200. MC/Visa. Call for brochure. *VAR Econometrics, Inc., P.O. Box 1818, Evanston, IL 60204, 800/822-8038, 312-864-1910 (IL, AK).*

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. $79. 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. *The Futures Group, 76 Eastern Blvd., Glastonbury, CT 06033, 203/633-3501*

1-2-3 Statistics

Complete Statistical Package designed to process data from *1-2-3*; Menu-driven; T-Tests, Correlations, Cross-tabulation, Powerful Multiple Regression routine, ANOVA/ANCOVA (with Repeated Measures), Nonparametric Statistics, Bar graphs, Scatterplots; Super fast (8087 Support); for 256K PC; $149. *StatSoft, 2832 East 10th St. #4, Tulsa, OK 74104, 918/583-4149*

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 for professional presentations. *Creative Research Systems, 1649 Del Oro, Dept. W, Petaluma, CA 94952, 707/765-1001*

Surveys

Do Surveys With Your PC
People Facts: *The Opinion Processor.* Find out what people think about your company, products, services. Create survey questionnaires, process results. Easy to use, all essential statistics. $395. Full-feature preview $25. Manuals with both. Call or write for details. *Shamrock Press, 1277 Garnet Ave. #206-P, San Diego, CA 92109, 619/272-3880*

Taxes

Tax Preparation
Fully interactive menu-driven program prepares 1986 Federal tax returns. Easy to use, follows IRS forms incl. 1040, sch A-G,R,SE&W; forms 2106, 2119, 2210, 2441, 3468, 3800, 3903, 4562, 4797, 4835, 4952, 4972, 5695, 6251, 6252. MS/PC-DOS 128K; Prof. $349; Personal $59. 85–Prof. $30. Visa/MC. *Dunphy Systems, Inc., P.O. Box 326, Worthington, OH 43085-0326, 614/431-0846*

Terminal Emulation

DataTerm 8220
Now you can connect your PC with any Datapoint computer. Full 8220 emulation. File transfer, with DOS or RMS, under user or host control. Supports 50 to 19.2K baud, directly to MPCA or modem. Requires only an IBM compatible with an async comm adaptor. $179.95 Visa/MC. Datapoint 8342 or 3600 terminal emulator & 8086 Assembler source is also available. *LAN Comp Systems, 14524 I.H.R., Issaquah, WA 98027, 206/391-3725*

TEK 4105/7/9 Emulation
TGRAF-05 emulates the Tektronix 4105 terminal plus TEK 4010 & DEC VT100. TGRAF-07 adds 4107/9 features; TGRAF-15 provides 4115 display list. Access mainframe graphics software such as ANSYS, ANVIL-4000, DI-3000, GKS, IDEAS, NASTRAN, PATRAN-G, PLOT-10, TEMPLATE. Resolutions to 1280x1024. *GRAFPOINT, 4340 Stevens Creek Blvd., San Jose, CA 95129-1102, 408/249-7951*

Transportation

TPRO88–Transp. Routes
Powerful interactive system for finding routes on transp. networks. Networks may have up to 512 nodes & 16384 links. TPRO88 finds shortest path between 2 points, sequences up to 50 stops, finds min. spanning trees, times & distances between all points. Menu-driven, graphics display, & many features similar to LP88. Req. 192K, color graphics. $99 w/8087 support, user's guide, U.S. road network. Visa/MC. *Eastern Software Products, P.O. Box 15328, Alexandria, VA 22309, 703/549-5469*

Typesetting

VS Fonts & FontGen
• VS, Compugraphic & ITC fonts. Download routines & *Microsoft Word* driver incl. Compatible w/Polaris products, *Spellbinder, Fontastic, MP-XL, Printworks, LaserPrint+, LaserType*, more.

• FontGen designs & edits fonts, symbols, logos. $250. For HP +, Cordata LP-300, Canon A1/A2, NCR 6416, LaserMaster 4080. *VS Software, P.O. Box 6158, Little Rock, AR 72216, 501/376-2083*

User Supported

Great Software, Cheap
Only $5.95 per disk for absolutely smashing Freeware & Public Domain programs. DOSamatic, AutoMenu, PC-Write, Chess, PC-Key Draw, Qmodem, PC-DeskTeam plus utilities, data bases, educational programs, games & lots more! IBM PC, PCjr, or compatibles. Send for FREE CATALOG. *PLUS, 33495 Del Obispo #160P, Dana Point, CA 92629*

Utilities

Padlock/Padlock II Disks
PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands. $99. PADLOCK II disks come preformatted with fingerprint & serialization. PADLOCK II disks offer superior protection. Ask about our hard disk protection and window library products. All work w/hard disk, EXE/COM files & all DOS versions. MC/Visa. *Glenco Engineering, 3920 Ridge Ave., Arlington Hts., IL 60004, 312/392-2492*

IBM Uses CP/M & Apple!
"The best CP/M to DOS converter" *PC* mag. 4/85. UniForm PC transfers files/formats/reads & writes DIRECTLY TO 200 CP/M disk formats on your IBM PC, XT, AT (also 96 TPI & 8"). Use normal DOS commands. $59.95 + $3 s/h. By Micro Solutions. NEW! MatchPoint card copies Apple DOS & CP/M files to IBM. BOTH products at $185 + $3 s/h. Dealers invited. *Blue Heron, 1108 S. Second St., DeKalb, IL 60115, 815/758-2355*

ZeroDisk
Run dozens of copy-protected business packages from your hard disk without floppies. Call for the latest list of software it handles. Needs IBM AT, XT, PC, or compatible, DOS 2.0 or higher. ZeroDisk is revised monthly & is not copy-protected. $75 US. Check or Credit Cards accepted. *Quaid Software Limited, 45 Charles Street East, 3rd Floor, Toronto, Ontario M4Y 1S2, Canada, 416/961-8243*

Path Command for Data
DPATH+ allows Lotus, *dBASE, WordStar*, etc. to read & write data files located in other directories. No more copying files from directory to directory! Uses hard disks, floppies, RAM disk, any combo. Allows "virtual disks," too. Requires only 4K. MS-DOS 2/3. $45 + $5 s/h. MD add 5%. Visa/MC/PO/chk. *Personal Business Solutions, P.O. Box 757, Dept. D, Frederick, MD 21701, 301/865-3376*

Automenu™ version 4.0
Create one menu system to run all your programs, batch files & DOS commands. "Insulates" novices; many options for power users. On-screen help, password protection, user-defined prompts. Written in assembler. 16K size. Over 7,000 satisfied users. Money back guarantee. $46 + $4 s/h. Chk/Visa/MC. *Magee Enterprises, Dept. W11, 6577 Peachtree Industrial Blvd., Norcross, GA 30092-3796, 404/446-6611*

AT-Disk Upgrade BIOS
DUB-14 overrides AT Drive Table to allow any compatible drive to be attached & fully used on the standard AT controller. 2 ROMs plug into empty sockets on system board. Includes complete Set-Up routine & low-level format facility. Works with UNIX, XENIX,

other OS & networks. $95 + $3 shpg, CA tax. *Golden Bow Systems, 2870 Fifth Ave. #201, San Diego, CA 92103, 619/298-9349*

FlexGen2—Data Manager

Powerful, easy to use, report writer, prog generator, file maintenance tool. Produces structured/documented RM COBOL Programs (and Source), or Runs Interpretively. Accesses/Maintains *ANY* RM COBOL file. Absolute MUST for accessing data or creating your own system. Menu-driven. No COBOL experience needed. 30 day trial/$50. *SINC, Inc., 1299 LaVelle Dr., Xenia, OH 45385, 513/372-4334*

Quickcache

Intelligent disk I/O management subsystem for PC/MS-DOS 2.xx & 3.xx. Capable of making your programs run up to 14 times faster. All parameters dynamically alterable. LIM memory supported. 40K min. required. $49.95 + $5 s/h. Visa/MC. 30-day guarantee. *P. R. Glassel and Associates, Inc., 30255 Fir Trail, Stacy, MN 55079, 612/462-1337*

PC Tools!

PC Tools is a complete set of resident DOS utilities including: undelete, locate files, search for text, change file attributes, map a disk, view/edit any sector, plus a complete set of DOS commands (format, copy, compare, etc.), featuring a graphic subdirectory "Tree" display. Just $39.95! *Central Point Software, Inc., 9700 SW Capitol Hwy., Portland, OR 97219, 503/244-5782*

Word Processing

PC-Write™ Now 2.6

Fast, flexible with menus, 40 help screens. New manual, mail merge, split screen, ASCII files, footnotes/index/contents. Supports LaserJet, 300+ printers. Software/QuickGuide on disk $10. Register for full manual/support $75. Soon with spell check: disk pair, $16; register, $89. OK to copy & share. Visa/MC. *Quicksoft, 219 First Ave. N. #224G, Seattle, WA 98109, 206/282-0452*

Textra® Now $9.95!

A word processing dream come true. Elegant simplicity, blinding speed. Thousands of you are switching to Textra from *pfs:write*, *MultiMate*, *WordStar*, etc. Give it a try & find out why. You will be *stunned* with the quality of Textra! Send $13.95 (Ver. 3.1) or $29.95 (Ver. 3.1A). Prices include s/h. *Ann Arbor Software, 407 N. Main, Ann Arbor, MI 48104, 313/769-9088*

Word Processor Add-ons

CompareRite™ for $99

SAVE HOURS. See every change at a glance! CompareRite compares two documents, instantly highlighting the differences between them in a third draft. Great for contracts, proposals, articles, reports, source code ... You select appearance of added & deleted text. For major Word Processors. Intro price $99 + s/h. *JURISoft Inc., 6 Story St. Penthouse, Cambridge, MA 02138, order: 800/262-5656, 617/864-6151*

Tape/Disk Conv.

Conversion Services

Conversion services to or from over 500 computer systems:

- Mag tapes
- Micro Computers
- Mini Computers
- Word Processors
- Typesetters

Our conversion capabilities surpass most in the industry. *Pivar Computing Services, Inc., 165 Arlington Heights Rd., Dept. W, Buffalo Grove, IL 60089, 312/459-6010*

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*

Mainframe/Mini/Micro

Conversion of Tape/8"/5¼"/3½" disk for most formats. IBM SYS/??, 3740, APPLE, CP/M and hundreds more. Convert 360K or 3-billion chrs from/to any word processor or data base. Also Data Entry and OCR input. *Amwork Systems Inc., 314 W. Downer, Aurora, IL 60506, 800/255-2255, ext. 4130*

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 area*

PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

FORMAT: *The standard format includes a product ID, a 300-character descriptive ad, and company name, address, and telephone number.*

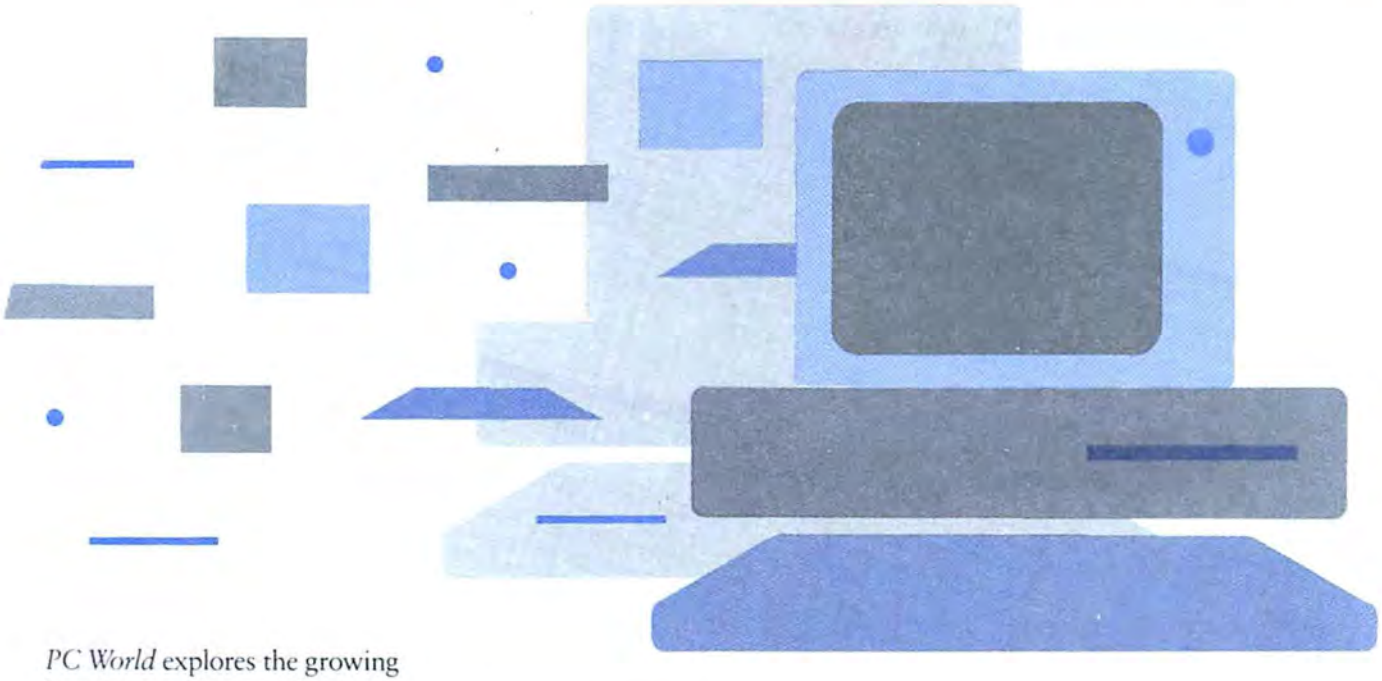
Advertisers may choose among categories already in use, or they may create their own. Display advertisers can cross-reference their current ad to the PC World Directory *for increased exposure at low cost.*

RATES: *Listings are accepted for three-time consecutive insertions at a rate of $975 ($325 per issue). We offer a six-time insertion, 15 percent discount contract for a total of $1626 ($271 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.*

DEADLINE: *For copy deadlines, contact a* PC World Directory *sales representative at 415/546-7722 or 800/435-7766 (nat'l), 800/435-7760 (CA). Please send copy and prepayment to* PC World Directory, *501 Second St., #600, San Francisco, CA 94107.*

December Preview

Focus on Manufacturing



PC World explores the growing importance of personal computers to American business. The PC is breaking new ground where it counts—in the nation's manufacturing centers. *PC World* analyzes this new trend and its impact on the way we work and produce goods.

- **A Hands-Off Approach**
  Using ALPS, the Automated Logistics and Production System, IBM has completely automated production of its PC Convertible. With the help of robotics, artificial intelligence, and machine vision, IBM's innovative manufacturing procedure has eliminated the human touch—from the loading dock to the shipping dock.

- **Planning for the Bottom Line**
  Materials Requirements Planning, or MRP, is the force behind the PC's new role in the manufacturing process. *PC World* presents an overview of this trend, highlighting its fiscal and functional implications. We also look at a manufacturing system that is being used for inventory planning.

- **Plus**
  With the proliferation of affordable AT clones, readers want to know what's out there and what's good. *PC World*'s Editors review six generic, mail-order AT clones.

  Also, for those who need help using Framework's spreadsheet, a helpful hands-on assemblage of utilities and FRED programs.

Manufacturing Company, Inc.

The Experts in Accessories

CURTIS

Universal Printer Stand

Save Space, Save Money...Only $19.95

The new PS-1 Universal Printer Stand from Curtis holds any printer, standard carriage or wide, saves valuable work-space, and costs only $19.95. The PS-1 uses no more desk-top space than the printer itself, and provides storage for input paper underneath the printer. Plus, a removable paper tray automatically stacks output.

Besides saving space, the PS-1 holds the printer at a slight pitch, to improve line of sight, saving you neck and eye strain. Give yourself more room to work, and a system setup that's more efficient and organized: The PS-1 Universal Printer Stand from Curtis — the experts in accessories. #PS-1 Retail...$19.95

Curtis products are available nationally from leading Dealers, Distributors, and Retail Chains.

In Canada: Micro-Computer Products, P.O. Box 235, Ajax, ONT, Canada L1S 3C3, (416) 427-6612

For the Curtis dealer nearest you call (603) 924-3823

Fits all printers, standard carriage or wide.

Improves line of sight for portable computers too!

Conveniently stores paper underneath, improves line of sight to printout, removable paper tray catches and folds printouts automatically.

Totally universal. Heavily constructed components, colored and textured to match or complement all microcomputer systems.

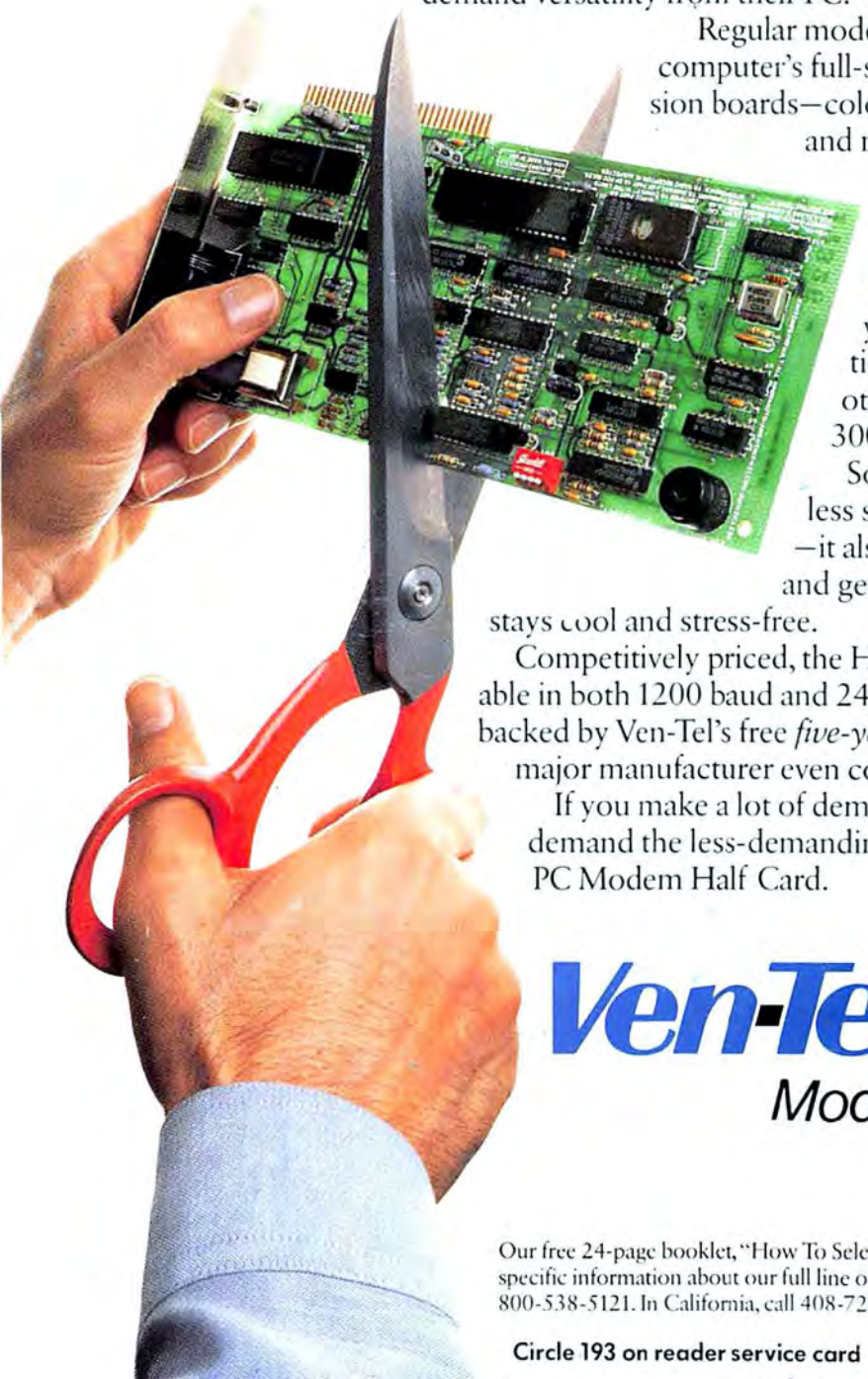
Manufacturing Company, Inc.

CURTIS

305 Union Street, Peterborough, NH 03458

We invented the modem that makes fewer demands on your PC.

The Ven-Tel Half Card™ modem. All the power and speed of our regular modems, but with some major advantages for people who demand versatility from their PC.



Regular modems plug into one of your computer's full-size slots. Just like expansion boards—color boards, graphics cards and memory expanders.

The Ven-Tel Half Card modem is different. It plugs into a short slot, freeing up a long slot so your PC can handle an additional function. And while other modems have about 300 components, ours has 70. So it not only demands less space from your computer—it also demands less power and generates less heat. Your PC stays cool and stress-free.

Competitively priced, the Half Card modem is available in both 1200 baud and 2400 baud speeds. And it's backed by Ven-Tel's free *five-year* warranty. No other major manufacturer even comes close.

If you make a lot of demands on your PC... demand the less-demanding modem: The Ven-Tel PC Modem Half Card.

Ven-Tel
Modems

Our free 24-page booklet, "How To Select The Correct Modem," contains specific information about our full line of modems. To request your copy, call 800-538-5121. In California, call 408-727-5721.

Circle 193 on reader service card